This is an "Agent Orange" page I formatted for Paul Sutton, who was then President of the New Jersey State Council of the Vietnam Veterans of America, and Chairman of the VVA's national Agent Orange and Dioxin Committee. This information has never, to my knowledge, appeared in any VVA publication, nor has it been publicly published elsewhere. Mr. Sutton has since resigned his positions in the New Jersey VVA. This document is not an official publication of the Vietnam Veterans of America, but was formatted by me to appear as if it was -- in the hopes that we could push the VVA to publish the data. Seems this info is still a political hot potato.

Andrew Wilson
UtVet.com editor and publisher
Former Director, Utah VVA Chapter 924

The amounts used are varying for several reasons-- some only include air spraying-- others do not include repeated spray over the same area-- and some include the other locations that were not in Nam--see attached-- when you add all the variables it does total over 22 mil gallons

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EXECUTIVE SUMMARY

THE HERBICIDAL WARFARE PROGRAM IN VIETNAM, 1961 - 1971

Operations Trail Dust/Ranch Hand

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Prefatory Notes:

The military use of herbicides in Vietnam began in 1961, was expanded during 1965 and 1966, and reached a peak from 1967 to 1969. Herbicides were used extensively in Vietnam by the U.S. Air Force's Operation RANCH HAND to defoliate inland hardwood forests, coastal mangrove forests, and cultivated land, by aerial spraying from C-123 cargo/transport aircraft and helicopters. Soldiers also sprayed herbicides on the ground to defoliate the perimeters of base camps and fire bases; this spraying was executed from the rear of trucks and from spray units mounted on the backs of soldiers on foot. Navy riverboats also sprayed herbicides along

riverbanks. The purpose of spraying herbicides was to improve the ability to detect enemy base camps and enemy forces along lines of communication and infiltration routes. Spraying was also used to destroy the crops of the Viet Cong and North Vietnamese.

The code name for the overall herbicide program was TRAIL DUST. The code name RANCH HAND specifically referred to the C-123 herbicide-spraying project.

The different types of herbicide used by U.S. forces in Vietnam were identified by a code name referring to the color of the 4-inch band painted around the 55-gallon drum that contained the chemical. These included Agents Orange, White, Purple, Blue, Pink, and Green. e.g. A 55-gallon drum with an orange band contained 50% n-butyl ester of 2,4-D (2,4-dichlorophenoxyacetic acid) and 50% n-butyl or isooctyl ester of 2,4,5-T (2,4,5-trichlorophenoxyacetic acid).

Agent Orange accounted for over 60% of the total herbicides disseminated over Vietnam (11.7 million gallons of a total 19.4 million gallons).

Orange contained relatively high levels of an exceedingly poisonous contaminant known as "dioxin" or "TCDD" (2,3,7,8-tetrachlorodibenzo-p-dioxin)

Chronology:

1961. Robert S. McNamara was appointed Secretary of Defense by President Kennedy and served until 1968.

1961. Dr. Alain Charles Enthoven (Ph.D., MIT, 1956), while an economist for RAND Corporation 1956-60, was hired by the Office of the Secretary of Defense to be the Director of the newly established Weapon Systems Analysis Directorate.

1961. The situation in Indochina deteriorates. (Cecil, p. 22)

April 12, 1961. Walt W. Rostow, a foreign affairs advisor to President Kennedy, forwarded a memo on Vietnam to the President recommending nine specific courses of action, setting into motion a series of events which led to the decision to send Air Force C-123s to South Vietnam to spray herbicides. The fifth action on the memo recommended a military hardware research and development team go to Vietnam to work with the Chief of the U.S. Military Assistance Advisory Group (MAAG), Army Lieutenant General Lionel C. McGarr, to explore the usefulness of various "techniques and gadgets" then available or under development. Aerial defoliation became one of these unspecified "techniques". (Buckingham pp. 9-10)

Early May 1961. President Kennedy sent Vice-President Lyndon B. Johnson to Saigon to consult with Vietnamese President Diem about future American assistance. One result of this consultation was the establishment of a joint U.S./Vietnamese Combat Development and Test Center (CDTC) in Vietnam, under the direction of the Defense Department's Advanced Research Projects Agency (ARPA). The CDTC was formed to develop new counterinsurgency methods and weapons, and one of its first tasks was to evaluate the use of herbicides to destroy concealing tropical vegetation and enemy food supplies. (Cecil, pp. 22-23)

May 11, 1961. National Security Council meeting, after which the focus of action on border control and the exploitation of technology in counterinsurgency shifted from the White House to subordinate levels of the Administration. (Buckingham, p. 11)

1961. 23-year-old John M. Deutch, upon graduation from MIT with a Bachelor's Degree in Chemical Engineering (B.Ch.E.), was hired by Dr. Enthoven (OSD Director for Weapon Systems Analysis) most likely to provide the OSD staff with expertise concerning chemical defoliation and to coordinate chemical defoliation studies with RAND Corporation.

(This is likely how John Deutch linked up with Dr. James R. Schlesinger who was a senior staff member at RAND from 1963-67. Dr. Schlesinger later served as Assistant Director, OMB; Chairman, Atomic Energy Commission; Director, CIA; Secretary of Defense; and in 1977 as the first Secretary of Energy. Dr. Schlesinger appointed Dr. Deutch to be Director, Office of Energy Research in 1977 and then Under Secretary of Energy in 1979.)

June 1961. The joint U.S./Vietnamese Combat Development and Test Center (CDTC) was formed in Saigon. (Cecil, p. 23)

August 10, 1961. The first defoliation test mission along a road north of Kontum flown by a South Vietnamese Air Force (VNAF) H-34 helicopter equipped with a Helicopter Insecticide Dispersal Apparatus, Liquid (HIDAL) spray system dispersing Dinoxol. (Buckingham, p. 11)

August 24, 1961. The first fixed-wing spray mission flown by a VNAF C-47 dispersing Dinoxol over a four-kilometer stretch of Route 13 about 80 km north of Saigon near the village of Chon Thanh, a target personally selected by South Vietnamese President Diem. (Buckingham, p. 11)

September 23, 1961. A joint State-Defense message stated that emergency actions were needed to support the Diem government and suggested that defoliants for an operational program be included in a list of items to be delivered without delay. (Buckingham, p. 14)

September 29, 1961. President Diem and his advisors met with an American delegation proposing immediate efforts be made to destroy crops before they could be harvested. (Buckingham, p. 13)

November 3, 1961. Memorandum from the Joint Chiefs of Staff to the Secretary of Defense, Robert S. McNamara, recommending implementation of a three-phased defoliation plan. (Buckingham, p. 16)

November 7, 1961. Memorandum from Defense Secretary McNamara to the Chairman of the Joint Chiefs of Staff and the Secretary of the Air Force directing the Air Force "to provide, on a priority basis, the required aircraft, personnel, and chemicals" to attack fast-maturing Viet Cong crops. (Buckingham, p. 16)

December 4, 1961. The Secretary of Defense, Robert S. McNamara, met with the Joint Chiefs of Staff and set December 15th as the target date for beginning defoliation operations. (Buckingham, p. 29)

December 1961. 20,000 gallons of pink and green herbicides and 15,000 pounds of cacodylic acid were already in Saigon. They had been sent for use in a crop destruction operation, which waited for President Kennedy's approval and which could not then be conducted because that year's rice crop had already matured in the target areas. DoD was procuring additional chemicals for use in the defoliation of Viet Cong base areas, border regions, and transportation routes on an expedited basis. (Buckingham, p. 29)

December 15, 1961. The first shipment of chemicals left the docks at Oakland, CA on the S.S. Sooner State - 111,000 gallons of purple and 49,000 gallons of pink. A second shipment later in the month contained an additional 17,000 gallons of purple and 31,000 gallons of pink. (Buckingham, pp. 29-30)

December 16, 1961. Secretary of Defense McNamara held a conference in Hawaii with Pacific area military commanders to examine Operation RANCH HAND preparations and make further decisions affecting the operations. (Buckingham, p. 30)

January 7, 1962. At 9 am, six Ranch Hand C-123s departed Clark Air Force Base in the Philippines and arrived at Tan Son Nhut airport outside Saigon at 4:30 pm. The crews parked the RANCH HAND planes in a secure fenced area on the field, sharing the space normally occupied by President Diem's personal aircraft. (Buckingham, p. 31)

January 8, 1962. The first shipment of chemicals arrived in Saigon at night. Off-loading of the drums began on the 9th.

January 9, 1962. Air Force personnel loaded four drums of Agent Purple (about 220 gallons) on one of the RANCH HAND C-123s. (Buckingham, p. 33)

January 10, 1962. The first RANCH HAND defoliation mission. Less than the full 220 gallons of Agent Purple were sprayed on a target north of Route 15, adjacent to a swath, which a VNAF C-47 had sprayed with pink on December 29, 1961. The effect of the spray was rated as poor, probably because the spray deposit was sub lethal. (Buckingham, p. 33)

Note: More than a decade earlier, the French Foreign Legion had laboriously cleared roadside vegetation by hand, in an unsuccessful attempt to halt ambushes of their military convoys. Now another foreign military power sought the same goal, but with a new military weapon - chemical herbicides. (Cecil, p. 30) The results of the French cutting and burning back of vegetation for 50 yards on either side of the road were still evident along Route 13 in the mid-1960s. (Cecil, p. 190)

See attached statistical summaries by year and chemical agent.

1965. John M. Deutch left OSD and returned to MIT to complete his Ph.D. in Physical Chemistry. 1966 Dissertation title: "Selected Problems in Statistical Mechanics".

October 1967. RAND Corporation issued two reports concluding the crop destruction program:

- had an insignificant effect on Viet Cong consumption of rice,
- had not resulted in any significant food shortages among Viet Cong units,
- had harmed residents in the vicinity of crop destruction targets,
- had alienated the rural South Vietnamese population from the government,
- had aroused much hostility toward the U.S. and its South Vietnamese allies,
- was not considered necessary or useful by the rural population, and
- might well be counterproductive. (Buckingham, p. 133-134)

November 1967. After reviewing RAND's results, Dr. Alain C. Enthoven, the Assistant Secretary of Defense for Systems Analysis, and his staff published their conclusions, which agreed that the existing wholesale crop destruction program was counterproductive because it alienated the affected population without denying food to the Viet Cong. (Buckingham, p. 135)

November 21, 1967. Secretary of Defense McNamara (obviously not pleased with these findings) directed the Joint Chiefs of Staff to review RAND's work. (Buckingham, p. 135)

December 29, 1967. The Joint Chiefs of Staff, in contradiction with RAND's findings and Dr. Enthoven's validation, asserted the published objectives of the crop destruction program as part of the overall economic warfare program were being met; that crop destruction was an important and effective part of the overall effort in South Vietnam; and that no changes in the program were needed. (Buckingham, p. 135)

As if to force "success", over 76% of the total gallons of herbicides sprayed over Vietnam occurred between 1967 and 1969 and repeated sprayings of the same area(s) occurred frequently.

1968. Robert S. McNamara left the Department of Defense.

1969. Slightly over one year after Dr. Enthoven agreed publicly with RAND's conclusions, he left public service permanently. DoD awarded him the Medal for Distinguished Public Service and he returned to RAND as a consultant while serving as vice-president for economic planning for Litton Industries.

October 7, 1970. Mandated by the U.S. Congress, an extensive and "independent" study of the effects of herbicides in South Vietnam was signed into law (Public Law 91-441) by President Nixon. (Buckingham, p. 189)

December 8, 1970. The Department of Defense signed a contract with the National Academy of Sciences (NAS) to provide funds and other support for the "independent" study. Seventeen scientists and thirty consultants comprised the committee. (Buckingham, p. 189)

January 7, 1971. RANCH HAND flew its last three C-123 sorties spraying a crop target in Ninh Thuan province.

October 31, 1971. The last U.S. helicopter herbicide operation was flown.

"Bottom Line":

Between 1961 and 1971, the U.S. sprayed enough herbicides to cover 30,305 square miles or 23.8% of the total area of Vietnam with one spraying.

19,395,369 total gallons sprayed by the U.S. between August 10, 1961 and October 31, 1971 equates to an average of 5,193 gallons per day for 3,735 days.

February 22, 1974. Three years and five months after contracting with DoD to perform an "independent" study, the National Academy of Sciences finally published its report, "The Effects of Herbicides in South Vietnam".

The NAS Committee found:

- no clear evidence of direct damage to human health from herbicides,
- "no conclusive evidence" linking the defoliants with human birth defects, and
- no proof of permanent soil damage. The Committee determined soils were capable of sustaining growth as soon as six weeks after spraying and that a year after spraying the effects on plant growth were "undetectable".

February 24, 1974. Dr. George Kistiakowsky, then a vice-president of the National Academy of Sciences and former science advisor to President Eisenhower, was the only NAS official with integrity enough to publicly criticize and challenge the commission's report. In the Washington Post article "Viet Defoliation Damage Held Serious", Dr. Kistiakowsky claimed the report "seriously underestimated the damage and is too casual about the possible ill effects on humans".

April 1995. Twenty-three and a half years after the last herbicidal mission was flown, former Secretary of Defense Robert S. McNamara, who directed and energized Operation TRAIL DUST from its inception in 1961 through a peak year in 1968, publicly admits that:

- "We were wrong, terribly wrong",
- The American bombings never seriously threatened Hanoi's capacity to wage war,
- American ground operations never established any real, lasting security in the South Vietnamese country-side, and
- The pacification program failed to win many "hearts and minds".

April 17, 1995. Researchers have found that during the spraying of Agent Orange in southern Vietnam, dioxin levels in human tissue were as high as 900 times greater in Vietnamese living in southern Vietnam than those living in northern Vietnam where Agent Orange was not used. Even now, although dioxin levels are at their lowest since the war ended, the study found that dioxin levels are as high as 50 times higher in Vietnamese living in southern Vietnam than those living in northern Vietnam. These findings suggest that citizens in southern Vietnam may be at a greater risk of cancers, adverse reproductive and developmental effects, immune deficiency, and other adverse health effects due to their exposure to Agent Orange. (From Agent Orange and the Vietnamese: The Persistence of Elevated Dioxin Levels in Human Tissue, Dr. Arnold Schecter,

State University of NY Health Science Center) How is it that the National Academy of Sciences can conclude there was no clear evidence of direct damage to human health from herbicides?

In retrospect, RAND's October 1967 reports were precisely correct and Doctors Enthoven and Kistiakowsky deserve the highest reverence for their courage to challenge "the system" in the name of truth.

Epilogue:

In March 1995, President Clinton called for an "independent" study of "Gulf War Syndrome", the health tragedy that has resulted from coalition forces' exposure to chemical warfare agents during the Gulf War. Until May 1995, Dr. John M. Deutch, who was a chemical engineering expert for former Defense Secretary Robert McNamara's staff for the first four years of Operation TRAIL DUST (1961-65), was DoD's key proponent in asserting "there is no clear evidence of any exposure of American soldiers to chemical or biological agents at any time during the Gulf War".

On 11 May 1995, President Clinton elevated Dr. Deutch to Director of Central Intelligence with special Cabinet-level status.

This is irrefutable proof that history does repeat itself.

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STATISTICAL SUMMARY OF HERBICIDAL WARFARE IN VIETNAM

Operation Trail Dust: 10 August 1961 - 31 October 1971 (3,735 days)

SUMMARY BY YEAR

YEAR	TOTAL GALLONS USED	TOTAL ACRES EFFECTED	TOTAL SQ. MILES EFFECTED

1962	17,171	5,724	27
1963	74,760	24,920	117
1964	281,607	93,869	440
1965	664,657	221,552	1,039
1966	2,535,788	845,263	3,962
1967	5,123,353	1,707,784	8,005
1968	5,089,010	1,696,337	7,952
1969	4,558,817	1,519,606	7,123
1970	758,966	252,989	1,186
1971	10,039	3,346	16
Year Unknown	281,201	93,734	439
TOTAL:	**19,395,369**	**6,465,123**	**30,305**

Assumptions and Conversion Factors:

3 gallons of herbicide disseminated per acre

640 acres per square mile

1,920 gallons disseminated per square mile

SUMMARY BY CHEMICAL AGENT
(Herbicide drums were identified by a 4-inch-wide circular band of paint colored in correspondence with these color codes.)

CHEMICAL AGENT	TOTAL GALLONS PROCURED BY DOD	TOTAL GALLONS USED	PERCENT OF TOTAL USED	TOTAL GALLONS REMAINING
Green	8,208	8,208	0.04%	0
Pink	122,792	122,792	0.6%	0
Purple	145,000	145,000	0.7%	0
Blue	2,166,656	2,166,656	11.2%	0
White	5,600,000	5,239,853	27.0%	360,147
Orange	13,927,985	11,712,860	60.4%	2,215,125
TOTAL:	**21,970,641**	**19,395,369**		**2,575,272**

The 15,480 drums of Agent Orange stockpiled at the Naval Construction Battalion Center

(NCBC) in Gulfport, Mississippi were transferred to the Dutch-owned ship the Vulcanus and destroyed between 15-24 July 1977.

The 24,795 drums of Agent Orange stored on Johnston Island were subsequently incinerated on the Vulcanus in two loads.

The last of the herbicide orange once destined for the jungles of Vietnam burned on September 3, 1977.

Data Sources: SIPRI, 1976 and Cecil, 1986.

The following 59 U.S. military bases were suffering from significant water or soil contamination a year ago, according to the Department of Defense's interpretation of its latest hazardous waste survey. DoD officials say not every base suffering such contamination is on the list, because information was not available for all bases. The list is based on the latest status report for DoD's Installation Restoration Program.

The IRP report contains no explanation of the problems at each base, so we asked each service to provide details. The Army did so. The Navy Chief of Information refused to help us gather the information. Air Force Public Affairs could not provide the information by our deadline, but we will publish it as soon as it becomes available. We gathered information on some of these missing bases from EPA and a DoD report to Congress on "Superfund" sites. LIFE IN THE TIMES cannot vouch for the accuracy or completeness of the information that was provided.

Army

Aberdeen Proving Ground, MD
Essentially every land portion of the Edgewood, MD, area (on which a portion of the base is located) is contaminated or potentially contaminated. Monitoring in 1977-78 indicated contamination of surface and ground water. Four standby wells were shut down in 1983 due to detected organic compounds. The base's active drinking water supplies come from two off-post sources. Deer Creek and Winters Run, unaffected by contamination on base.

Fort A.P. Hill, VA
There are three problems. A herbicide contaminated the soil near an old pesticide storage building. The soil has been placed in sealed drums. Second, herbicide and dioxin Contaminated soil and debris are stored at a base warehouse in 33-gallon drums inside sealed 55-gallon drums. A study will be done to recommend an environmentally sound method of permanent disposal. Third, the base plans to remove some 70 tons of soil contaminated by DDT. The base water comes from a deep aquifer and is not contaminated, the Army says.

Fort Belvoir, VA
Several contaminants - benzene, trichloroethylene, chloroform, toluene, ethylbenzene, and 1-2-dichloroethane - have seeped from the Building 324 tank farm into an unnamed creek. None of

these contaminants was detected in surface water at the installation boundary, and no health hazard is apparent, the Army, says. Post drinking water comes from the Fairfax County Water Authority.

Fort Devens, MA
A sanitary landfill that is a potential source of contamination is being closed. It was used as an open burning site, then for incineration of waste and burial of residues. Water quality meets state standards.

Fort Dix, NJ
Nine potentially contaminated sites are known. One, the sanitary landfill, was placed on the National Priority (Superfund) List due to the presence of organic solvents. However, the Army says no significant health hazards have been identified. To avoid any risk, the landfill may be capped with clean soil and vegetated with grass. The other eight sites were identified only recently. Organic solvents and/or petroleum products were located at an old magazine area, a tank farm, a fire station, the golf course, a motor pool, a firing range, a pesticide storage building, and a National Guard facility. Investigation is under way to determine any problems. The sites to not endanger the base water supply according to the Army.

Fort Lewis, WA
There are two problems: One, is Landfill No. 5. Plans call for a landfill liner and leachate collection to preclude ground water contamination. There are also plans for a refuse-fired incinerator to reduce reliance in the landfill. Also trichloroethylene (TCE) has been found in the ground water beneath the Logistics Center. Post drinking water comes from a spring unrelated to that aquifer.

Fort McClellan, AL
Ten old training areas and three former disposal sites have a slight chance of subsurface contamination from mustard agent and its breakdown products and possible byproducts of chemical agent decontamination. Only very small quantities of agent were used and all sites have been closed, decontaminated and fenced. No evidence of any surface or surface water contamination has been found in the past, the Army says. The post receives its water from the city of Anniston.

Redstone Arsenal, AL
A $30 million cleanup was recently completed by Olin Corp, which made DDT in a leased factory that was closed in 1970 for environmental reasons. Manufacturing waste was contaminating soils and streams. DDT was found in the wildlife food chain but not in potable water supplies inside or outside the base. In addition, the presence of PCBs. heavy metals, while phosphorous and other organic compounds is known or suspected. An investigation is under way to determine if they contaminated the active sanitary landfill, a DDT waste landfill, open burning and detonation grounds, and 22 old disposal sites. Also, a $5 million program is in progress to remove all asbestos from post buildings.

Navy

Brunswick NAS, ME

A study is under way to determine contaminants and their migration habits.

Lakehurst Naval Air Engineering Center, NJ
Soil and shallow ground water at the tetraethyl lead disposal site are contaminated, perhaps from aviation fuel. The ground water in some areas is covered with a 6-inch layer of JP-Fuel. Elsewhere, the carcinogen nitronomine may be present. Waste oils, battery acid, and solvents are suspected of having been discharged into some dry wells. The soil stabilization field test received 362 gallons of aniline and 161 of furfural (toxic by ingestion, inhalation, or skin absorption), and ferric choride solution; personnel and animals that come in contact with the soil may be endangered. A landfill received thousands of gallons of hydraulic fluids, five tons of asbestos, and also cutting oils, solvents, sludge, and heavy metals. A site for PCB testing and storage is near the environmentally sensitive Ridgeway Branch. The western portion of the base may be contaminated by ordnance: shells, gas-loaded projectiles, phosgene, phosphorus, mustard agent, explosives, flares, and depth bombs. The shallow aquifer in this area may also be contaminated.

Moffett Field NAS, CA
The major contaminants in the ground water are volatile organic compounds.

Whidbey Island NAS, WA
The ground water could be contaminated. Waste oil, solvents, fuel, and caustic rinse water containing heavy metals have been discharged through the storm sewer system and into Dugella Bay. Waterfowl and fish that feed or live in drainage's may be affected. Subsurface migration at the seaplane base may have affected fish or shellfish in Oak and Crescent Harbors. A backup well at Ault Field is threatened by potential migration of contaminants.

Other Navy bases:

China Lake, CA
Indian Head NOS, MD
Jacksonville NAS, FL
Miramar NAS, CA
Pabmont River NAS, MD
Roosevelt Roads NS, Puerto Rico

Air Force

Castle AFB, CA
On-base drinking water supply has been contaminated with trichloroethylene (TCE). Work is under way to install a new well drawing from a deeper, uncontaminated aquifer.

Dover AFB, DE
Ground is contaminated with arsenic and other metals, and a stream on base is contaminated

with trichloroethylene (TCE). The base well, however, is free of these contaminants. Remedial action has been under way since 1985.

Griffiss AFB, NY
Phenols, ethyl benzene, and benzene have been detected in ground water on base, and toluene in surface water on base.

Hill AFB, UT
Seepage water near two disposal areas contains toxic organic chemicals, such as trichloroethylene (TCE), 1-2 dichloroethane, and 1,1,1 trichlorethane. None of the affected water is used for human consumption. Remedial action to date includes construction of a slurry wall and landfill covers as well as pumping and treating contaminated ground water.

Mather AFB, CA
Water in 36 homes was affected by trichloroethylene (TCE) contamination of a well on base. A new permanent water supply is to be provided to these homes.

McChord AFB, WA
Various chemicals -- methylene chloride, chloroform, benzene, arsenic, chromium, and mercury -- have been detected in test wells and in surface drainage leaving the base. One site is a liquid waste spill next to the wash rack and industrial waste treatment system. Contracted work for the American Lake Gardens Water Supply Project began in 1985; a contractor installed shallow wells and one deep well.

McClellan AFB, CA
An estimated 160 sites have been identified. Contaminants include organic compounds, such as trichloroethylene (TCE), methylene chloride, and 1-1 dichloreythlene. Wells both on and off base that had contaminants exceeding government standards have been shut down. McClellan is considered a leader in cleanup efforts. Completed projects include alternate water supply for off base residents and a ground water containment system and treatment plant.

Norton AFB, CA
Trichloroethylene (TCE) was detected in concentrations exceeding state drinking water standards. All base wells were contaminated to various degrees with silver and tetrachlorethylene (PCE). Closure of a lagoon and sludge removal was begun several years ago.

Robins AFB, GA
Contaminants include halogenated solvents, heavy metals, pesticides (DDT, chordane, etc.), cyanide, and oil products. The toxic organic compounds trichloroethylene (TCE), and tetrachloroethylene (PCE) have been detected in ground water on base. Ground water is not used as drinking water, but the contaminants could eventually appear in surface water.

Tinker AFB, OK
Some base wells were closed due to contamination from chlorinated solvents. Chlorinated solvents were also detected in the aquifer that is the primary water source in the region. Organic compounds have been detected at all sites, though migration is limited. Remedial action begun in

1984 includes capping landfill No. 6, and stopping leaks from underground storage tanks at the fuel farm.

Wright-Patterson AFB, Ohio
Fourteen organic compounds, including trichloroethylene (TCE) and tetrachloroethylene (PCE) in relatively high quantities has been found in wells serving the base. Nearly half the 17 wells have been shut down due to contamination or age. An air stripper has been put on two wells to remove the organics, and installation of two other strippers is planned.

Other Air Force bases:

Beale AFB, CA
Chanute AFB, IL
Charleston AFB, SC
Columbus AFB, MS
Edwards AFB, CA
England AFB, LA
F.E. Warren AFB, WY
George AFB, CA
Hanscorn AFB, MA
Hickam AFB, HI
Kelly AFB, TX
Lowery AFB, CO
Luke AFB, AZ
Kirtland AFB, NM
Langley AFB, VA
MacDill AFB, FL
McGuire AFB, NJ
Moody AFB, GA
Mountain Home AFB, ID
Otis AG Base, MA
Pope AFB, NC
Pease AFB, NH
Plattsburgh AFB, NY
Reese AFB, TX
Seymour Johnson AFB, NC
Shemya, AL
Travis AFB, CA
Vandenburg AFB, CA
Wurtsmith AFB, MI