THE MEDICAL
JOURNAL
US ARMY MEDICAL CENTER OF EXCELLENCE

July–September 2020 PB 8-20-7/8/9

US Army Public Health Center
The First 75 Years

Preventive, Occupational and Environmental Medicine, and Public Health History

UNITED STATES ARMY MEDICAL CENTER OF EXCELLENCE

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THE MEDICAL JOURNAL

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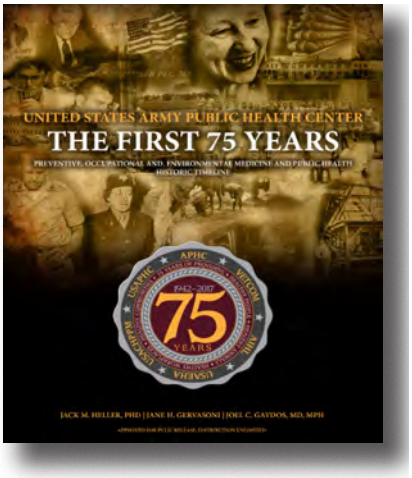

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Introductions

Commanders' Corner

Dennis P. LeMaster

Major General
US Army
Commanding General
US Army Medical Center of Excellence (MEDCoE)

Introduction
Major General Dennis P. LeMaster

Welcoming the return of the quarterly, peer-reviewed publication of *The Medical Journal*, US Army Medical Center of Excellence (MEDCoE) is proud to have such a valuable resource readily available to our training community. Since the journal's inception in 1994, it has not only served as a prominent medium to share original, innovative medical research, history, and lessons learned, but the journal has also served as an essential educational resource for the training community. The journal welcomes engagement and submissions from the force, especially from its training and working medical professionals, so I urge the community to take advantage of this unique relationship.

R. Scott Dingle

Lieutenant General
The Surgeon General of the Army
Commanding General
US Army Medical Command

Introduction
Lieutenant General R. Scott Dingle

As the premiere medical messaging platform for The Surgeon General of the US Army, we welcome back the quarterly publication of *The Medical Journal*, under the US Army Medical Center of Excellence (MEDCoE). The journal serves a global medical professional community, offering peer-reviewed, original medical research, scholarship, and information. Its very mission is to "provide a forum for the presentation and exchange of the most current level of readiness and operational of healthcare, clinical, and medical research information, as well as medically related combat experiences and military medical doctrine development ideas and proposals." We invite the community to engage with and participate in this valuable resource, in our collective effort to remain effective in this ever-changing dynamic of medical readiness and healthcare.

THE FIRST 75 YEARS

Timeline of United States Army Preventive, Occupational and Environmental Medicine, and Public Health History

Jack M. Heller, PhD
Jane H. Gervasoni
Joel C. Gaydos, MD, MPH

For any individual associated with an organization that has a record of significant achievements and meaningful contributions, knowing the history of that organization can foster a sense of identity with the organization in such a way that one not only respects and appreciates the successes of the past but, more importantly, is inspired to emulate the work of those who came before. Developing a deeper understanding of how our predecessors defined their organization, their capabilities and their roles—as well as how they approached and solved problems—can help form a mental perspective that promotes confidence and a structured approach to addressing current daily and strategic challenges.

Since its beginning in 1775, the United States Army has undergone many adjustments within both the military force and the civilian force that supports it, and many of the Army's organizations have been retired, renamed, re-organized or combined to form new organizations. Following World War I, the Historical Section of the United States Army War College began to maintain historical information on Army units. However, existing military organizations bear considerable responsibility for acquiring, maintaining and using historical information relating to their current organization and its lineage.

In 2017, the United States Army Public Health Center (USAPHC) celebrated its 75th Anniversary. The organization was born as the Army Industrial Hygiene Laboratory (AIHL) and was initially established at the School of Hygiene and Public Health, Johns Hopkins University, 615 North Wolfe Street, Baltimore, Maryland, by War Department Memorandum Number S40-6-42, November 12, 1942. In 1945, the AIHL was relocated to Edgewood Arsenal, now the Edgewood Area of Aberdeen Proving Ground, Maryland. About five years later, the AIHL was renamed the Army Environmental Health Laboratory (AEHL), and, in 1960, its name was again changed to the United States Army Environmental Hygiene Agency (USAEHA). In 1994, the USAEHA became the core of the United States Army Center for Health Promotion and Preventive Medicine (USACHPPM). In 2010, USACHPPM became part of the United States Army Public Health Command. In 2015, reorganization placed many elements that had formed the AIHL, AEHL, USAEHA, USACHPPM and the Army Public Health Command in the current Army Public Health Center.

A small number of professional publications have addressed selected historical aspects of the APHC and its predecessor organizations, but a comprehensive historical record has never been compiled. In an attempt to capture important milestones in a format that could be presented in a poster, the following timelines corresponding to APHC's 75-year history were constructed. The timeline project presented here started as an attempt to update and improve upon an existing timeline—covering the time period from years 1775 to 2013—that highlighted the work of the AIHL and its subsequent organizations. The 1775-2013 timeline was sent to selected reviewers with interest in and knowledge about the history of military medicine. The reviewers noted that the 1775-2013 timeline included events in civilian medicine, events in military

Figure 1. Army Industrial Hygiene Laboratory personnel in the Spring of 1949. Front Row: Lt. Albert L. Paul (Optometrist), Cpt. Lee B. Grant (Industrial Medical Officer), Lt. Col. Edward J. Dehne (Chief, Medicine Section), Col. Wesley C. Cox (Chief), Lt. Col. B. Dixon Holland (Assistant Chief), Cpt. Kenneth S. Piggott (Adjutant), Cpt. Carlos E. Newton (Chief). Back Row: Mr. Henry Ackerman (Chemist), Sgt. Seavey (Supply), Mr. Holland B. McClung (Industrial Hygienist), Mr. Walter Halpin (Chemist), Mrs. Reynolds (Stenographer), Mr. Christian F. Berghout (Engineer, Industrial Hygiene), Mrs. Julia M. Ewing (Typist), Dr. Robert H. Duguid (Scientific Director), Mrs. Lancaster (Stenographer), Sgt. Wallace Crosson (Clerk, General), Mrs. Brown (Chemistry Section Assistant), Sgt. Wilmer L. Parrett.

medicine not directly related to the AIHL, as well as events relating to AIHL and its subsequent organizations. The reviewers recommended that the timeline for the AIHL and subsequent organizations be restricted to milestones and significant events directly tied to the organizations of primary interest.

Based upon the comments from the reviewers of the 1775-2013 timeline, this project developed as five separate but related timelines:

1- United States Army Public Health Center–The First 75 Years–Preventive, Occupational & Environmental Medicine and Public Health History.

2- Military Preventive, Occupational & Environmental Medicine and Public Health History.

3- Civilian Preventive, Occupational & Environmental Medicine and Public Health History.

4- Legal & Regulatory Actions - Preventive, Occupational & Environmental Medicine and Public Health History.

5- United States Wars, Military Conflicts and Operations.

With emphasis on the APHC and its 75-year history, available historical reports for the APHC and its predecessor organizations were carefully reviewed to comprehensively capture significant events, achievements and milestones. To assist with placing the events in the centerpiece timeline into broader perspective, selected events in military and civilian Preventive, Occupational & Environmental Medicine and Public Health were placed in the second and third timelines. Timelines 2 and 3 are not intended to present a comprehensive picture of all significant events, achievements and milestones in military and civilian Preventive, Occupational and Environmental Medicine and Public Health. Rather, entries on these two timelines were selected arbitrarily to add perspective to the events portrayed in Timeline 1. The work of the AIHL and subsequent organizations was greatly influenced by legal and regulatory activities and United States Military engagements; with this in mind, Timelines 4 and 5 were added to provide additional reference points.

The development of a visually attractive poster timeline or series of poster timelines were not products of this project. The timelines are presented in narrative fashion, with limited citations to be used by others as a reference and for the construction of poster timelines. Visually attractive timelines were constructed and

displayed for the APHC 75th Anniversary and are located in the APHC archives.[1]

Methods

All annual historical reports in the Army Public Health Center (APHC) archives were reviewed. For the period comprising the years 2003-2008, the APHC's archives contain only one draft report for the entire period. The 2003-2008 draft report was not used in the compilation of this document.

The authors, all with long histories of involvement with APHC and its predecessors, selected events identified as having significant impact on military operations. Administrative changes and implementation of what might be called routine tasks were added only when these were considered necessary to provide perspective on the importance placed on the organization at that time, and how the organization positioned itself to respond to public health and preventive medicine needs.

In some cases, significant events were either not included in the APHC's archived reports or were more well-documented in other sources, including sources available within the open professional literature. These significant events are included with the pertinent references identified.

Timelines

Timeline 1: US Army Public Health Center – The First 75 Years: Preventive, Occupational and Environmental Medicine and Public Health History

1942: Public Law 530 Paves the Way for the Army Industrial Hygiene Laboratory.[2]

Passed by the 77th Congress in April, the provisions of the law and designation by the Secretary of War required the Division of Engineers, Middle Atlantic Division, to make alterations to the premises of the Johns Hopkins University for the Army Industrial Hygiene Laboratory, for military purposes necessary for the continuation of the War.

1942: U.S. Army Industrial Hygiene Laboratory (AIHL) Is Established in Baltimore.[3, 4]

The U.S. Army Industrial Hygiene Laboratory (AIHL) was established in the School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Maryland, in November. With a staff of three and an annual budget of $3,000, its mission was to support occupational health in the military industrial base. This was the first iteration of what is now the U.S. Army Public Health Center (APHC).

1943: The War Department Establishes the Army Industrial Medical Program.[2]

Circular Number 59, War Department, Washington, DC, February 24, 1943, required the program due to the large number of industrial facilities the Army owned and operated. These employed several hundred thousand personnel for whom the Army was obligated to furnish safe and hygienic working conditions and maintain an adequate industrial medical service. These responsibilities fell to the Army Surgeon General, and the Army Industrial Hygiene Laboratory was to provide many of the required services.

1945: The Army Industrial Hygiene Laboratory Is Recommended for Inactivation.[2]

In September, following the end of World War II, the Commander of the Army Industrial Hygiene Laboratory recommended inactivation of the organization due to a lack of requirements for services in the future that would justify continuation of the laboratory.

1945: Army Industrial Hygiene Laboratory Moves to Edegewood, Maryland.[2]

The Army Industrial Hygiene Laboratory was not inactivated but was transferred to Building 330 at what was then known as the Chemical Warfare Center, Edgewood Arsenal, Maryland.

1946: Occupational Vision Programs Started at Depots and Arsenals.[5,6]

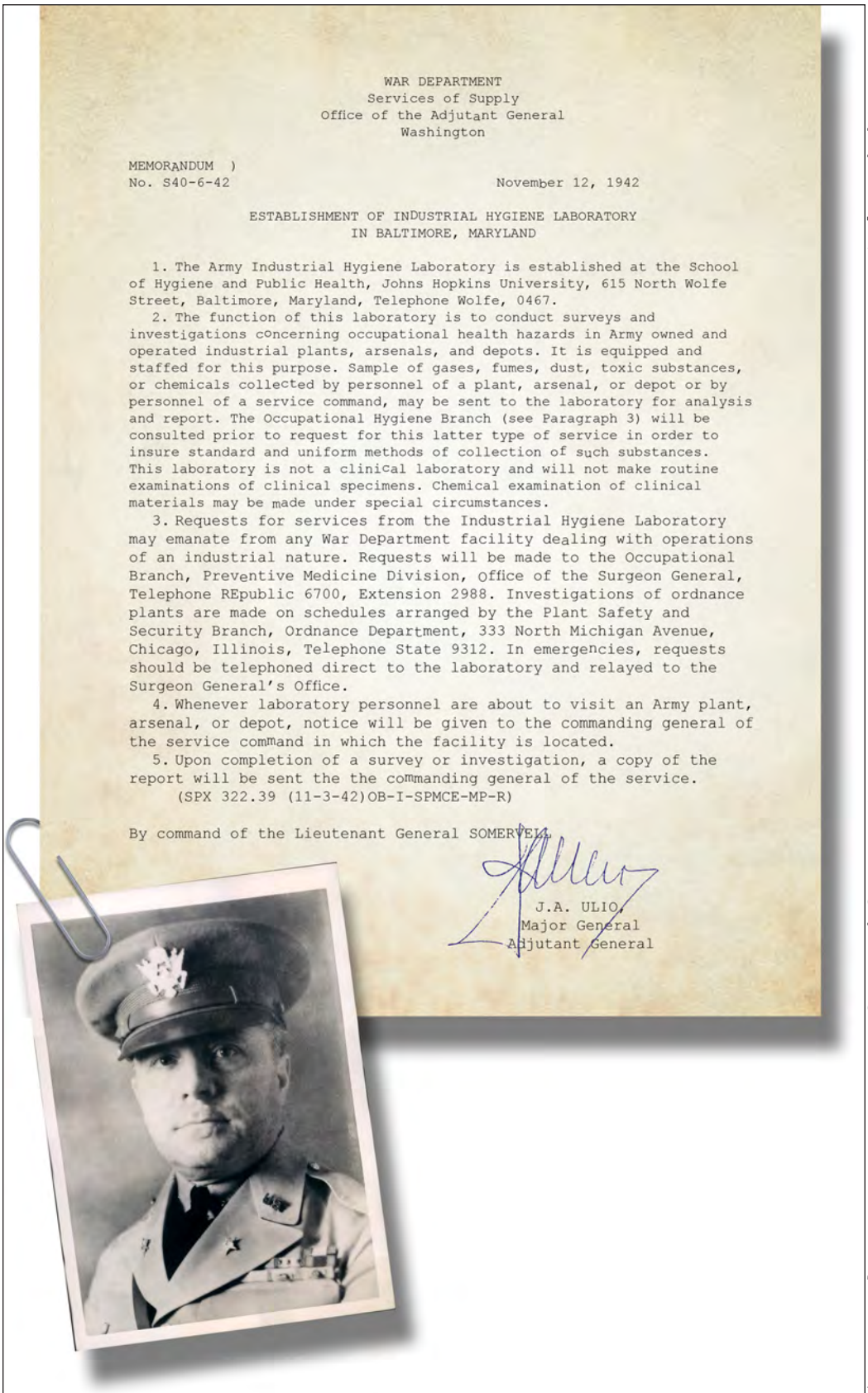
Occupational Vision Programs for Army civilian employees were developed by Army Industrial Hygiene Laboratory personnel. By 1953, 19 Army installations and 90,000 civilian employees were in a program.

1946: Army Industrial Hygiene Laboratory Recommended for Relocation.[2]

The Director, Control Division, Army Surgeon General's Office, recommended in May that the Army Industrial Hygiene Laboratory and all its functions be transferred to the Army Medical Center, Washington, DC. The Commander of the laboratory concurred in the recommendation, but the relocation did not occur.

1946: Congress Mandates Health Programs for Government Employees.[2]

Public Law 658, passed by the 79th Congress in August, required health programs for Government Employees and required the Office of the Army Surgeon General to carry forward the Army Industrial Hygiene Program, conducting research and plans for the integration of Public Law 658 in the program of public



WAR DEPARTMENT
Services of Supply
Office of the Adjutant General
Washington

MEMORANDUM)
No. S40-6-42 November 12, 1942

ESTABLISHMENT OF INDUSTRIAL HYGIENE LABORATORY
IN BALTIMORE, MARYLAND

1. The Army Industrial Hygiene Laboratory is established at the School of Hygiene and Public Health, Johns Hopkins University, 615 North Wolfe Street, Baltimore, Maryland, Telephone Wolfe, 0467.

2. The function of this laboratory is to conduct surveys and investigations concerning occupational health hazards in Army owned and operated industrial plants, arsenals, and depots. It is equipped and staffed for this purpose. Sample of gases, fumes, dust, toxic substances, or chemicals collected by personnel of a plant, arsenal, or depot or by personnel of a service command, may be sent to the laboratory for analysis and report. The Occupational Hygiene Branch (see Paragraph 3) will be consulted prior to request for this latter type of service in order to insure standard and uniform methods of collection of such substances. This laboratory is not a clinical laboratory and will not make routine examinations of clinical specimens. Chemical examination of clinical materials may be made under special circumstances.

3. Requests for services from the Industrial Hygiene Laboratory may emanate from any War Department facility dealing with operations of an industrial nature. Requests will be made to the Occupational Branch, Preventive Medicine Division, Office of the Surgeon General, Telephone REpublic 6700, Extension 2988. Investigations of ordnance plants are made on schedules arranged by the Plant Safety and Security Branch, Ordnance Department, 333 North Michigan Avenue, Chicago, Illinois, Telephone State 9312. In emergencies, requests should be telephoned direct to the laboratory and relayed to the Surgeon General's Office.

4. Whenever laboratory personnel are about to visit an Army plant, arsenal, or depot, notice will be given to the commanding general of the service command in which the facility is located.

5. Upon completion of a survey or investigation, a copy of the report will be sent the the commanding general of the service.

(SPX 322.39 (11-3-42)OB-I-SPMCE-MP-R)

By command of the Lieutenant General SOMERVELL:

J.A. ULIO,
Major General
Adjutant General

Figure 2. Army Industrial Hygiene Laboratory (AIHL) Is established in Baltimore, Maryland.

health for all civilian employees of the War Department.

1948: Army Industrial Hygiene Laboratory Leads in Employee Health Programs.[7]

The head of the AIHL was designated as Consultant to the Surgeon General on Industrial Health and Hygiene for Public Law 658 Health Programs for Government Employees. The Laboratory was given responsibility for the technical administration of the Health Services Program/Army Industrial Medicine Program, including management of statistical information and quarterly reports from the installations, and technical administration.

1948: Army Industrial Hygiene Laboratory Design Section Made Recommendations for the Elimination of Hazards from Low Concentrations of Mustard Gas at Chemical Depots.[7]

The AIHL Design Section reviewed plans and made recommendations for the total enclosure of systems at chemical depots to eliminate exposures and hazards during industrial processes. The scientific director represented the AIHL Medicine Section at a conference at Huntsville Arsenal, Alabama, relative to the effects of

exposure to minimal amounts of mustard gas in employees at chemical manufacturing plants. Clinical investigations of symptoms manifested by the employees who were exposed to low concentrations of mustard gas over long periods of employment indicated that exposures of this type result in lung pathology and physical disability.

1949: Army Industrial Hygiene Laboratory Does Toxicity Skin Testing.[8]

About 15,000 skin patches were applied to approximately 1,700 human test subjects. The skin tests were conducted to obtain information on military products to make recommendations as to their acceptability, from a toxicity standpoint, for their proposed uses. The skin patch tests were performed on mostly civilian employees who volunteered.

1949: Army Industrial Hygiene Laboratory (AIHL) Environmental Sanitation Section Initiated a Study of the Trade Waste Problems at Army and Air Force Industrial Facilities.[8]

With the new Federal Stream Pollution Control Act and many states enacting more stringent stream pollution standards, the AIHL, in conjunction with other departments, initiated a study of how to deal with trade waste problems at Army and Air Force industrial facilities. To facilitate this effort, the chief of the Environmental Sanitation section attended a nine-week training course in stream pollution abatement programs at the Environmental Health Center, Public Health Service, Cincinnati, Ohio.

1950: AIHL Re-Designated as the US Army Environmental Health Laboratory (AEHL).[3]

The Army Industrial Hygiene Laboratory name was changed to the US Army Environmental Health Laboratory. Increasing emphasis on environmental cleanup is believed to have played a role in the name change.

1950: AEHL Functions Increased as a Result of Public Law 80-845 and Executive Order 10014 Governing the Control of Interstate and Intrastate Water Pollution.[9]

Laboratory functions and responsibilities increased in response to new federal, state, and local water pollution regulations focusing on industrial waste and nationwide air pollution controls. In addition, the Laboratory retained responsibility for yearly inspections of 105 installation plants, to include formal reports with conclusions and recommendations. The AEHL Medical Division was responsible for overseeing and summarizing worker health at the 105 plants on a quarterly basis.

1951: AEHL Environmental Sanitation Division Takes a Leading Role in Research on Treating the Waste Water Problem Resulting from the Manufacture of TNT.[10]

As a result of the large quantities of 2,4,6-Trinitrotoluene (TNT) that were manufactured, a "red water" waste was created. The "red water" waste was toxic to fish and wildlife. AEHL studied the problem from the standpoint of treatment of the waste produced at the time. To assess possible treatment methods, research work was initiated by the AEHL Environmental Sanitation Division, in cooperation with George Washington University, Washington, DC, New York University, New York, NY, and others.

1952: AEHL Detachment Number One Orlando, Florida Organized and Staffed.[11]

The 9928th Technical Service Unit, Detachment Number One, AEHL was organized as a Class II Activity at Orlando, Florida. The unit was staffed by AEHL personnel with the primary mission of toxicological screening of candidate chemical formulations proposed for use as insect repellent skin lotions, clothing and equipment impregnants, and insecticides.

1953: AEHL Conducts Studies Assessing the Effects of Cold and Heat on Human Performance and Pathogenic Bacteria Survival.[12]

In coordination with the Army Medical Research and Development Board, the Armed Forces Epidemiological Board, the Preventive Medicine Division, Office of the Army Surgeon General, and the Harvard School of Public Health, AEHL conducted studies at Churchill, Manitoba, Canada, and Yuma Test Station, Arizona, to determine the effects of cold and heat on various human performance factors and other health related

Figure 3. US Army Industrial Hygiene Laboratory.

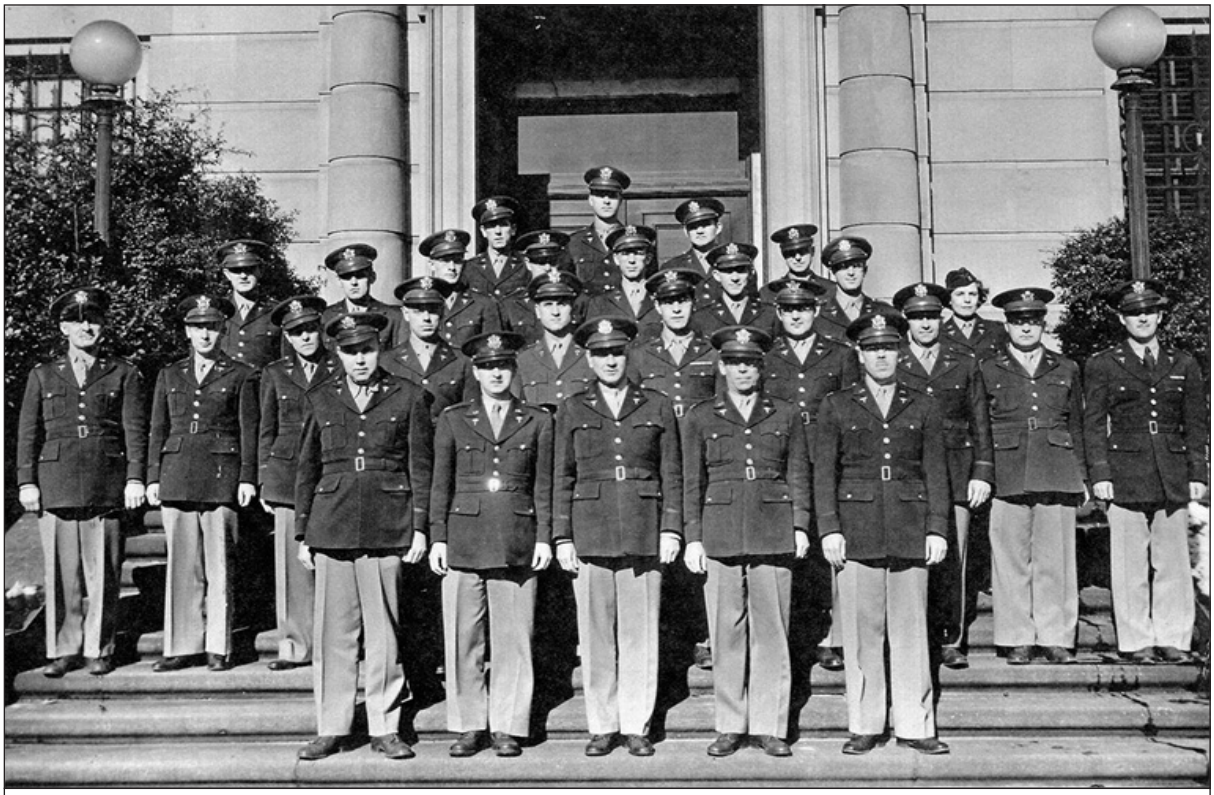


Figure 4, Army Industrial Hygiene Laboratory personnel on the steps of the Johns Hopkins School of Hygiene and Public Health just before the move to Edgewood, Maryland.

issues affected by heat and cold, such as pathogenic bacteria survival.

1954: Detachment Number One, the Only Sub-Unit of the Laboratory, Was Discontinued.[13]

Started in 1952, Detachment Number One, the only sub-unit of the laboratory, stationed at Orlando, Florida, was discontinued 31 August 1954, and the functions of the sub-unit were transferred to the parent unit.

1954: AEHL Conducted Studies on M-1960 Insect Repellent at Stateville, Illinois, Prison.[13]

A large study of the effects of prolonged wearing of clothing impregnated with M-1960 insect repellent, which was developed in 1953 by the AEHL Occupational Health Division, was successfully conducted on male prisoners at Stateville Prison, Illinois, in the spring of 1954.

1955: AEHL Subitted Recommendations to the Surgeon General to Modify AEHL.[14]

The recommendations included (1) transfer the administrative and supervisory functions for the preventive medicine health services for federal civilian employees to AEHL; (2) devote maximum energy to inspection, survey, testing, reporting and continuing consultation to the installations that have conditions presenting occupational health hazards; (3) as the AEHL emphasis on the preventive medicine federal health program for civilian employees decreases, emphasize and expand AEHL service to military installations. The recommendations were accepted and implemented.

1955: Recommendation Made to the Surgeon General to Relocate the Laboratory.[14]

A recommendation was made by an ad hoc committee for the Army Environmental Health Laboratory to relocate the laboratory by providing accommodations for it in the proposed new laboratory building to be constructed at Forest Glen, Maryland. AEHL was still being considered in the planning for the proposed new laboratory as of 4 April 1956, but the move did not occur.

1956: AEHL Toxicology Branch Investigates Important Candidate Insect Repellent.[15]

Toxicological investigations on a candidate insect repellent, N, N-diethy1-m-toluamide (DEET), of major importance to the Armed Forces, were continued using a 90-95% pure chemical. A number of different studies

using different formulations and routes of exposure were conducted in 1956, with plans to continue testing into 1957. An interim report of these studies was presented to the Armed Forces Pest Control Board.

1960: AEHL Renamed US Army Environmental Hygiene Agency (USAEHA).[3]

The motivating factor for the name change could not be identified.

1960: US Army Occupational Medicine Residency Starts at AEHA.[16]

This Occupational and Environmental Medicine Residency training program was started at AEHA for uniformed physicians and served the Army and other uniformed services until 1996.

1960: USAEHA Greatly Increases Support to the Army Chemical Corps Demilitarization and Production Facilities Waste Management and Treatment Efforts.[17]

Studies were conducted at Rocky Mountain Arsenal (RMA), Colorado, and Black Hills Ordnance Depot, South Dakota. The Study at RMA was a major sampling effort to characterize the waste streams from production and demilitarization facilities that were causing ground water contamination off the installation as a result of disposal practices involving a 96-acre asphalt membrane sealed reservoir (Reservoir F, also called Lake F and Basin F) used for disposal by evaporation.

1961: Pesticide Testing Memorandum Signed by the Army Surgeon General, the Armed Forces Pest Control Board and, the US Department of Agriculture.[18]

The memorandum outlined procedures to be followed to coordinate the biological testing of pesticides by the U.S. Department of Agriculture that were of interest to the Department of Defense, and the toxicological evaluation program for those pesticides conducted by the USAEHA.

1962: At the Request of the Chemical Corps Chief, the Surgeon General Authorized Studies and Evaluations by USAEHA of Waste Treatment at Chemical Corps Installations.[19]

Waste evaluations were conducted in 1962 at Edgewood Arsenal, Maryland, and Newport Chemical Plant, Indiana. A preliminary visit was also made to Pine Bluff Arsenal, Arkansas, and plans were initiated for a study of that installation to be made in 1963. In addition, the longstanding ground water contamination problem at Rocky Mountain Arsenal, Colorado, continued to receive attention.

Figure 5. Army Industrial Health Laboratory re-designated as the US Army Environmental Health Laboratory.

1962: USAEHA Placed Increased Emphasis on Waste-Disposal Problems Related to Advancing Military Technologies, Particularly Those Associated with Biological and Chemical Weapons, and Missile Operations.[19]

Due to increased federal and state regulation and emphasis, and the increasing number of concerns being identified at military industrial facilities impacting ground water and drinking water reservoirs, more of USAEHA efforts in regard to training, personnel recruitment and mission emphases were being put toward environmental quality and related health impacts. This effort also included surveys and studies by all divisions of the USAEHA to prevent negative health impacts or environmental contamination from occurring. For example, at the request of the Commanding General, US Army Air Defense Command, a study was conducted by the Radiological Hygiene Division of microwave and ionizing radiation hazards associated with the AN/FPS-71 Radar undergoing acceptance tests at Fort Bliss, Texas. This was done to identify and mitigate exposures before health affects occurred.

1964: New Mission Implemented to Conduct Annual Reviews of Army Area Environmental Health Engineering Services.[20]

The first review for this new mission, assigned in 1963, was conducted at the Sixth US Army Medical Laboratory and resulted in recommendations to The Surgeon General relative to scope, manning, resources, organization and administration of services. Work was initiated on developing specific technical guidance for these services, and documents were completed and forwarded on equipment, sampling techniques and calibration of airflow meters to assure an integrated program. A conference was also held with representatives of the Second US Army Medical Laboratory, which initiated a similar service in July 1964.

1964: Headquarters, Eegewood Arsenal, Requested USAEHA Assistance in Characterizing Waterborne Industrial Wastes Generated by All Activities at Rocky Mountain Arsenal (RMA), Colorado, and in Evaluating the Existing Industrial Waste Disposal Facilities.[20]

This study was a continuation of the work started at RMA in 1960 involving many of the same issues and facilities. In addition to waste characterization, this study would also involve studying the aerosol dispersion from the spray evaporation raft on Lake F, offsetting the increasing volume of waste entering Lake F, and performing exploratory treatability studies on Lake F waste.

Figure 6. US Army Environmental Health Laboratory (USAEHL) is renamed US Army Environmental Hygiene Agency (USAEHA) in 1960.

1966: Surgeon General of the Army and Director, Defense Supply Agency (DSA), Agree USAEHA Will Provide Services for DSA.[21]

The agreement called for USAEHA to provide services on a reimbursable basis. Services included, but were not be limited to routine and special industrial and radiological hygiene surveys; investigations and surveys of toxicological problems; sanitary engineering surveys; initiating and providing conservation programs in preventive and occupational medicine, occupational health nursing, toxicology, sanitary and industrial hygiene engineering, radiological hygiene, industrial hygiene chemistry, and entomology; and furnishing appropriate introductory training in industrial hygiene for safety personnel upon request.

1966: Environmental Pollustion Mission of the Agency Extended for Air and Water.[21]

Change 2 to Army Regulation 40-4, Army Medical Service Facilities, 10 August 1966, expanded the USAEHA mission. To meet the requirements of the extended mission in the areas of air and water pollution, an Air Pollution Engineering Division (APED) was established on 8 April 1966, with augmentation of the existing water pollution program. Executive Order 11282, Control of Air Pollution from Federal Facilities created a major demand for air pollution control services, along with increasing public awareness. In its first partial year of existence the APED accomplished two major projects; a three-week air monitoring program for oxidants and organic pesticides at RMA and an inventory of air pollution sources at Army installations were completed and published.

1967: Wesley C. Cox Building Becomes USAEHA Headquarters and Principal Labaoratory.[22,23]

The $3.2 million Wesley C. Cox Building (Edgewood Arsenal, Maryland, Building 2100) was named in

memory of the Commander of the predecessor organizations of USAEHA from 1946 to 1953, an accomplished Preventive Medicine physician who died in 1953. The building was dedicated on October 3, 1967, by Colonel Cox's widow; Lieutenant General Leonard D. Heaton, the Army Surgeon General; Major General Phillip W. Mallory, Director of the Walter Reed Army Medical Center; Brigadier General William A. Hamrick, Chief of the Army Medical Service Corps; Colonel Ingalls H. Simmons, Commander of AEHA; Colonel Herschel E. Griffin, Chief of the Preventive Medicine Division, Office of the Surgeon General; and Colonel Walter J. Davies, acting Commander of Edgewood Arsenal.

1967: Electronics Division of USAEHA Radiation Services Directorate Experienced Dramatic Increase in Workload.[24]

The workload increase reflected the deployment of large numbers of laser and microwave devices. By agreement, the Division performed all laser hazards surveys for the National Aeronautics and Space Administration (NASA), and at the request of the US Army Satellite-Communications Agency (SATCON), the Division was engaged in the evaluation of microwave hazards from these systems worldwide.

1968: USAEHA Air Pollution Engineering and Sanitary Engineering Divisions Acquire Mobile Laboratory and Monitoring Vans.[25]

The vans were intended to assist with the increasing environmental pollution monitoring and control missions assigned to USAEHA. The Sanitary Engineering Division received a second mobile laboratory, a water pollution monitoring van, and special equipment to include automatic chemical analyses equipment, a central control unit, a teletypewriter for continuous physical parameter monitoring, recording equipment, and an atomic absorption spectrophotometer. The Air Pollution Engineering Division acquired a mobile air-sampling network consisting of a 32-foot van housing a control monitoring station, a data acquisition system, a paper tape punch, a chemical laboratory bench, and five monitoring substations.

1969: Bio-Acoustics Division (BAD) Established at USAEHA.[26]

The first military audiologist was assigned to USAEHA, and the Bio-Accoustics Division (BAD) provided expertise on the medical, engineering, and administrative aspects of hearing conservation.

1969: USAEHA Air Pollution Engineering Division Established a Permanent Air Sampling Network at Rocky Mountain Arsenal.[27]

The purpose of the permanent air sampling network was to monitor the air quality at the arsenal boundary prior to and during the demilitarization of chemical munitions. The network included nine sampling stations composed of small camping trailers which housed the sampling equipment and recorders. In addition to measurement of air quality, wind direction and speed were measured at each location.

1970: Executive Order 11507 Significantly Impacts the USAEHA Mission.[28]

Executive Order 11507, Prevention, Control and Abatement of Air and Water Pollution at Federal Facilities, 4 February 1970, had a major impact on USAEHA mission priorities, equipment purchases, and personnel allocations. Emphasis was placed on industrial waste water problems at US Army Missile and Munitions Command facilities. Air Pollution Engineering Division personnel provided comprehensive consulting and survey services to define and control anticipated air pollutants originating from the demilitarization of chemical and biological munitions. These services included consultation on the installation of an alarm system and on automation of the air monitoring network at Rocky Mountain Arsenal; methods for conducting validation tests for antiballistic missile system diesel engines; establishment of air monitoring networks at Tooele Army Depot, Utah and Pine Bluff Arsenal, Arkansas; and atmospheric sampling conducted to determine background, ambient concentrations of nitrogen dioxide, sulfur dioxide, and suspended particulate prior to start-up of a new, continuous TNT production plant at Newport Army Ammunition Plant, Indiana.

1971: A Temporary Office, Special Assistant to the Commanding Officer for Research and Development Activities, Established at USAEHA.[29]

Under guidance provided by the Office of The Surgeon General and the Commanding General, U.S. Army Medical Research and Development Command (USAMRDC), Fort Detrick, Maryland, this new unit was established under the command and control of USAMRDC. Its mission was to support broad-based research and development in the area of Army medical environmental engineering.

1971: Two New Environmental Monitoring Initiatives Planned for USAEHA.[29]

The Entomological Sciences and Pesticide Division was directed to develop, initiate and conduct by 1973, an Army-wide pesticide and polychlorinated phenyl (PCB) monitoring program to monitor pesticide and

PCB levels on Army installations in the continental United States (CONUS), to include collecting and analyzing the samples and developing many of the analytical methods required. Water Quality Engineering Division recommended establishing an expanded drinking water quality surveillance program. This recommendation gained wide acceptance during the year. At year's end, plans were well under way to implement such a program, to include some 30 additional parameters of public health significance, throughout CONUS, the Pacific Theater, and Panama in 1972 as a cooperative effort between the Agency and the Environmental Health and Engineering Services (EHES) of the Army Area Medical Laboratories.

1971: Department of Defense Approved the Agency's Environmental Pollution Program Change Request (PCR) for Additional Personnel.[29]

During the year, the Department of Defense approved the PCR for an additional 68 civilian personnel in fiscal year (FY) 1973, 13 personnel in FY 1974, and 2 personnel in FY 1975. This necessitated further major revisions of the mission and organizational structure of the Environmental Services Directorate. Plans for implementing the reorganization were developed in detail for implementation in 1972.

1971: Noise-Induced Hearing Loss Is the Most Common Disability In the US Army.[30.31.32]

USAEHA scientists collaborated with The Army Audiology and Speech Center, Walter Reed Army Medical Center, Washington, DC, to conduct a study that established noise-induced hearing loss as the most common disability in the US Army.

1972: Examining and Entrance Station Supplying Recruits for a Military at War Closed.[33]

In September 1972, during the Vietnam War, the examining and entrance station supplying midwestern recruits closed due to an alleged hepatitis outbreak. Army Environmental Hygiene Agency and other investigators determined the observed liver abnormalities were associated with exposure to chemicals used in a photocopying process. Work processes were modified, and within a few days the station returned to full operating capacity.

1972: USAEHA Major Reorganization Forms the Directorate of Laboratory Services, Resulting in a Total of Four Directorates.[34]

On 3 January, the agency was reorganized into four directorates: Occupational Health Directorate, Directorate of Environmental Quality, Directorate of Radiation and Environmental Sciences, and Directorate of Laboratory Services. The most significant change was the formation of the new Directorate of Laboratory Services that placed all of the analytical, biological, and radiological chemistry capabilities, formerly scattered throughout the divisions of the agency, in this new directorate.

1973: USAEHA Became a Subordinate Command of US Army Health Services Command.[35]

On 1 April 1973, the direct command jurisdiction over the agency was transferred from The Surgeon General, to the newly created Health Services Command, Fort Sam Houston, Texas.

1973: USAEHA Scientists Help Craft the First Total Army Acoustical Design Standard.[36.37]

The US Army Human Engineering Laboratories (HEL), Aberdeen Proving Ground, Maryland, led development of an acoustical design standard for Army materiel. However, confusion resulted from differences in noise limits in Army medical documents and HEL documents. The March 1973, Military Standard, MIL-STD-1474(MI), became the first design standard for noise in which all Army review activities concurred.

1973: USAEHA Provided Support to the Army's Chemical Demilitarization Program, Particularly at Rocky Mountain Arsenal (RMA).[35]

Air Pollution Engineering Division personnel made 28 consultant trips to RMA to assure that demilitarization operations were environmentally safe. These consultations were integrated with emission and air quality studies and included evaluations of Mustard and the M-34 Spray Dryer; Combustion Gas Abatement System for the Demilitarization of Mustard; and, Demilitarization of M-34 BG Cluster Bombs. Many other divisions in the Agency also supported chemical demilitarization activities at RMA and other sites, including the Chemical Agent Munitions Disposal System (CAMDS), Tooele Army Depot, Utah.

1974: Regional Laboratories Come under Army Environmental Hygiene Agency[38]

In February, the Office of Director, Regional Activities, was established to develop plans to transfer the mission responsibility for the Health and Environment Program from the CONUS US Army Medical Laboratories to USAEHA and to provide administrative supervision and operational coordination of Regional Division activities. This transfer was effective on 1 October and the following USAEHA Regional Divisions were established: Fort George G. Meade, Maryland; Fort McPherson, Georgia; Fort Sam Houston, Texas; Fort Baker, California, and Saint Louis, Missouri.

1974: USAEHA Undergoes Personnel and Mission Growth as a Result of New Environmental and Occupational Health Regulations.[38]

Between 1971 and 1974, USAEHA personnel strength increased from 171 to 409 in direct response to the following new or amended Federal regulations; the Occupational Safety and Health Act, Clean Air Act (CAA) of 1970, Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act), Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), Noise Pollution and Abatement Act of 1972, and the anticipated Resource Conservation and Recovery Act (RCRA). The additional personnel were required to support the new health and environmental monitoring and pollution control requirements these new regulations required of Army installations and commands.

1974: USAEHA Receives Meritorious Achievement Award From the American Conference of Governmental Industrial Hygienists (ACGIH) for Outstanding Contributions in the Field of Industrial Hygiene.[38]

In addition, to the Meritorious Achievement Award, certificates of achievement from ACGIH were given to several employees for their individual contributions to the field of industrial hygiene conducted during the previous 30 years.

1975: USAEHA Reorganizes Regional Divisions.[39]

On 1 July, the following actions were directed: USAEHA Regional Division West, Fitzsimons Army Medical Center, Denver, Colorado, was established; USAEHA Regional Division-Saint Louis, Missouri, was discontinued; USAEHA Regional Division - Fort McPherson, Georgia, was renamed USAEHA Regional Division-South and USAEHA Regional Division - Fort George G. Meade, Maryland, was renamed USAEHA Regional Division - North. On 1 October, USAEHA Regional Division - Fort Sam Houston, Texas, was discontinued. Action continued to phase down the Regional Division, Fort Baker, California, with the goal of discontinuing it upon the attainment of full operational capability at Regional Division - West.

1975: Requests for Support from USAEHA Technical Directorates Increased as the Number and Complexity of Environmental and Occupational Health Regulations Increased.[39]

The demilitarization of chemical materiel continued to receive emphasis. Support was provided in evaluation of ambient air levels, atmospheric emissions, effectiveness of air pollution controls, in-plant monitoring, ventilation, protection of personnel, and medical surveillance, Divisions of USAEHA involved in the support were Air Pollution Engineering, Solid Waste Management, Water Quality Engineering, Bio-Acoustics, Industrial Hygiene, Occupational Medicine, Health Physics, Environmental Chemistry, Analytical Reference, and Quality Assurance and Toxicology. Technical guidance was provided to the Project Manager for Chemical Demilitarization and Installation Restoration. The Installation Restoration Program started to require significant resources from the Directorate of Environmental Quality. Other organizations requiring increased support were Armed Forces Examining and Entrance Stations from Bio-Acoustics Division, and Defense Supply Agency, US Army Materiel Command

and Health Services Command (HSC) from the Industrial Hygiene Division. HSC required development of an environmental health and safety program for all activities and installations.

1976: USAEHA Missions Expanded with Development of Computerized Systems, Increased Support for Environmental Impact Assessments and Statements (EIA/EIS), and Persistent Need for Major Support to Chemical Demilitarization Activities.[40]

Computerized systems included (1) an industrial hygiene hazard inventory program using a uniform system to facilitate compliance with Army Regulation 40-5, Health and Environment, which required an inventory of operations or activities of occupational health significance; (2) a pesticides "hotline" in the Pest Management and Pesticide Monitoring Division to provide current information to military activities on registration, labeling, and specifications; and (3) a plague surveillance plan for US Army installations in the Western United States. Major support to the Chemical Demilitarization Program continued with the successful completion of a three-year effort to dispose of more than 21,000 M-34 nerve agent cluster bombs at Rocky Mountain Arsenal, Colorado, and approximately 78,000 pounds of the nerve agent Sarin (GB) contained in Ml90 (Honest John) Warheads, Ml39 bomblets, and about 900 Weteye bombs, and the transferring of approximately two million pounds of phosgene from storage containers into Department of Transportation approved containers at Rocky Mountain Arsenal. Support was also provided to ensure the safe operation of the Chemical Agent Munitions Disposal System (CAMDS), Tooele Army Depot and Dugway Proving Ground, Utah. Environmental impact assessments/environmental impact statements (EIA/EIS) support involved collecting and reviewing available information relative to air and water quality, environmental noise, solid waste and hazardous material management, ecology, geohydrology, and pesticide operations.

1977: USAEHA Commander Implemented a Policy of Management by Mission Programs.[41]

The commander implemented a policy of management by mission program which led to the allocation of agency resources to 37 direct mission programs and the supporting administrative functions.

1977: USAEHA Modifies Mission Focus to Deal with New Health Questions, Regulatory Demands, and Technological Advances in Weapons and Military Equipment.[41]

USAEHA Environmental Medicine physicians, engineers and scientists had to deal with concerns about the long-term effect of defoliant chemicals on Vietnam veterans and evaluation of the health and environmental impact of depleted uranium used by the military. As encroachment around Army installations continued, the USAEHA Environmental Noise Assessment and Abatement Program prepared for an increase in the number of requests for consultation. In the Directorate of Environmental Quality, the National Pollution Discharge Elimination System (NPDES) Program, Wastewater Pollution Abatement Program and Air Pollution Abatement Program assisted with responding to new and amended Federal and state regulations, to include (a) providing review and advice or assistance to installation commanders on technical matters pertaining to NPDES permits and maintaining a database of all permits; (b) evaluating installation Spill Prevention Control and Countermeasures Plans (SPCCP) and Installation Spill Contingency Plans (ISCP) from an environmental sufficiency standpoint to ensure compliance with oil and hazardous substances spill prevention regulations for each facility with more than a nominal amount of stored oil or hazardous substances; (c) evaluating the adequacy and effectiveness of Army installation air pollution abatement programs and providing assistance to installations in the attainment and maintenance of program requirements to comply with the Clean Air Act Amendments since Federal facilities could now be required to open their facilities to State inspection and had to comply with all State and local regulatory agency procedural requirements pertaining to air pollution control; and, (d) expansion of the Installation Restoration Program, to include the evaluation and control of contaminants at installations that were closing or had pollutants migrating off the installation. The Microwave, Radio Frequency and Ultrasound Program's electro-magnetic interference (EMI) capability was developed in response to the growing interference threat to sensitive health care and life support instruments, the most frequently mentioned threat being cardiac pacemakers and their possible vulnerability to microwave ovens. The Laser/Optical Source Program was heavily committed to supporting Army organizations with new or modified laser/optical systems, such as laser rangefinders, designators, training devices, searchlights, infrared missile guidance systems, and hospital UV phototherapy sources.

1978: Department of Defense (DoD) Instruction 6055.1 Published.[42]

Department of Defense Instruction 6055.1, Department of Defense Occupational Safety and Health Program, was published. This instruction provided guidance to administer a comprehensive DoD occupational safety and health program. In addition, Department of

Defense Instruction 6055.3, Hearing Conservation, became effective.

1978: Civilian Hiring Restrictions and Heavy Mission Requirements Stress USAEHA.[42]

In 1978, a Health Services Command Manpower Survey Team increased recognized personnel requirements from 523 to 667 total personnel, yet there were only 410 employees working at USAEHA at the start of the year and only 395 working at year's end. At the end of the year the agency was operating 22% below authorized strength. This situation was related to a civilian hiring freeze and a freeze on hiring GS-13 and above positions, making it difficult to recruit qualified individuals due to competition with the private sector and other government agencies. Some programs were hit particularly hard, operating below 50% authorized strength. At the same time, the USAEHA was tasked to be the Army Medical Department technical support element for the Army Pollution Abatement Program (APAP) and was designated as the Department of the Army (DA) focal point for the DOD Hazardous Materials Information System. Additionally, DA designated USAEHA as technical consultant for the health and environmental aspects of oil and hazardous materials spills at DA installations. Imposition of state and local regulatory requirements, often more stringent than federal regulations, due to the Resource Conservation and Recovery Act (RCRA) and the 1977 amendments to the Clean Air and Clean Water Acts, caused Army major commands to place a high priority on obtaining USAEHA assistance to meet regulatory requirements. The National Pollutant Discharge Elimination System (NPDES) program, under the Clean Water Act of 1977, gave the states both administrative and regulatory authority on Federal installations. Under the Safe Drinking Water Act, 38 states and two territories assumed primacy over Federal installations. Since states normally had additional or more stringent standards than those imposed by USEPA, program management and discharge of Army Regulation (AR) 200-1, responsibilities became increasingly more difficult for the agency to accomplish. The same issues also existed for the Solid Waste Management and Air Pollution Engineering Divisions. Dealing with 10 US Environmental Protection Agency regions and more than 30 states made interfacing and negotiation difficult. A multidivision occupational health evaluation of tactical nuclear weapons storage and maintenance operations was directed by the Office of The Army Surgeon General. The Director, USAEHA Radiation and Environmental Sciences coordinated the effort.

1978: Illegal Polychlorinated Biphenyl (PCB) Spill at Fort Bragg, North Carolina.[43]

In August 1978, a massive, illegal PCB spill occurred in North Carolina. Approximately 12 miles of roadway at Fort Bragg were contaminated. Samples (113) were collected to determine the extent of the spill and make recommendations for cleanup to protect health and the environment. The spill was defined and covered to prevent PCB migration. Final cleanup was not completed until 1983 with the assistance of USAEHA.

1979: USAEHA Missions Increase while Personnel Shortages Persist.[44]

Inability to hire and retain the needed civilian professional staff at USAEHA persisted as a major problem. As short and long-term projects were added to the workload, important routine services were deferred and sometimes cancelled. New missions included establishment of a Health and Veterinary Services Office dedicated to providing occupational health support to the Chemical Systems Laboratory, Edgewood Area, Aberdeen Proving Ground, Maryland, and a fully operational Hazardous Material Spill Response Team that responded to several spills in 1979. Other missions that temporarily diverted existing resources included support for the field testing of the XM-2 Infantry Fighting Vehicle at Ft Carson, CO; expansion of a program for monitoring trihalomethanes (THM) in drinking water, to include studies of procedures for reducing THM formation in water treatment facilities; determination of the air pollution and environmental noise impacts of open detonation demilitarization of ammunition at 15 Department of Army Materiel Development & Readiness Command (DARCOM) installations; and a request from the US Army Training & Doctrine Command for a complete survey of all transformers at their installations to comply with Title 40, CFR, 1979 ed., Part 761, Polychlorinated Biphenyls (PCBs) Manufacturing Processing, Distribution in Commerce, and Use Prohibitions. Additionally, the USAEHA Directorate of Radiation and Environmental Sciences lost professional resources when the US Army Health Services Command directed that all medical treatment facilities with Nuclear Medicine Services must appoint a full-time Radiation Protection Officer.

1980: USAEHA Civilian Employee Strength at an All Time High.[45]

The long-standing civilian hiring lag was eliminated and employment was at an all time high at year's end with 445 employees. The continued inability to locally manage high grade positions caused significant delays in filling critical positions. Two additional buildings were assigned to USAEHA by Aberdeen Proving

Ground, providing needed office space and relief for the crowded Laboratory Services Directorate. Noteworthy activities included conducting the environmental analysis of a long range program for demilitarization of conventional ammunition; investigating the possible emissions of two highly toxic chemical groups, polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzo-furans (PCDF) from the incineration of PCP treated ammunition boxes; and acting as executive agent for the DOD Pesticide Regulatory Action System.

1981: The Army Health Hazard Assessment Program Is Initiated.[46]

The Army Surgeon General established the Health Hazard Program at USAEHA in response to continuing concerns about the effects that operating and maintaining military weapons systems may have on the health of service members. Hazards were identified and assessed and recommendations were made for eliminating or mitigating the hazards.

1981: USAEHA Tasked with New Mission to Evaluate Possible Radiation Hazards Associated with Some Army Nuclear Warheads.[47]

The Office of the Army Deputy Chief of Staff for Operations and Plans requested that the Office of The Surgeon General initiate a study with the USAEHA to evaluate possible radiation hazards associated with selected Army nuclear warheads. Known as the Intrinsic Radiation (INRAD) Study the Agency evaluated intrinsic radiation hazards (gamma and neutron) from Army Special Weapons.

1981: All Laboratory Services at USAEHA Consolidated.[47]

All analytical laboratory functions within the agency were consolidated under The Directorate of Laboratory Services with two divisions: (1) the Organic Environmental Chemistry Division with three branches; Pesticide Analysis, Chromatographic Analysis, and Special Analysis; and (2) Radiological and Inorganic Chemistry Division with three branches; Radiochemistry Analysis, Metals Analysis, and Nonmetals Analysis.

1981: Occupational Health Management Information System (OHMIS) Established at USAEHA.[47,48]

This program was officially established for administration and budget purposes. The project officer in charge was tasked to perform all functions required to identify, evaluate, develop, acquire, and field a management information system to support the Army Occupational Health Program throughout the Army's Health Services Command (HSC). In addition, a decision memorandum was prepared on the Hearing Evaluation Automated Registry System (HEARS). This was used to chart the future directions of what was planned as a module of the OHMIS. The OHMIS was designed to include three modules: the Medical Information Module (MIM), the Health Hazard Inventor Module (HHIM) and the HEARS.

1981: USAEHA Is the Central Army Resource for Occupational and Environmental Health Pproblems and Programs.[47]

The Environmental Noise Assessment and Abatement Program received all the required computer programs needed to support the global Army's Installation Compatible Use Zone (ICUZ) effort. The ICUZ process attempted to convince the public not to build housing areas, medical facilities, and other noise-sensitive institutions in high noise zones created by military airfields or firing ranges. The Water Resource Surveillance Program sought National Interim Primary Drinking Water Regulation (NIPDWR) laboratory certification from 37 states and three EPA Regions in order to perform all NIPDWR drinking water analyses for all Army installations at USAEHA. A major problem surfaced concerning chlordane contamination in air handling systems in Army family housing, primarily in homes built on poured concrete slabs with air ducts embedded in the slab or placed beneath it. This occurred when the pesticide chlordane, used for subterranean termite control, was either accidentally applied directly into the air handling systems of slab-based housing or leaked into air ducts as cracks occurred in the material around the ducts. A sampling protocol and priority recommendations from the Pesticide Monitoring Program concerning this issue were approved by the Office of the Surgeon General and the Army's Health Services Command and transmitted to appropriate commands for initiation. The number of air and wipe samples needed from 55 installations with 14,920 quarters, was estimated at 25,000.

1982: USAEHA Celebrates Its 40th Anniversary.[49,50]

The US Army Environmental Hygiene Agency (USAEHA) celebrated its 40th anniversary of supporting worldwide preventive medicine programs for the US Army and DoD with a major event attended by employees, friends, and dignitaries, past and present. The keynote speaker was Dr. Anna Baetjer, who played a major role in the establishment of the organization at the Johns Hopkins University, Baltimore, Maryland, in 1942 and its continued operation.

1982: Hazardous Waste Study at Defense

Depot Ogden, Utah, Resulted in a Cost Savings for the Depot for Sample Analyses of $400,000.[51]

A hazardous waste study at Defense Depot Ogden, Utah, required training and assistance in sampling approximately 485 55-gallon waste drums as part of the disposal action. USAEHA scientists developed a cost savings algorithm for sampling the 485 drums. Initially, drum samples were field tested and separated according to physical and chemical characteristics. This reduced the total number of samples requiring definitive analyses from 485 to 70, and resulted in a cost savings for sample analyses for the depot of $400,000.

1983: Army Regulation (AR) 40-10, Health Hazard Assessment Program in Support of the Army Materiel Acquisition Decision Process, Was Published.[52,53]

As the Army modernized its equipment, weapons, and vehicles. Concern arose among military leaders that many new items presented potentially serious health threats to the users and maintainers. The health threats included chemicals such as carbon monoxide and cyanide and physical forces such as blast over-pressure and vibration. Army Regulation (AR) 40-10 formalized The Surgeon General's involvement, with most of the reports coming from USAEHA, in the identification, assessment, and resolution of health hazards to users and maintainers of Army materiel.

1983: USAEHA Supports the US Army Health Facility Planning Agency (HFPA).[52]

A Memorandum of Understanding between the HFPA and Health Services Command established the Industrial Hygiene Division of the USAEHA as the technical expert for medical-technical design review of US Army new hospital and dental facility construction and renovation projects world-wide.

1983: USAEHA Assists in Complying with the Environmental Protection Agency Hazardous Waste Regulatory Program.[52]

The USAEHA Air Pollution Source Surveillance and Hazardous Waste Programs assisted installations and commands as Resource Conservation and Recovery Act (RCRA) Part B permit applications were required by regulatory authorities. Several trial run test plans, data from which must accompany the RCRA Part B permit application for an incinerator, were prepared in addition to a major test that was conducted at Tooele Army Depot, Utah, to obtain previously unavailable emission data on deactivation furnaces. Also, evaluations of open-burning and open-detonation grounds for obsolete munitions expanded from 27 to 36 installations. These evaluations included gathering environmental data, along with concurrent development of draft interim environmental criteria for open-burning/open-detonation grounds as recommended guidance for RCRA permit writers.

1984: USAEHA Becomes More Automated with the Acquisition of Microcomputers and the Development of Databases.[54]

In addition to microcomputers becoming available for division and project officer use, the following databases were developed or activated: (1) The Product Fact Sheet System was converted to a database system, and the Waste Disposal Instruction System was assessed for integration with the Product Fact Sheet; (2) the Mission Services System was converted from a microcomputer to a UNIVAC database system, permitting data entry and query by USAEHA divisions; (3) a Waste Characterization System was developed, establishing a database of information on the potentially hazardous constituents of small and large caliber munitions; (4) The Environmental Information Retrieval System (TEIRS) was redesigned and converted from a batch system to an interactive system with greatly enhanced capabilities for retrieval of Agency reports using multiple keywords; (5) the Inventory of Surveys and Ionizing Radiation Sources was developed as an interactive system capable of providing expanded information to serve as a tool in managing work efforts; and (6) the Hearing Evaluation Automated Registry System (HEARS) and the Local Occupational Health Hazard Inventory (LOHHI) system were developed using the Fort Detrick, MD, computer facility and became operational.

1984: USAEHA Assists with Human Subjects Protocols.[54]

The Health and Veterinary Services Office devoted significant effort to developing and processing four human subjects research protocols for the Chemical Research and Development Command, Aberdeen Proving Ground, Maryland, for approval by The Army Surgeon General's Human Subjects Research Review Board. Two other protocols involving minimal risk for the human subjects were approved within Army Material Command (AMC).

1984: USAEHA Finds Dioxin Contaminated Soil at Fort AP Hill, Virginia.[55]

Prior to the 1985 National Boy Scout Jamboree at Fort AP Hill, Virginia, soil sampling was conducted by USAEHA and concerning contamination was found. The Jamboree was in danger of cancellation due to the identification of significant dioxin and DDT contamination under a former pesticide storage facility. USAEHA

defined the contaminated area and oversaw the cleanup, which continued into 1985 prior to the scheduled event, in conjunction with USEPA and Army Corps of Engineer personnel. The 1985 National Boy Scout Jamboree at Fort AP Hill took place as scheduled.

1985: USAEHA Commander's Position and Regional Division Chiefs Become Command Designated Positions.[56]

The USAEHA commander had been selected by a Special Command Selection Board. The Surgeon General approved a recommendation by the Medical Service Corps (MSC) Command Designated Position List Board that the USAEHA Commander's position be established as a Colonel (06) level command designated position, and the division chief positions at each Regional Division (Field Support Activity) be established as Lieutenant Colonel (05) level command designated positions. This meant that officers would be selected for these positions in a process in line with that used for other command positions in the Army.

1985: Chemical Agent Munitions Decontamination Facility Shut Down When Polychlorinated Biphynls (PCBs) Discovered in Rockets Being Destroyed.[56]

While M55 nerve agent containing rockets in their shipping and firing tubes were being destroyed at the Tooele Army Depot, Utah, Chemical Agent Munitions Decontamination System (CAMDS), PCBs were discovered in the coating of the rocket shipping and firing tubes and the operation was shut down. USAEHA Hazardous Waste Program personnel took the lead in responding to an urgent request from the Department of the Army and the Army Materiel Command to deal with the problem and get the operation running. USAEHA personnel provided guidance on testing for PCBs and assessing health risks, resolving potential exposures and health risks, and negotiating with regulators.

1985: Army Audit Agency (AAA) Report Results in a Requirement for Major Commands to Comply with USAEHA Report Recommendation Regarding Regulatory Compliance.[56,57]

An AAA report revealed significant losses to the Army occurred because USEAHA recommendations regarding regulatory compliance were disregarded. The Adjutant General notified the Army Major Commands (MACOMS) of a requirement to use USAEHA reports to correct and prevent occupational and environmental health hazards identified during surveys. All MACOMS followed formal procedures to respond to and monitor compliance with USAEHA recommendations involving regulatory compliance.

Figure 7. Dr. Anna Baetjer, who played a major role in the establishment of USAEHA at the Johns Hopkins University, Baltimore, Maryland, in 1942 and its continued operation, was keynote speaker at 40th anniversary celebration.

1986: Occupational Health Management Iinformation Ssystem (OHMIS) Moves Forward in Deployment.[58]

The Hearing Evaluation Automated Registry System (HEARS) was approved for acquisition and deployment in February. The Health Hazard Information Module (HHIM) acquisition and deployment approval was obtained in July, and funding was obligated to procure the needed hardware and software. The Medical Information Module (MIM) initial development was completed, and occupational health patient visit data capture forms, to be incorporated into the MIM, were successfully tested at six installations by the Health Care System Clinical Investigation Agency, Health Services Command.

1986: USAEHA Moves Toward Completion of the M-55 Rocket Project.[58]

The Army's Chemical Weapons Demilitarization Program was interrupted by the discovery of PCB

contamination in M-55 rocket shipping and firing tubes in 1985. A multi-disciplined task force was formed to address the issue and ensure a timely and safe solution to the problem. Regulatory, occupational health, and environmental issues had to be addressed under extreme time constraints, while dealing with the US Environmental Protection Agency, the Centers for Disease Control and Prevention (CDC), and various public interest groups representing sites where the rockets were to be incinerated. This project required coordination and extensive world-wide travel, shipment of rocket tubes using military transport and access to sensitive military facilities. Completion of the project was required in 30 days by the Vice Chief of Staff of the Army. Phase one of the three-phase M-55 rocket project was completed and addressed the occupational health exposures of Army personnel to PCB-contaminated M441 shipping and firing tubes. This phase also addressed environmental considerations for disposing of the tubes. USAEHA scientists found no occupational health exposures for Department of the Army personnel from the PCB-contaminated shipping and firing tubes and no significant environmental hazards from the disposal of the tubes by incineration. Phase two of the study, addressing air pollution aspects of incineration of the M441 shipping and firing tubes, continued during the remainder of the year. Phase three of the study, the final phase, addressing industrial hygiene and other environmental aspects of disposal, was initiated. Important milestones were briefings for the Under Secretary of the Army, Dr. Ambrose, and for Ms. Hoeber, the Deputy Under Secretary of the Army by Dr. Jack Heller and Major Forrest Oliverson, Medical Corps (MC), of the USAEHA.

1986: Health Hazard Assessment (HHA) Program Impacts Materiel Acquisition.[58]

The developing Army Manpower and Personnel Integration (MANPRINT) initiative integrated human factors engineering, manpower, personnel, training, system safety, and the HHA program with the goal of improving individual soldier performance and the entire Materiel Acquisition Decision Process (MADP). A HHA MANPRINT data base was conceived and designed to provide lessons learned information to personnel involved in materiel acquisition. Data from HHA reports were extracted by USAEHA staff for inclusion in this data base. The USAEHA supported Bradley Fighting Vehicle Survivability testing at Aberdeen Proving Ground, Maryland, to include analyses of air samples, ventilation measurements, and optical radiation measurements.

1986: USAEHA Is a Leader In Addressing Ionizing and Non-Ionizing Radiation Concerns.[58]

Following the catastrophic nuclear reactor accident at Chernobyl in the Ukraine on April 26, 1986, a health physicist from the Health Physics Division was sent to assist the 7th Medical Command, US Army Europe, in developing an environmental monitoring program for the fallout that resulted. Increasing awareness of the hazards caused by radon in dwellings led to USAEHA participation in a radon monitoring task force to develop a methodology to conduct radon screening at military installations. The Health Physics Division also played a significant role in the study of the Abrams M1A1 Tank with regard to exposure of the crew to depleted uranium. The USAEHA Laser Microwave Division supported the Bradley Fighting Vehicle Survivability Test Program regarding evaluation of optical radiation hazards.

1986: New Environmental Legislation Increases USAEHA Workload.[58]

Workload in the Waste Disposal Engineering and Air Pollution Engineering Divisions increased with the promulgation or re-authorization of the Hazardous and Solid Waste Amendments of 1984 (HSWA, Public Law 98-616) and the Superfund Amendments and Re-authorization Act (SARA, Public Law 99-499). This legislation significantly amended the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund, Public Law 96-510) and had a significant impact on the Army's Installation Restoration Program. New USAEHA projects included ground water and solid waste studies at Army Materiel Command (AMC) installations seeking permits for chemical demilitarization facilities, assisting AMC in developing the AMC Hazardous Waste Minimization Program (HAZMIN), developing AMC HAZMIN goals, and performing a comprehensive evaluation of the HAZMIN plans of 10 AMC installations. Major air pollution consultative efforts were provided to the Program Manager for Chemical Demilitarization regarding the demilitarization of chemical agents and to AMC regarding the disposal of conventional munitions, propellants, explosives and pyrotechnic materials. Assistance was also provided to the Program Manager for Chemical Demilitarization in the preparation and review of program and environmental documents for the disposal of chemical agent 3-Quinuclidinyl Benzilate (BZ) at Pine Bluff Arsenal, Arkansas, and for the Chemical Agent Munitions Disposal System in Utah. In conjunction with the Occupational and Environmental Medicine Division, operational guideline values, monitoring requirement impact analyses, and permit assistance were provided in preparing incinerator trial

burn test plans, reviewing Resource Conservation and Recovery Act (RCRA) Part B permit applications, consulting on a major study to determine the environmental and health impacts of open burning/open detonation (OB/OD) of munitions, and preparing a permit writer's guide for future RCRA permitting of OB/OD operations. (analysis of a long range program for demilitarization of conventional ammunition, investigating the possible emissions of two highly toxic chemical groups, polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzo-furans (PCDF) from the incineration of pentachlorophenol (PCP) treated ammunition boxes, and acting as executive agent for the DoD Pesticide Regulatory Action System.

1987: Major Administrative Changes Occur; USAEHA Administrative Footprint Grows.[59]

The position of Deputy Commander for Administration was redesignated; the Chief of Staff and the position of Director of Administrative Services was abolished. To assess the utilization of resources, achievements and issues, a Functional Area Analysis (FAA) was conducted. Each program manager took part in two in-process reviews culminating in a formal presentation to the Commander, Health Services Command. In the FAA process, hundreds of operational problems and personal irritants were disclosed, and 612 issues were resolved. Under the FAA process, program managers appeared before the Program Budget Advisory Committee to identify the merits of their programs and compete directly for dollars and spaces. One of the changes that came from the FAA was the Direct Support/General Support (DS/GS) concept. The Field Support Activities (FSA) were responsible for DS, and program managers at USAEHA-Edgewood, Maryland, were responsible for GS. An objective of this concept was to move as many services as possible to the FSA level. A formal Information Systems Plan was drafted as the strategic plan for a coordinated, integrated information resource management approach for the utilization and management of data and information. A Quality Assurance (QA) Plan was developed by the Ad Hoc Committee on Quality Assurance. The Chief, Analytical Quality Assurance Office (AQAO) was designated QA Coordinator to develop a formal Agency-wide QA program with guidance from the commander and QA Committee and implement the plan. Major efforts were made to improve, expand, and reorganize the administrative side of USAEHA under the Chief of Staff to allow it to catch up with the technical programs, which had rapidly grown.

1987: USAEHA Supports Intermediate-Range Nuclear Forces Treaty (INF Treaty).[59,60]

A treaty between the United States and the Union of Soviet Socialist Republics on the elimination of intermediate- and shorter-range missiles (known as the Intermediate-Range Nuclear Forces or INF Treaty) was signed by US President Ronald Reagan and Soviet General Secretary Mikhail Gorbachev on December 8, 1987. The treaty called for the elimination of Pershing Rockets. The solid fuel rocket motors would be bolted to concrete and steel stands and fired to destroy them. The USAEHA Air Pollution Engineering Division was given the lead in evaluating air emissions during the disposal of the Pershing rocket motors. USAEHA support included estimating emissions and developing associated health risk assessments; providing assistance in the preparation, review, and staffing of the Environmental Impact Assessment; preparation of test protocols; sampling and providing other assistance during testing; attendance at public hearings and briefings of state officials, to include governors; and assistance in the preparation and staffing of regulatory permits. These efforts culminated in successful disposal operations at Longhorn Army Ammunition Plant, Texas, and Pueblo Army Depot Activity, Colorado in 1988.

1988: USAEHA Field Support Activities Redesignated.[61]

The Field Support Activities were redesignated as US Army Environmental Hygiene Activity - North, US Army Environmental Hygiene Activity - South, and US Army Environmental Hygiene Activity - West.

1988: USAEHA Plays a Major Role in Lyme Disease Prevention.[61]

Lyme disease, a zoonotic disease, became one of the most important diseases reported by military health personnel in some geographical areas of the United States. The number of human cases increased, and the geographical distribution of human cases widened. USAEHA Pest Management Program personnel took a key role in developing a Lyme disease educational program for the Army, conducting Lyme disease surveillance on military installations, and evaluating personal protective measures for Lyme disease.

1988: USAEHA Initiates Master Consultant Program to Recognize Technical Employees.[62,63]

The Master Consultant Program was started in 1988 to recognize technical employees who demonstrated long term, outstanding contributions to the organization in their scientific discipline. The designation of "Master Consultant" acknowledged that the individual possessed exceptional technical acumen, additional impact which certain individuals bring to the job by virtue of their extraordinary intellect, experience, and

technical or managerial skill which extended beyond that originally envisioned for their position or specific program, and was recognized by peers for possessing the highest level of expertise in the areas of health promotion and preventive medicine. Six scientists were selected for the inaugural class.

1989: USAEHA Investigates Worker Health Complaints at Wheeled Vehicle Training Facility, Aberdeen Proving Ground (APG), Maryland.[64]

Construction of the Wheeled Vehicle Training Facility at APG was halted due to worker health complaints from possible environmental contamination. Construction at this 20 million dollar facility was in danger of being permanently halted. USAEHA formed a multidisciplined task force to investigate all possible sources of contamination. This included environmental sampling and analyses, i.e., soil, sediment, water, and air (vapors and particulates); insect and poisonous vegetation survey; chemical agent survey; radiological survey; medical evaluations of workers; epidemiological investigation; and health risk assessments at the facility. After a determination that workers could safely return to their jobs, construction restarted in 3 weeks. Further construction delay costs of $20,000/day were averted.

1990: Total Quality Management (TQM) Process Is Adopted by USAEHA.[65]

This initiative placed responsibility for developing quality assurance (QA) and quality control functions directly within each organizational element. The USAEHA QA Committee was abolished and replaced with a TQM Committee chaired by the commander. This transition provided command emphasis on all matters related to quality and service improvements.

1991: USAEHA Initiates Risk Communication Training for Professional Staff.[66]

As USAEHA involvement with the health risk assessment portion of the Installation Restoration Program increased, numerous requests were received for physicians and scientists to participate in public hearings and town meetings. The importance of these people appropriately transmitting medical and scientific information to the general public was recognized. An accomplished risk communications specialist was identified and agreed to assist in the risk communication process. An initial class was presented to 30 employees. The responses to the training session were so positive that USAEHA continued this effort and made it available to members of other services.

1991: USAEHA Designated DoD Lead Agency for Lyme Disease Surveillance.[66]

Entomological Sciences Division was tasked to extensively address Lyme disease issues. Anticipated Congressional funding had not been appropriated by the year's end, but USAEHA conducted significant activities, such as identifying 1,163 ticks, of which 936 were assayed for the presence of the Lyme disease spirochete.

1991: Gulf War I: USAEHA Addresses Depleted Uranium and Waste Water.[66]

USAEHA Health Physics Division (HPD) consulted with Army Materiel Command and deployed units on the hazards of depleted uranium (DU). HPD also worked with the USAEHA Waste Disposal Engineering Division, at the request of the DoD, on DU cleanup requirements. Of particular concern were a tank fire during Operation Desert Shield and a depot fire during Operation Desert Storm (ODS). The USAEHA Wastewater Management Program was requested during the ODS build-up by Headquarters, Civil Affairs Command, to develop a plan for rebuilding the waste water sewer system following liberation of war torn Kuwait.

1991: Gulf War I: USAEHA Assessed Health Risks from the Kuwaiti Oil Well Fires.[66,67,68]

During Operation Desert Storm, Iraqi troops set fire to more than 600 Kuwaiti oil wells. USACHPPM was tasked by the Army Surgeon General to monitor possible adverse health effects in US Forces. Monitoring sites were established in Saudi Arabia and Kuwait and more than 5,000 environmental samples were collected to assess health risks. Air dispersion modeling was also used in conjunction with Geographic Information System (GIS) technology and satellite imagery to assess service members' exposures to oil well fire smoke and the resultant health risks. In addition, the following studies were also carried out in conjunction with the health risk assessment: (1) The Kuwait Biologic Surveillance Initiative (BSI) was a huge effort designed to help determine the health effects, if any, from the oil well fires. The project involved a medical surveillance package to a group of deploying soldiers, where USAEHA professionals measured a group of health parameters baselined in Germany prior to deployment, in Kuwait while deployed, and again in Germany after deployment to ascertain any changes. (2) Members of the Industrial Hygiene Division stayed in Kuwait until the end of June, and monitored workplace environments for air contaminants which may have been emitted from the burning oil wells. They provided technical information and equipment recommendations which enabled decision makers at Office of the Surgeon General (OTSG) to respond to DoD concerns over potentially lethal pollutant levels. These levels were predicted if weather inversion and air stagnation conditions

developed within the Kuwait oil fire region.

1991: USAEHA Partners with Navy Environmental Health Center.[66]

A Memorandum of Understanding (MOU) was developed between the Navy Environmental Health Center (NEHC), Portsmouth, Virginia, and USAEHA. This MOU delineated responsibilities to cooperatively accomplish training of NEHC personnel in the Installation Restoration Program (IRP); use of USAEHA personnel and resources to accomplish NEHC required support for the Navy IRP; training of NEHC selected Medical Corps Officers in Occupational and Environmental Medicine residency-related experiences; and, USAEHA health risk assessment Quick Response services for the Department of Navy, as requested, coordinated and funded by NEHC.

1992: USAEHA Celebrates Its 50th Anniversary.[69]

The agency celebrated its 50th anniversary of supporting the worldwide preventive medicine programs for the US Army and DOD with a major event attended by dignitaries past and present. Approximately 1,000 people attended, including employees, friends, and former members.

1992: USAEHA Receives American Academy of Environmental Engineers Award.[69]

The USAEHA received an award in the Excellence in Environmental Engineering competition. It was presented by the American Academy of Environmental Engineers in recognition of the Environmental Characterization of the Kuwait Oil Well Fires.

1992: USAEHA Supports the DoD Injury Surveillance and Prevention Work Group.[70,71]

USAEHA personnel were committed to providing leadership and publications support for the work group from 1992 to 2000. The work group provided data that identified an estimated DoD cost for injuries at $12 to $20 billion per year.

1992: USAEHA Developed DoD and Army Policies on Lead in Housing.[69]

Lead poisoning was identified as the number one environmental health hazard facing children. Through participation on the DoD Task Force on Lead in Military Housing, USAEHA's scientists developed the DoD and Army Lead-Based Paint Management Policies and Childhood Lead Poisoning Prevention Policies.

1993: USAEHA Develops the First Occupational Health Textbook of Military Medicine.[72]

Working with the Office of the Surgeon General, Department of the Army, David P. Deeter, MD, MPH, and editor Barbara Weyandt of the USAEHA, compiled and published the first occupational health textbook in the Army Medical Department Textbook of Military Medicine series, entitled *Occupational Health, the Soldier and the Industrial Base*.

1993: USAEHA Supported Safe Removal of Chemical Warfare Agents from Residential Site.[73]

USAEHA supported Operation Safe Removal in the residential Spring Valley section of Washington, DC. More than 140 World War I-era chemical warfare munitions were discovered during new construction. These munitions had been buried as waste from chemical warfare work that was done at American University in support of the United States effort in World War I. The support USAEHA provided involved industrial hygiene, environmental engineering, logistical support, onsite professional representation, equipment training, and coordinating the sampling and chemical analyses of soil samples from the residential site.

1993: USAEHA Became a Subordinate Command under the New Army Medical Command.[73]

On October 1, USAEHA became a subordinate command of the new "provisional" Army Medical Command (MEDCOM). The MEDCOM headquarters was located at Fort Sam Houston, Texas. LTG Alcide M. LaNoue, The Army Surgeon General, was named as the commander. The US Army Health Services Command, previous parent command of USAEHA, continued to operate as a major Army command until full activation of the MEDCOM.

1993: USAEHA Becoming Increasingly Dependant on Supplemental Funding.[73]

The Directorate of Environmental Health Engineering executed work in exchange for approximately $4 million in supplemental funds from numerous accounts, to include the Defense Environmental Restoration Account (DERA), Agency for Toxic Substances and Disease Registry (ATSTR), Defense Logistics Agency (DLA), Strategic Defense Command (SDC), and Kuwait Oil Fires Health Risk Assessment. The total for supplemental funds received throughout the USAEHA was approximately $8.6 million.

1994: USAEHA Became the US Army Center for Health Promotion and Preventive Medicine.[74,75]

In order to expand the list of preventive medicine and public health services provided and to place greater emphasis on health promotion, the USAEHA was

reorganized and redesignated the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) (Provisional) on August 1, 1994.

1994: Army Medical Surveillance Activity (AMSA) Established at USACHPPM (PROVISIONAL).[76,77,78]

The AMSA was established at the USACHPPM (Provisional) as operational (P8 funded). Medical surveillance activities were transferred from the Walter Reed Army Institute of Research, Silver Spring, Maryland. The AMSA included the Army Medical Surveillance System (AMSS), the Army-Navy/Marine Corps Serum Repository (ANSR) and the Army Reportable Medical Events System (RMES).

1994: USACHPPM Made the Focal Point for 520th Theater Army Medical Laboratory.[74]

USACHPPM was designated as the Army Medical Department's focal point for the standing up of the 520th Theater Army Medical Laboratory (TAML) at Aberdeen Proving Ground, Maryland. A small TAML staff was located within the USACHPPM. When deployed, the TAML was planned to be staffed with soldiers from USACHPPM and other organizations. Under the command and control of the 44th Medical Brigade, Fort Bragg, North Carolina, the TAML mission was to identify and evaluate health hazards in areas of operations.

1994: Last Free-Standing Army Medical Laboratory Placed under USACHPPM.[74]

The occupational, environmental, and toxicology elements of the 10th Medical Laboratory, Landstuhl, Germany, the last free-standing Army medical laboratory, came under operational control of USACHPPM. The pathology elements were relocated to Landstuhl Regional Medical Center, the adjoining US Army Hospital.

1995: The 520th Theater Army Medical Laboratory (TAML) Was Activated.[79]

The 520th Theater Army Medical Laboratory, a US Army Forces Command medical surveillance unit with Senior Command and Control provided by the 44th Medical Brigade, XVIII Airborne Corps, Fort Bragg, North Carolina, was activated. USACHPPM was identified as the focal point for the 520th TAML in 1994 and provided soldiers to staff the 520th TAML.

1995: USACHPPM-Europe Formed from the 10th Medical Laboratory.[79]

The US Army 10th Medical Laboratory, Landstuhl, Germany, was inactivated and replaced by the newly designated USACHPPM-Europe.

1995: USACHPPM-Pacific Formed.[79]

US Army Pacific Environmental Health Engineering Agency, Sagami, Japan, was redesignated USACHPPM-Pacific, under operational control of the USACHPPM. In 1997, it was relocated to Camp Zama, Japan.

1995: USACHPPM Became Fully Functonal.[79]

With the provisional status removed, the USACHPPM assumed full status, full responsibilities, and the duties of a major subordinate command of MEDCOM under a general officer commander. With this came new missions and responsibilities and a structure that included the Directorate of Health Promotion and Wellness, the Directorate of Epidemiology and Disease Surveillance, the Directorate of Field Preventive Medicine, and the Preventive Medicine Planning and Integration Office.

1995: USACHPPM Physicians Aessess Army's Workers' Compensation Claims and Costs.[80]

The Army had been attempting to reduce Workers' Compensation claims and costs with little or no success since the early 1980s. In the mid-1990s USACHPPM physicians, in conjunction with the Army Occupational Medicine Residency Program, initiated an assessment of the Army's initiatives and failures and identified the changes needed to improve control of costs and claims.

1995: Edgewood Area Building 1930 Becomes USACHPPM Headquarters.[79]

Edgewood Area Building 1930, at one time served as a warehouse for chemical weapons and last used as a US Army Commissary, was designated as USACHPPM Headquarters. Even though the building was most recently used as a commissary, because of its history as a chemical weapons warehouse, considerable sampling and testing was required before permitting occupancy.

1996: USACHPPM Named Executive Agent for the Department of Defense Serum Repository (DoDSR).[76,78]

Serum specimens from US Air Force personnel were added to the Army-Navy/Marine Corps Serum Repository (ANSR), forming the Department of Defense Serum Repository (DoDSR). The DoDSR was located in Silver Spring, Maryland, and the USACHPPM was named Executive Agent for the DoDSR.

1996: USACHPPM Responds to Loss of Adenovirus Vaccines for Military Trainees.[81,82,83,84,85,86]

Adenoviruses, particularly types 4 and 7, were the primary cause of acute febrile, respiratory disease (ARD) in military trainees. For decades adenoviral associated ARD was well controlled by types 4 and 7 oral

vaccines. In 1996, the sole manufacturer ceased vaccine production. To support efforts to re-establish the adenovirus vaccine program, USACHPPM physicians and scientists identified outbreaks of ARD and initiated studies to compare circulating adenovirus strains with the available vaccine strains, assess the level of immunity to adenoviruses in incoming trainees, define the cost-effectiveness of a re-established adenovirus vaccine program, identify other populations that reported adenoviral associated ARD, and identify non-vaccine ARD interventions. Findings were briefed to DoD and Army leaders and others, presented at professional meetings and published.

1996: USACHPPM Supports Deployed Forces and Combatant Commands.[87]

USACHPPPM formed a Deputy Chief of Staff for Operations (DCSOPS) position with the mission of collecting, analyzing, and archiving environmental health threat information and providing preventive medicine operational and contingency assistance to the Combatant Commands. Work began on a Preventive Medicine Operation Center (PMOC) to be used for classified and unclassified preventive medicine operations and contingency planning. Work on current and past operations was done, to include investigation of possible hazardous chemical exposures of Operations Desert Shield/Desert Storm veterans; assisting the DoD's Deployment Surveillance Team (DST) with Persian Gulf oil fire exposures and respiratory health effects; potential exposures of US forces to low levels of military chemical agents following the demolition of the Iraqi weapons depot in Khamisiyah in March 1991; and supporting and augmenting the 520th Theater Army Medical Laboratory in collecting and analyzing air, water, and soil samples from the entire Bosnia-Herzegovina area of operations.

1996: The US Army Occupational Medicine Residency Moves to Bethesda, Maryland.[17]

Because of mission and organizational changes, the residency program was moved to the Uniformed Services University of the Health Sciences, Bethesda, Maryland, but was to continue to provide significant Army-specific occupational and environmental medicine training.

1997: USACHPPM Supports Operation Joiint Endeavor/Joint Guard in Bosnia.[88,89]

USACHPPM scientists, engineers, and other health professionals augmented tactical units to conduct environmental sampling in Bosnia during Operation Joint Endeavor/Joint Guard. USACHPPM personnel collected more than 4,000 samples, resulting in more than 122,547 reportable analyses for potentially toxic environmental contaminants. Environmental monitoring was critical to maintaining the health of service members as well as public confidence that the Military Health System was protecting service members. Additionally, USACHPPM scientists developed detailed industrial hygiene (IH) sampling guidance for the 520th TAML Bosnia Theater of Action Plan based on the available IH equipment and potential scenarios. They also conducted training for 520th TAML soldiers.

Figure 8. US Army Environmental Health Agency (USAEHA) became the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) in 1994.

1997: USACHPPM-Pacific Relocated.[89]

The USACHPPM-Pacific, under operational control of the USACHPPM, was relocated to Camp Zama, Japan.

1997: USACHPPM Named Executive Agent for the Defense Medical Surveillance System.[89]

` The Office of the Assistant Secretary of Defense for Health Affairs named USACHPPM Executive Agent for the Defense Medical Surveillance System (DMSS), a tri-service health surveillance effort with joint staffing that was built upon the Army Medical Surveillance System. This system routinely collects and integrates data, such as personal health histories, career assignments, hospitalizations, and environmental exposures.

1997: Tri-Service Vision Conservation and Readiness Program Established.[89]

A tri-service vision conservation and readiness program with tri-service staffing was established at USACHPPM to emphasize and address readiness concerns.

1997: USACHPPM Provides Support to Foreign Governments.[89]

USACHPPM support to foreign governments included PM2.5 sampling in Kuala Lumpur, Malaysia, at the request of the Department of State, in support of EPA's efforts to characterize air quality associated with forest fires in Malaysia and Indonesia; assistance to the Ukrainian Government, through the Defense Special Weapons Agency, with overseeing the contract for the dismantlement of the weapons of mass destruction infrastructure, looking at sampling techniques and

suggesting better ways of collecting samples; and technical expertise to an environmental and occupational health assessment team to evaluate concerns about rocket fuel exposures, carcinogens, and low level radiation exposures in the Ukrainian military.

1997: Department of Defense Published Joint Medical Surveillance Directive.[89]

The Deputy Secretary of Defense published DoD Directive 6490.2, Joint Medical Surveillance, directing the military departments and combatant commands to monitor environmental, occupational, and epidemiological threats and diverse stressors before, during, and after deployment. This, with the implementing instruction, provided the military services, joint commands and USACHPPM the authority to write policy and form work groups and infrastructure to bring deployment surveillance to fruition.

1998: Defense Intelligence Agency Accredited the USACHPPM Secure Facility.[90]

The Defense Intelligence Agency accredited the Secure Compartmented Information Facility (SCIF), and USACHPPM's Global Command and Control System (GCCS) access was activated. The Deputy Chief of Staff for Operations coordinated the participation of USACHPPM personnel in deployments and addressed requirements for country clearances for missions outside the United States.

1998: USACHPPM Supports Gulf War Illness Investigations.[90]

The USACHPPM Deployment Environmental Surveillance Program assisted the Office of the Special Assistant for Gulf War Illness (OSAGWI) and other organizations in studies of potential environmental exposures to US forces in the 1991 Gulf War. These ongoing efforts included modeling chemical agent exposures from the Khamisiyah Depot demolition, providing information, data, and analyses to groups studying veterans, testifying before the Presidential Special Oversight Board investigating environmental exposures to US forces in the Persian Gulf, making presentations at national and international scientific conferences, and publishing in scientific journals. USACHPPM's Medical Health Physics scientists assisted with determining the extent of depleted uranium (DU) exposures and preparing health risk characterizations of selected scenarios.

1998: Laboratory Sciences Directorate Supports USACHPPM Global Mission.[90]

The success of USACHPPM and its predecessor organizations was predicated on the performance of its laboratories and their ability to perform high quality analysis, keep up with the latest methods, develop new methods for military unique compounds, and analyze large numbers of samples in a timely manner. This year, Laboratory Sciences Directorate personnel processed more than 48,000 samples with more than 84,000 separate analytical procedures performed; secured accreditation for cholinesterase analysis and urine radiobioassay from the Commission on Office Laboratory Accreditation; and maintained ISO 9001 registration.

1998: USACHPPM Is the DoD Proponent for Public Health Data Systems.[90]

USACHPPM completed the migration of the Army Medical Surveillance Activity (AMSA) System to the Defense Medical Surveillance System (DMSS) and functioned as executive agent for DoD medical surveillance databases and deployment surveillance analysis. The Army Occupational Health Management Information System (OHMIS) successfully migrated to the Defense Occupational Health Readiness System (DOHRS). The OHMIS Project Office successfully transferred all legacy OHMIS corporate data from the Fort Detrick, Maryland, main frame computer to the new data warehouse at USACHPPM. USACHPPM received DoD Health Affairs funding to develop the DOHRS-Industrial Hygiene (IH) module.

1999: Army Medical Department Activity-Japan Assets Placed Under USACHPPM-PAC.[91]

Preventive Medicine assets from the US Army Medical Department Activity Japan (MEDDAC-JAPAN) were consolidated with USACHPPM-PAC. With the consolidation, USACHPPM-PAC became responsible for providing installation-level preventive medicine, health promotion, community health nursing, and occupational health nursing support to all US Army Japan installations, while also providing regional preventive medicine and health promotion support to all Army installations in the Pacific Theater.

1999: USACHPPM Commander to Be Proponent for Army Preventive Medicine Program.[91]

The Army Surgeon General directed the Commanding General, USACHPPM, to initiate action to become the Functional Proponent for the US Army Preventive Medicine Program. The plan also called for the creation of the Proponency Office for Preventive Medicine (POPM), a single, cohesive Preventive Medicine policy cell, with a physical presence at Aberdeen Proving Ground, Maryland, San Antonio, Texas, and Falls Church, Virginia. The POPM was charged with affecting close coordination with international, Federal, DoD, DA, and US Army Medical Department (AMEDD) organizations at each location. The POPM was identified

as the single entry point for all Army Preventive Medicine policy issues and taskings.

1999: USACHPPM Focuses Effort on Deployment Support.[91]

The Deployment Environmental Surveillance Program (DESP) continued environmental health surveillance initiatives (collection and analysis of air, water, and soil samples) for US forces in the former Yugoslavia, Egypt, Saudi Arabia, and Kuwait. USACHPPM provided air sampling equipment, media, and laboratory analyses for military Preventive Medicine units, consultations on risk management and training, as well as site assistance visits.

1999: USACHPPM Receives Lyme Disease Funding.[91]

Section 710 of the fiscal year (FY) 1999 DoD Appropriations Bill stated, "Of the amounts authorized to be appropriated by this Act for Defense Health Programs, $3,000,000 shall be available for research and surveillance activities relating to Lyme disease and other tick-borne diseases." As a result, USACHPPM received $1,500,000 to support improving tick-borne disease pathogen molecular detection; performing a serologic survey for tick-borne disease antibodies at military installations; studying the incidence of tick-borne infections among US military personnel; developing a field expedient polymerase chain reaction (PCR) detection test kit; and establishing Geographical Information System (GIS) capability to improve assessments of tick-borne disease threats on military installations and during deployments.

1999: The Defense Medical Surveillance System (DMSS) Supports DoD.[91]

Data from more than 6.5 million service members populated the online DMSS databases. The DMSS staff responded to more than 350 Army and DoD requests for analysis and summaries of data, assisted numerous medical investigators in designing and conducting sero-epidemiologic studies using stored specimens in the DoD Serum Repository (DoDSR), distributed version 2.0 of the Defense Medical Epidemiology Database (DMED), which provided a capability to quickly query rates of hospitalizations, ambulatory visits and reportable events, and distributed the Army Reportable Medical Events System (version 4.0) to all reporting sites worldwide.

1999: USACHPPM Physicians Use Novel Approach to Study Cancer in Army Depot Workers.[92]

The commander at a depot that had been disassembling, refitting, and repairing tanks since the early 1940s became concerned that welders might have an excess risk of cancer from possible past exposures to asbestos, chromium, and nickel from stainless steel welding and cadmium contained in paints. In a novel application, USACHPPM Occupational Medicine physicians used Geographical Information System (GIS) techniques to enhance record-matching in a retrospective study that compared cancer death rates for depot welders with cancer death rates in the county, state, and US general populations and other welder cohorts. The study did not detect significant increases in cancer risk among depot welders.

1999: USACHPPM Provided Diverse Epidemiologic Consultation (EPICON) Services.[91]

EPICON services assisted in determining the existence, nature, and severity of health problems and aided in the development of policy, medical treatment regimens, and vaccine use. EPICON missions included (1) a study of acute respiratory disease among unimmunized recruits at Fort Jackson, South Carolina; (2) investigation of a cluster of Legionella pneumophila infections at the Walter Reed Army Medical Center Forest Glen annex, Maryland; (3) investigation of pneumococcal pneumonia and acute respiratory bacterial infections among Ranger students at Fort Benning, Georgia; (4) investigation of a cluster of Graves' Disease in the 5th Special Forces Group, Fort Campbell, Kentucky; and, (5) an epidemiologic study of tick-borne infections (TBIs) in the United States. In collaboration with the Army Medical Surveillance Activity, Uniformed Services University of the Health Sciences, and the Navy Medical Research Center, a cross-sectional serologic study of 10,000 personnel in the Armed Forces was done and found little evidence of past infection with the agent of Lyme Disease, which supported the DoD-wide policy of no routine use of Lyme Disease vaccine among US military personnel.

2000: USACHPPM Supports Gulf War Illness (GWI) Investigative Efforts.[93]

Support was provided to the Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illness (OSAGWI) through the USACHPPM Gulf War Illness Team (GWI Team), led by Dr. Jack Heller. The GWI Team assisted the OSAGWI in studies of potential environmental exposures to US forces during the Gulf War, including conducting revised analyses of potential chemical agent exposures to modeled releases from the Khamisiyah Depot demolition operations and a joint study with the Department of Veterans Affairs of the incidence of Amyotrophic Lateral Sclerosis (ALS or Lou Gehrig's Disease) in Gulf War Veterans. An effort was initiated to develop an interactive web site where

Gulf War Veterans could determine their individual oil fire exposure levels and potential health risk. This site was to begin operation in 2001. The GWI Team made numerous presentations at national and international scientific conferences and developed several papers for submission for publication in peer-reviewed journals.

2000: USACHPPM Responds to Possible Heavy Metal Exposure in Pirmasens, Germany.[91,93]

The potential for significant heavy metal exposure was identified in Building 4109, Pirmasens, Germany, where cadmium, chromium, and lead were used in electroplating. The building was ordered closed and sealed by the Chief of Staff of US Army, Europe. The Commander, US Army, Europe, committed to finding all soldiers who had been potentially exposed. USACHPPM scientists and epidemiologists guided the effort to find and evaluate those at risk, with pertinent information on all identified stored in a database. This effort, starting in 1999, included identifying, contacting, and evaluating all who may have been exposed but had left Europe. The USACHPPM staff provided consultation to those conducting the evaluations, risk communication to those possibly exposed, and arrangements for travel orders, clinic visits, and follow-up.

2000: USACHPPM Provides Deployment Support.[93]

USACHPPM staff provided occupational and environmental health surveillance support to US operations in Kosovo, Bosnia Herzegovina, Kuwait, Egypt, Jordan, and Saudi Arabia. Teams from USACHPPM-Europe and CONUS subordinate commands augmented deployed Preventive Medicine units. In addition to providing the units with air sampling equipment and media, consultations and training were conducted. The supporting units conducted industrial hygiene, entomological, environmental sampling, and radiation assessments, including surveys of target sites where depleted uranium rounds were fired.

2000: USACHPPM Addresses Concerns about Depleted Uranium (DU).[93]

USACHPPM staff supported the Deputy Secretary of Defense and The Army Surgeon General on medical issues relating to the use of DU. Technical information was provided to the World Health Organization group developing a DU health monograph. Lieutenant Colonel Mark Melanson, Health Physics Program, represented the United States on an international United Nations scientific team deployed to Kosovo to measure the health and environmental risks of the use of depleted uranium in Kosovo during the 1999 air campaign against Yugoslavia.

2000: Injury Prevention and Population Health Programs Established.[93]

The Injury Prevention Program was developed to integrate injury reduction efforts into military training using current surveillance capabilities, improve understanding of injury incidence and prevalence, develop new surveillance capabilities for injuries, and collect, analyze, and disseminate their results. Studies conducted included Injury Incidence and Injury Risk Factors Among Marine Corps Officer Trainees, Surveillance of Injury Rates and Injury Risk Factors Among Ordnance School Students, Investigation of Injuries Among Students at the Army War College, Carlisle Barracks, Pennsylvania, and assessment of a fitness program called The Victory Fitness Program. Injury Prevention Program personnel also participated in a test of the US Army's emerging physical readiness training doctrine. The Population Health Program mission was to develop an integrated and comprehensive population health program in support of the Military Healthcare System. Goals were to enhance the population health database in the Defense Medical Surveillance System, to conduct epidemiological analyses in support of population health, and to monitor the effectiveness of healthcare services. Emphasis was given to decreasing tobacco use, sexually transmitted diseases, workplace and family violence, and alcohol use.

2001: 9/11 Attacks on the World Trade Center and Pentagon.[94]

On September 11, 2001, terrorists attacked the World Trade Center and Pentagon. The Pentagon response included a Special Medical Augmentation and Response Team (SMART) from the USACHPPM. The mission was to assess initial acute occupational health hazards and develop a plan to determine if levels of contamination were safe for workers to resume operations. A total of 3,716 samples were collected. This USACHPPM team effort included the laboratory's exigent analyses of samples and other directorates providing information, assessment, and recommendations. Shortly after the attack, USACHPPM staff developed a Pentagon Post-Disaster Health Assessment, using internet-based technology as a tool to reach out to the victims of the attack and assess its impact.

2001: Anthrax Attacks.[95]

The commander USACHPPM dispatched a Special Medical Augmentation Team (SMART-PM) in support of the Capitol Incident Management Team response to the anthrax attack. The Team provided consultation on

establishing the extent of anthrax contamination and guidance on remediation and reoccupation of contaminated areas. They also evaluated Army mail handling facilities that received mail from the contaminated US Mail Brentwood facility.

2001: USACHPPM Creates the Directorate of Health Risk Management.[93]

The Directorate of Health Risk Management provided guidance, support and information to commanders who made environmental exposure risk management decisions based on available health risk assessment data. The program goal was to provide decision makers the information needed to detect, assess and counter environmental threats as part of a Comprehensive Military Medical Surveillance Program required by DoD Directive 6490.2, Medical Surveillance. This Directorate supported Gulf War Illness investigations, Operation Southern Watch 2001, Operation Joint Forge – Bosnia, Operation Joint Guardian, the US Pacific Command, Military Traffic Management Command, Operation Enduring Freedom, Operation Noble Eagle and the US Southern Command. USACHPPM also developed and activated a secure network to disseminate and receive classified information. Following the attacks of September 11, 2001, program personnel assisted the US Joint Forces Command-Joint Task Force-Civil Support-J2 by identifying major industrial chemical sites near metropolitan areas and modeling the impact of catastrophic chemical releases for selected sites.

2001: USACHPPM Wins a White House Educational Award.[97]

Affirmative Procurement (AP) was the US Government's mandatory buy recycled program. AP requirements were driven by the Resource Conservation and Recovery Act, Federal Acquisition Regulations and Executive Order 13101 entitled Greening the Government Through Waste Prevention, Recycling and Federal Acquisition, September 1998. USACHPPM Ground Water and Solid Waste Program personnel developed an AP training seminar and presented it to more than 1700 people at 30 facilities in the Military Services and other Federal agencies. USACHPPM was the only training resource for DoD. USACHPPM employees went to the White House to accept the 2001 White House Closing the Circle Award in Education and Outreach.

2002: USACHPPM Supports US Deployed Forces around the World.[98]

The services provided included identifying and assessing occupational and environmental health hazards for ongoing and projected future deployments; evaluating the potential risk posed by the occupational and environmental hazards identified; providing deployed medical units with surveillance equipment sets which contained sampling equipment, media, and other supplies for air, water and soil sample collections; and conducting operational risk management estimates for base camps and forward operating bases using data from the samples collected. Support was provide to US forces in Bosnia and Kosovo, the US Pacific Command, the US Southern Command, and the US Special Operations Command.

2002: USACHPPM Established Three Smallpox Epidemiological Response Teams.[98]

USACHPPM established three fully prepared Smallpox Epidemiological Response Teams to respond to terrorist smallpox threats against Army personnel, installations and operations worldwide. The teams included rapid response officers, physicians, nurses, and other medical personnel who could identify and control outbreaks of smallpox. USACHPPM provided most of the people for the teams and ensured that they were immunized, well-trained, and equipped to respond to threats.

2002: USACHPPM Supports Chemical Demilitarization Efforts.[98]

To eliminate the current stockpile of chemical weapons and clean and close the storage sites, USACHPPM assisted with comprehensive and recurring planning and sampling to attain closure of chemical agent disposal operations on Johnston Atoll in the Pacific; supported emissions testing for a prototype chemical neutralization process at the Newport Chemical Agent Disposal Facility, Indiana; provided human and environmental health risk assessments for the Aberdeen Chemical Agent Disposal Facility, Maryland; and prepared the final protocol for the Resource Conservation and Recovery Act Part B Permit Risk Assessment for the Anniston Chemical Agent Disposal Facility, Alabama.

2003: Army Phyisical Fitness Research Institute Placed Under USACHPPM.[99]

USACHPPM assumed command and control of the Army Physical Fitness Research Institute at Carlisle Barracks, Pennsylvania. The Institute was an integral part of the Army War College's educational, research, and outreach mission in the areas of health and fitness, including reducing injuries and cardiovascular disease.

2003: USACHPPM Investigated Acute Eosinophilic Pneumonia in US Forces in Iraq.[100]

A rare condition, acute eosinophilic pneumonia was identified in 18 US military personnel deployed in or

near Iraq from March 2003 through March 2004, with two deaths. An etiology was not found; a possible association with recent onset of smoking was identified.

2008: Medical Surveillance Activities Moved from USACHPPM to the New Armed Forces Health Surveillance Center (AFHSC).[76]

The Department of Defense Armed Forces Health Surveillance Center was formed in Silver Spring, Maryland, and oversight and operation of the Defense Medical Surveillance System (DMSS), the DOD Serum Repository, and Army Reportable Medical Events System (RMES) were transferred to the AFHSC.

2009: USACHPPM Renamed the US Army Public Health Command (USAPHC).[101]

The USACHPPM was renamed the US Army Public Health Command (Provisional). The former five USACHPPM subordinate commands became Public Health Regions North, South, West, Europe, and Pacific.

2010: USAPHC Merged with the US Army Veterinary Command.[102]

The US Army Public Health Command merged with the US Army Veterinary Command, located at Fort Sam Houston, Texas. The USAPHC now embodied the capabilities for a "One Health" approach to public health and promoted and publicized the "One Health" concept. The "One Health" concept recognized the interactions between human health, animal health, and ecosystems and the need for public health professionals working in these three areas to coordinate and integrate their efforts.

2011: US Army Public Health Command Achieves Full Operational Capability.[103]

On October 1, the US Army Public Health Command was officially designated as having reached full operational capability, with six elements. The organization consisted of the Army Institute for Public Health, the headquarters unit located on the Edgewood Area of Aberdeen Proving Ground, MD, and five subordinate regional commands at Fort George G. Meade, Maryland, Joint Base San Antonio, Texas, Joint Base Lewis-McChord, Wshington, Landstuhl Regional Medical Center, Germany, and Camp Zama, Japan.

2011: The Adenovirus Vaccine Program for Military Trainees Is Re-Established.[104]

The vaccine program was re-established in 2011, with USAPHC monitoring the impact of the program.

2011: Surety Medicine Division Established at US Army Public Health Command.[105]

The mission of the Surety Medicine Division was to provide compliance assistance, specialized training and exercises, consultative services, and policy development support to clinical and oversight activities that support the 26 Surety programs, and their populations, operated or overseen by the Army, across the Army Enterprise. Surety was defined as the sum of materiel, personnel, and procedures that contribute to the security, safety, and reliability of surety materials. Surety materials included special nuclear materials, chemical warfare and novel threat agents, and biologic select agents and toxins.

2011: Extensive Effort to Identify Deployed Soldiers at Risk of Rabies.[106,107,108,109]

In 2011, a US Army soldier was bitten by a dog in Afghanistan. After his return to the United States, the soldier died of rabies. The US Army Public Health Command formed a Rabies Response Team to identify service members who may be at risk of rabies infection and needed treatment. Review of health assessment forms and other medical records resulted in more than 100 soldiers receiving rabies post-exposure prophylaxis. The review also identified about 300 soldiers who never reported a dog bite they received; 50 of these received post-exposure prophylaxis. Rabies risk was also assessed for deployed DoD civilians and contractors.

2012: USAPHC Leads Creation of the Operation Tomodachi Registry.[110]

The devastating March 11, 2011, earthquake and tsunami in Japan caused severe damage to the Fukushima Daiichi Nuclear Power Station, which resulted in the release of radiation into the environment. The USAPHC's Army Institute of Public Health was selected by DoD to be the lead organization to create, manage, and sustain the Operation Tomodachi Registry in the Defense Occupational and Environmental Health Readiness System. The registry includes all DoD personnel and their dependents who were on the mainland of Japan or onboard a US vessel off the coast of Japan during the tsunami land radiation release. The registry became operational on September 5, 2012.

2012: Initial Phase of Qarmat Ali Long Term Medical Surveillance Program Completed.[111,113]

Service Members and DoD civilians were potentially exposed to sodium dichromate, a known carcinogen, at the Qarmat Ali Industrial Water Treatment Plant near Basrah, Iraq. During 2012, the first round of a long-term medical surveillance program for those possibly exposed was completed under the guidance of the USAPHC Environmental Medicine Program. Sixty-five

individuals were offered participation; 51 accepted. Physical examinations were done and participants were referred for follow-up when indicated. The results showed no unusual or unexpected findings and no increased risk of cancers of the respiratory tract. On a scale of 1 to 5 (very satisfied), participants rated the program as 3.83. Future follow-ups were planned.

2012: Veterans Affairs - Department of Defense Airborne Hazards Symposium Held.[111,112]

A joint Veterans Affairs (VA)-Department of Defense (DOD) Airborne Hazards Symposium was attended by about 100 participants in August 2012. DoD, VA, and civilian academic physicians and scientists presented data on what is known, what needs to be known, and what can be done to study and improve care for veterans and service members who may have experienced adverse health effects from exposures to airborne hazards, to include burn pit smoke. Army Public Health Command (APHC) Environmental Medicine Program staff assisted the VA Office of Public Health in planning the 3-day symposium consisting of plenary sessions and working groups. Drs. Baird and Harkins of the APHC compiled the presentation and working group reports for future publication.

2013: US Army Public Health Command Region-Pacific Monitors Food After Nuclear Incident.[110]

The US Army Public Health Command Region-Pacific was responsible for a regional food surveillance program for the Pacific Area of Operation following the tsunami and nuclear plant damage that occurred in Japan in 2011. Working with the US Food and Drug Administration, Winchester Engineering and Analytical Center and the Government of Japan, long-term radiological surveillance and screening of food products from commercial processing and distribution facilities were established.

2014: Newspaper Reports US Forces Were Exposed to and Injured by Iraqi Chemicals.[114,115]

The New York Times newspaper reported that from 2004 to 2011, US troops had repeatedly found old Iraqi chemical weapons in bunkers or buried, and many were injured by these. USAPHC physicians and scientists were tasked to lead the implementation of a five goal plan to identify, contact, and evaluate service members and veterans possibly exposed; offer and provide medical examinations to those with symptomatic exposures; document the results of these efforts and inform the Department of Veterans Affairs of the findings; assist with appropriate recognition, such as the Purple Heart award, for those injured; and, develop and implement a follow-up plan for affected soldiers and veterans.

Figure 9. US Army Center for Health Promotion and Preventive Medicine (USACHPPM) renamed to US Army Public Health Command (USAPHC) in 2009.

2014: USAPHC Supports the Army Surgeon General's Performance Triad Initiative.[116]

The Surgeon General's Army Performance Triad focused on sleep, activity, and nutrition as part of a comprehensive plan to improve readiness and resilience through education and leader involvement. The Performance Triad encompassed messaging, outreach, education and collaborative partnerships built to maintain, restore and improve the stamina, resiliency, and health of the Army Family. USAPHC was tasked by US Army Medical Command Operation Orders 13-27, 13-59 and 14-20 to support the Performance Triad as it was one of The Surgeon General's top priorities for her tenure. More than 20 staff members were involved in USAPHC support for the Performance Triad in Fiscal Year 2014. A preliminary assessment of morbidity burden among dependents, retirees, and non-activated Guard and Reserve members supported the Performance Triad campaign plan. Performance Triad printing totaled $193,111.61. Army Wellness Centers (AWCs) were identified as the actionable arm of multiple Army initiatives, including the Performance Triad, and focused on improving the health, well-being, and resiliency of the Army Family. In 2014, there were 23 AWCs operating worldwide. AWCs were available to all active duty, family members, retirees, and Army civilians.

2014: Successes of the Army Institute of Public Health Injury Prevention Program.[116]

The Injury Prevention Program provided a full array of core public health epidemiologic functions to the Army including monitoring of injury surveillance data; providing field investigation capabilities; making recommendations for program and policy development; evaluating programs and policies; and disseminating scientific injury prevention information. Successes over the preceding 10 years included 1) demonstrating that modifications of physical training programs in basic combat training (BCT) could reduce injury rates by 30%; 2) documentation that soldiers involved in High

Mobility Multipurpose Wheeled Vehicle (HMMWV or Humvee) crashes who were not wearing seat belts were six times more likely to die than those who were wearing seatbelts; 3) showing the new T-11 parachute reduced jump-related injury rates by more than 40%, compared to the older T-10 parachute; and 4) demonstrating that measuring foot type as a basis for prescribing running shoes in BCT did not prevent injuries.

2014: Response to the West African Ebola Outbreak 2014-2016.[116,117,118]

The large outbreak began in late 2013 and lasted until 2016; 11 people were treated for Ebola in the United States. Army Public Health Center staff provided guidance, assistance, and subject matter expertise to military medical treatment facilities (MTFs) and for planning sessions. This included developing plans and protocols for MTFs and deployed personnel on Ebola waste management and decontamination and serving on teams to evaluate the readiness of MTFs to receive Ebola patients.

2015: Publication of the Specialty Volume "Airborne Hazards Related to Deployment."[112]

Coleen P. Baird, MD, MPH, and Deanna K. Harkins, MD, MPH, of the USAPHC Environmental Medicine Program, collected and edited the presentations and work groups reports from the 2012 joint Veterans Affairs - Department of Defense Airborne Hazards Symposium. These were published as a single specialty volume by the Borden Institute in 2015.

2015: Army Public Health Center Formed from the US Army Public Health Command.[119]

Reorganization resulted in the formation of the US Army Public Health Center (APHC) in a provisional status on August 17, 2015, as a Field Operating Activity of the US Army Medical Command. The APHC was headed by a civilian director who also held the position of Acting Deputy Chief of Staff for Public Health, US Army Medical Command.

2015: Inaugural "Health of the Force" (HOF) Report Released.[120]

Figure 10. Reorganization forms the US Army Public Health Center in 2015.

The inaugural HOF report provided an overview of health for Army active duty soldiers at US-based installations in 2014. It summarized initial findings from the Surgeon General's Performance Triad initiative and featured an Installation Health Index, which assessed ten metrics across installations. Selected metrics included medical readiness, injury incidence, chronic disease, behavioral health disorders, obesity, and tobacco use. Measurements of sleep, activity and nutrition, the focus of the Performance Triad campaign, were also assessed. Prior to the HOF, similar reports summarizing comprehensive population health information for Army communities did not exist. The HOF was the result of an Office of the Surgeon General and Army Public Health Center collaboration to fill this gap and provide leaders and public health stakeholders with a meaningful assessment of installation health.

2016: US Army Public Health Center Achieves Full Operational Capability.[121]

On October 1, 2016, the US Army Public Health Command was inactivated and the US Army Public Health Center transitioned from provisional status to full operational capability.

2017: US Army Public Health Center Celebrates Its 75th Anniversary.[122]

The US Army Public Health Center hosted a 75th Anniversary Celebration at the Stark Recreation Center at Aberdeen Proving Ground (APG)-South on 26 September, commemorating the history of USAPHC and its predecessor organizations. More than 500 personnel attended the ceremony, including current USAPHC and APG employees, MEDCOM employees, DoD employees, many distinguished guests, alumni, retirees, and other friends of US Army Public Health. Army Surgeon General Lieutenant General Nadja West served as the keynote speaker. Other speakers included Major General Randy Taylor, senior commander of Aberdeen Proving Ground and Mr. John Resta, Director of the Army Public Health Center. The day began at 8:30 AM with Center-wide exhibits and demonstrations in the Stark Recreation Center. Following the ceremony, participants enjoyed lunch, and APHC facilities were open for visitors in the afternoon.

Timeline 2: Military Preventive, Occupational and Environmental Medicine

1753: Scurvy Prevention and Treatment Discovered for Sailors.[123,124]

Royal Navy Surgeon James Lind studied sailors at sea and found citrus fruit could prevent and cure scurvy;

Figure 11. Army Surgeon General Lieutenant General Nadja West served as the keynote speaker at USAPHC 75th anniversary celebration in 2017.

he published "A Treatise of the Scurvy." In 1937, Albert Szent-Györgyi received the Nobel Prize for discovering Vitamin C as the preventive and curative component of citrus fruit.

1775: Continental Army Hospital Department Established.[125]

Early in the Revolutionary War (1775-1783), the Continental Congress established the Hospital Department.

1777: Variolozation against Smallpox Ordered for the Continental Army.[126]

General George Washington issued the order for inoculating soldiers of The Continental Army with material from smallpox patients with intent of producing protection without severe disease.

1777: Health of Soldiers Related to Dress, Diet, Cleanliness, Encampment, and Exercise.[126,127]

Revolutionary War physician Benjamin Rush published "Directions For Preserving the Health of Soldiers" for Army officers, addressing dress, diet, cleanliness, encampments, and exercise.

1812: Soldier Health Related to Small, Ventilated, Scattered Hospitals.[129]

During The War of 1812 (1812-1815), Physician General James Tilton advocated for small, ventilated, scattered hospitals to improve soldier health.

1815: Military Weapons Cause Deafness.[127,128,130]

Revolutionary War Surgeon Benjamin Rush described hearing loss associated with artillery fire.

1818: The Army Medical Department Established.[131]

The first Army Surgeon General, Joseph Lovell, ordered Army physicians to record weather conditions and investigate relationships between disease and weather. These actions led to the creation of the US Weather Bureau.

1861: Sickness Abounds in the Union Army.[128,132]

The Union Army went from 15,000 to about 500,000 soldiers with the induction of unseasoned volunteers.

Figure 12. US Army Industrial Hygiene Laboratory was established in The Johns Hopkins University School of Hygiene and Public Health, Baltimore, Maryland, 1942.

The Army Medical Department was reported to be small, weak, and disorganized, without innovations in sanitation and hygiene. Union troops experienced considerable disease. Confederate forces suffered a similar or worse experience.

1865: Health in the Union Army Improves.[128,132]

Incomplete records show the health of Union troops improved after the first year of the Civil War (1861-1865). This was attributed to the seasoning of troops in uniform and some improvements in sanitation and hygiene. Attention was given to a Sanitary Commission, sanitation inspections and medical education, but the Civil War is not remembered for great contributions to Military Preventive Medicine.

1892: Publication of the First American Textbook of Bacteriology.[133]

Army physician George M. Sternberg published the first American textbook of bacteriology.

1893: The Army Medical School Established.[131,134]

The Army Medical School in Washington, DC, was the first school of public health and preventive medicine in the United States. It became the Walter Reed Army Institute of Research (WRAIR).

1898: Transmission of Typhoid and Preventive Measures Described.[134]

The Typhoid Board, led by Major Walter Reed, described how typhoid was transmitted and developed sanitary procedures to prevent Army camp outbreaks.

1900: Yellow Fever Described as a Viral Disease Transmitted by a Mosquito.[134]

Major Walter Reed, other members of the Yellow Fever Commission, and Cuban researcher Carlos J. Finlay, established that the hemorrhagic disease Yellow Fever was caused by a virus and transmitted by a mosquito.

1909: First Typhoid Vaccine in America.[134]

Major Frederick F. Russell, Army Medical School professor of bacteriology, developed the first typhoid vaccine in America.

1910: Liquid Chlorine Method of Water Purification Developed.[134]

Army Medical School Professor of Chemistry, Major Carl Rogers Darnall, developed the liquid chlorine method of water purification, a process now widely used around the world.

1915: First Major Military Gas Attack.[135]

The first major gas attack of World War I occurred on April 22; German forces fired 150 tons of chlorine gas at French forces in Ypres, Belgium. By war's end, more than 100,000 tons of chemical agents had been used; approximately 500,000 troops were injured, and almost 30,000 died from the agents.

1917: Occupational Exposures in US Munitions Plants Cause Morbidity and Mortality.[48]

American Occupational Medicine pioneer, Dr. Alice Hamilton, and others documented occupational exposures in US munitions plants as causes of morbidity and mortality.

1918: Carbon Monoxide a Health Threat to Soldiers Using Tanks and Machinge Guns.[48,136]

The French Army identified carbon monoxide from tank main guns and machine guns as threats to the health of soldiers who used these weapons. Casualties were described.

1938: Medical Services Added to First Aid Services at US Government Plants.[48]

The Army Chief of Ordnance requested that medical services be added to existing first aid services for civilian employees in government industrial plants. As a result, contract surgeons provided examinations for workers with potentially hazardous exposures.

1941: Industrial Hygiene Section Established in the Army Surgeon General's Office.[48]

An Industrial Hygiene Section was established in the Preventive Medicine Division of the Office of the Army Surgeon General.

1941: Military Weapons Cause Deafness.[50]

Research by the US Military resulted in a recommendation for use of hearing protective devices by gun crews, gunnery instructors, and all personnel regularly exposed to gunfire.

1942: Occupational Health Division Formed in the Army Surgeon General's Office.[48]

A separate and distinct Occupational Health Division was formed in the Office of the Army Surgeon General.

1942: Armored Force Medical Research Laboratory Established.[137,138,139]

The Armored Force Medical Research Laboratory was established at Fort Knox, Kentucky, to study occupational exposures of tank crew members, to include toxic gases and heat stress.

1942: US Army Industrial Hygiene Laboratory (AIHL) Established.[48]

In October, the US Army Industrial Hygiene Laboratory (AIHL) was established in The Johns Hopkins University School of Hygiene and Public Health, Baltimore, Maryland.

1943: Climatic Research Laboratory Established.[48]

The Climatic Research Laboratory was established in Lawrence, Massachusetts, to simulate all climatic conditions to which soldiers might be exposed and to research the impact of these on the clothing and equipment of soldiers and on the soldiers themselves.

1943: The US Army Audiology and Speech Center Established at Walter Reed Hospital.[140,141]

Studies done at Walter Reed Hospital Audiology and Speech Center in Washington, District of Columbia, and at Fort Knox, Kentucky, resulted in the identification of occupational noise exposures and lead to the development of the Army Hearing Conservation Program.

1944: US Military Policy on Pregnant Civilian Workers Issued.[48]

The War Department issued a policy on pregnant civilian workers that prescribed work hours, required a safe workplace, and ensured job seniority would not be lost.

1945: US Army Industrial Hygiene Regulation Published.[142]

US Army Regulation 40-220, Industrial Medical Program, was published, becoming the first Army regulation on industrial hygiene.

1948: US Air Force Requires Noise Measurements to Identify Noise Hazardous Areas.[143]

Large numbers of US service members returning from World War II stimulated interest in hearing conservation. In 1948, the US Air Force issued its first regulation on hazardous noise, Air Force Regulation 160-3, Precautionary Measures Against Noise Hazards, which

required noise measurements.

1950: Malaria in United Nations Forces in Korea.[144]

During the Korean War (1950-1953), nearly 8,500 United Nations allied forces came down with malaria while in Korea or after leaving Korea.

1950: Cold Injuries in US Forces in Korea.[145]

Osaka Army Hospital, Japan, was the center for US forces evacuated from Korea with cold injuries. More than 4,000 US service members were admitted to the Cold Injury Section of Osaka Army Hospital, but many other cold injury casualties evacuated from Korea were sent elsewhere.

1956: Technical Bulletin Medical (TB Med) 251, Noise and Conservation of Hearing Published.[146,147]

This inaugural publication outlined requirements for hearing conservation programs and maximum noise exposure levels. Revisions occurred in 1965 and 1972, and in 1980 it was renamed TB MED 501, Hearing Conservation. TB MED 501 was replaced by Department of the Army Pamphlet (DA Pam) 40-501.

1961: Agent Orange Application Started in Vietnam.[148]

US Forces in Vietnam began application of Agent Orange, chemical defoliants containing traces of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), used to deny the enemy cover and food crops. During 1961-1972, Operation Ranch Hand sprayed >19 million gallons on >4.5 million acres.

1963: US Army Acoustical Design Criteria Developed for New Materiel.[38]

The US Army Human Engineering Laboratory, Aberdeen Proving Ground, Maryland, developed a standard for the first uniform method for establishing acoustical design criteria for the Army (HEL S-1-63).

1968: Six Thousand Sheep Die near Dugway Proving Ground, Utah.[149]

On the morning of 14 March 1968, 6,000 sheep were found dead in Skull Valley, Utah, 27 miles from Dugway Proving Ground. A week later, US Senator Frank Moss from Utah released a Pentagon document describing a 13 March 1968, test in which a jet released 320 gallons of the nerve agent VX over Dugway in a weapons test. An equipment malfunction released the chemical agent at a higher altitude than planned, which allowed it to drift far from Dugway Proving Ground.

1970: Effective Vaccine for Meningococcal C Meningitis Developed by the Army.[150,151]

Historically military recruits were at high risk for acquiring meningococcal disease, particularly disease caused by Group C. Dr. Malcolm Artenstein and his group at the Walter Reed Army Institute of Research, Washington, DC, developed and tested a Group C meningococcal polysaccharide vaccine that was associated with an 87 per cent reduction in Group C disease.

1971: Novel Adenovirus Vaccine Program Controls Respiratory Disease in Recruits.[152]

Adenovirus vaccines types 4 and 7 significantly controlled acute respiratory disease in trainees.

1972: Veitnam War (1965-1972) Ocular Injury Casualties Are 6.0-9.5% of all Casualties.[5,153,154]

American soldiers struck in the eye had a greater than 50% chance of losing it.

1975: US Military Medical Teams Support Camps for Vietnamese Refugees.[155,156]

Following the fall of Saigon and the end of the war in Vietnam, US military teams supported camps for fleeing Vietnamese refugees in the Pacific and the continental United States (CONUS).

1975: Significant Hearing Loss in US Combat Arms Soldiers.[157]

About 20-30% of all combat arms soldiers with more than 1.5 years of service had significant hearing loss; more than 50% of those with more than 15 years of service had significant hearing loss.

1976: Swine Influenza Outbreak at Fort Dix, New Jersey, Causes National and Global Concern.[158]

Discovery of a novel influenza strain in military recruits, related to the influenza pandemic strain of 1918, with mortality, raised concern about a possible, deadly influenza pandemic.

1978: DoD Requires Services to Monitor Noise Hazardous Areas with Sound Surveys.[159,160]

Noisy environments are common in the military, and the sources of noise are varied and related to the equipment and missions of the different uniformed services. Following World War II, many military sites began collecting and maintaining information on hazardous noise. In the late 1970s, the DoD initiated an overall hearing conservation program with a requirement for period surveys of noise hazardous areas and publication of Department of Defense Instruction 6055.3: Hearing Conservation.

1979: Vietnam Veterans Agent

Orange Class Action Lawsuit.[148]

About 2.4 million Vietnam veterans, claiming exposure to Agent Orange during their military service, filed a class action lawsuit.

1984: US Army Occupational Medicine Physician Assistant Model Program Started.[48]

A model program for uniformed Occupational Medicine Physician Assistants to establish and operate Occupational Medicine Programs for soldiers was initiated at Fort Campbell, Kentucky.

1991: US Forces Exposed to Kuwaiti Oil Well Fires.[62,161]

In the First Gulf War, from February to November, Iraqi forces ignited oil wells, producing fires with dense clouds of soot, liquid, gasses, and aerosols, with varying exposures for US Armed Forces.

1991: US Forces Provide Humanitarian Assistance to Kurds Fleeing Iraq Retaliation.[162,163,164]

After the 1991 Persian Gulf War, 1.5 million Kurds fled to northern Iraq after a failed revolt and were stranded in freezing mountain passes on the Turkey-Iraq border. Operation Provide Comfort provided relief.

1991: Agent Orange Act Signed.[148]

President George H.W. Bush signed the Agent Orange Act, mandating selected diseases associated with defoliants (e.g., chloracne) be classified as occurring as the result of wartime service. The Act supported the Department of Veterans Affairs response to Veterans' conditions related to Agent Orange exposure.

1991: Gulf War Veterans Concerned about Health Effects from Depleted Uranium.[165]

Depleted uranium was widely used in the First Gulf War (1990-1991). Concern arose about adverse health effects among service members potentially exposed.

1991: US Forces Report Possible Chemical Warfare Agent Exposures in Iraq.[166]

Concerns about US service members being exposed to chemical agents in Iraq surfaced. The first site to receive considerable attention was the Iraqi chemical weapons site at Khamisiyah. Investigations of reports of possible exposures and identification and follow-up of service members involved would continue for the next quarter century.

1991: The Conundrum of Gulf War Illness.[167]

Possibly hundreds of thousands of veterans of the 1990-1991 Gulf War complained of diverse symptoms that collectively came to be called Gulf War Illness (GWI). Despite extensive studies, GWI has never been adequately explained using established medical diagnostic criteria, and a cause and effect relationship has never been established.

1995: Concern about US Forces Exposures to Pollution in the Former Yugoslavia.[88]

Following a decade of ethnic conflicts, US troops were deployed to the former Yugoslavia during 1995-1999 to promote stability and provide security. With complaints about air pollution and concerns about environmental contamination, military leaders feared post-deployment health problems like Gulf War Illness.

1999: The Successful Military Adenovirus Vaccine Program in Recruits Ended.[168]

The successful immunization program against adenovirus types 4 and 7 terminated in 1999, when all vaccine stocks were depleted and the vaccine was not being manufactured. Considerable morbidity and mortality followed.

2001: Attacks on the World Trade Center and Pentagon.[169]

On September 11, the terrorist group al-Qaeda attacked the World Trade Center in New York City, and the Pentagon. The US Army responded to both sites.

2001: Anthrax Attacks on the United States.[170]

Anthrax attacks came as two sets of anthrax letters were sent through the US mail, causing morbidity, mortality, contamination of buildings and concern about the possible contamination of the US military mail system.

2003: US Forces Exposed to Carcinogenic Hexavalent Chromium in Iraq.[113]

Following initiation of U S. military activity in Iraq, US Army National Guard troops from four states provided security at the Qarmat Ali Water Treatment Plant, which was contaminated with the industrial chemical sodium dichromate, which includes carcinogenic hexavalent chromium.

2003: Nuclear Contamination in Iraq.[172]

The Al Tuwaitha Nuclear Research Center in Iraq, had been bombed and looted by civilians, creating significant contamination over several kilometers.

2003: US Forces Exposed to Large Release of Sulfur Dioxide in Iraq.[173]

The largest recorded man-made release of sulfur dioxide occurred following a deliberately set fire at the Mishraq State Sulfur Mine Plant, Iraq, with US forces

being exposed.

2004: Fashionable Ballistic Protective Eyewear Made Available to US Forces.[174]

With the availability of commercial, fashionable eyewear, compliance with wearing protective eyewear increased dramatically to greater than or equal to 85%; and eye injuries decreased, even as enemy attacks increased in Iraq.

2004: Industrial Pollution at Ash Shuaiba Port, Kuwait.[175]

The Ash Shuaiba Port Industrial Area, Kuwait, had been used by US forces as a Sea Port of Debarkation/Embarkation. Industrial pollution was an ongoing problem and significant environmental incidents occurred during 2004-2006.

2007: Injuries Are the Leading Cause for Outpatient Clinical Visits.[176]

Department of Defense data revealed injuries were the leading cause of outpatient clinical visits; and musculoskeletal injuries accounted for an estimated 25 million limited-duty days per year.

2009: Influenza A (H1N1) Pandemic.[177,178]

The earliest cases were identified by US military laboratories in California and Texas.

2010: Post-Traumatic Stress Disorder 2-4 Times More Common in Combat Veterans.[179]

The point prevalence of combat-related post-traumatic stress disorder (PTSD) across studies of US combat veterans ranged from 2% to 17%. Compared to US civilians, combat veterans had a two- to four-fold increase in PTSD prevalence.

2011: Traumatic Brain Injury (TBI) Diagnoses Reach an Annual High in US Forces.[180]

TBI was diagnosed in 32,829 US service members, the highest annual number reported by the Defense and Veterans Brain Injury Center from 2000 through 2015.

2011: A New Adenovirus Vaccine Program Greatly Reduces Recruit Respiratory Disease.[104]

Reductions in acute respiratory disease were dramatic and persisted.

2012: Worst Year for Suicides in US Service Members in Recent History.[181]

Suicides in US service members reached 321, the worst year for military suicides in recent history. The Army's suicide rate was almost 30/100,000; the national rate was 12.5/100,000.

2014: The New York Times Reports Chemical Weapons Injuries to US and Iraqi Forces.[114]

The New York Times reported that from 2004 to 2011, US and Iraqi forces found and were injured by old chemical weapons stored in bunkers or buried.

2014: Veterans Concerned about Health Effects from Military Burn Pit Exposures.[182]

The United States had been disposing of trash in large, continuously operating open burn pits since 2001 in Afghanistan and 2003 in Iraq. These were associated with huge smoke clouds, respiratory irritation and concerns about associated health effects. On June 19, the Department of Veterans Affairs (VA) opened the VA Airborne Hazards and Open Burn Pit Registry to ascertain and monitor health effects in veterans.

Timeline 3: Civilian Preventive, Occupational and Environmental Medicine and Public Health History

1713: Ramazzini Publishes Diseases of Workers.[183,184]

Italian physician Bernardino Ramazzini published *De Morbis Artificum Diatriba* (Diseases of Workers), describing the health hazards of workplace exposures for more than 50 occupations. He recommended that physicians ask their patients "What is your occupation?"

1796: Jenner Develops a Successful Smallpox Vaccination.[185]

Englishman Edward Jenner developed a vaccination against smallpox.

1847: Semmelweis Reduces Puerperal Fever with Hand Washing.[186]

Hungarian physician Ignaz Semmelweis discovered that hand washing in obstetrical clinics could reduce the incidence of puerperal or childbed fever, a potentially deadly infection.

1854: John Snow Removes the Broad Street Pump Handle to Stop Cholera.[187,188]

In London, Dr. John Snow acquired data that convinced him the source of a cholera epidemic was the Broad Street water pump. The pump handle was removed on September 8, 1854.

1870: Pasteur and Koch Develop the Germ Theory of Disease.[189]

Frenchman Louis Pasteur and Robert Koch, a German, developed the germ theory (infectious diseases are caused by microorganisms), and supported their theory with scientific data.

Figure 13. Colonel Wesley C. Cox, Medical Corps, US Army (front row, center), commanded the US Army Industrial Hygiene Laboratory and US Army Environmental Health Laboratory, predecessors of the Army Public Health Center, from 1946 until his untimely death in 1953. Building E-2100 in the Edgewood Area of Aberdeen Proving Ground, MD, was later named in his honor. Colonel Cox is with administrative staff, physicians, engineers, industrial hygienists, chemists, and other scientists.

1881: Pasteur Uses Microbe Attenuation as a Process for Making Vaccines.[190]

Louis Pasteur discovered how to attenuate or weaken microorganisms, which he used to make vaccines. He successfully demonstrated a protective anthrax vaccine in animals.

1885: Pasteur Demonstrates a Successful Rabies Vaccine.[190]

Pasteur successfully treated his first human patient with rabies vaccine, a young boy who had been bitten by a rabid animal.

1890: Antitoxin Treatment for Tetanus and Diphtheria Discovered.[191]

Prussian Emil von Behring, with Japanese scientist Shibasaburo Kitasato and others, discovered that antitoxins could be developed to counter the toxins produced by the tetanus and diphtheria microorganisms, and used this technology to develop vaccines.

1906: Pulmonary Failure Death in an Asbestor Worker Documented.[192]

The first death from pulmonary failure in an asbestos worker was documented in London, large numbers of asbestos fibers were identified in his lungs.

1918: Influenza A (H1N1) Pandemic.[193,194]

The "Spanish" influenza A (H1N1) pandemic of 1918–1919 caused an estimated 50 million deaths worldwide.

1928: Penicillin Discovered.[195]

Scotsman Alexander Fleming discovered penicillin, a substance from mold that inhibited growth of bacteria.

1932: 764 Workers Drilling and Blasting Hawk's Nest Tunnel Die from Silicosis.[196]

Hawk's Nest (West Virginia) Tunnel construction (1930-1932) resulted in an estimated 764 men dying from silicosis and related diseases. Underground drilling and blasting of high grade, silica-bearing sandstone occurred with poor ventilation and a lack of dust control and personal breathing protection.

1943: Alice Hamilton's *Exploring the Dangerous Trades* Published.[197]

Exploring the Dangerous Trades: The Autobiography of Alice Hamilton was published. Hamilton's formal investigations into the association between occupational exposures and diseases began in 1910, and resulted in her international recognition as an expert in lead and other workplace exposures.

1948: Air Pollution Kills 20 People in Donora, a Mill Town.[198]

Fog mixed with industrial air pollutants hung over Donora, a Pennsylvania mill town, for 5 days, killing 20 people and causing illness in thousands more.

1955: Salk Polio Vaccine Safe and Effective.[199]

The killed polio vaccine developed by American Jonas Salk was declared safe and effective.

1956: Minamata, Japan, Neurological Disease Caused by Mercury Contamination.[200]

An outbreak of a central nervous system disease in people and animals was identified in Minamata, Japan. Minamata disease was determined to be caused by

consuming seafood from Minamata Bay, contaminated with organic mercury from an industrial plant.

1957: Influenza A Virus (H2N2) Pandemic.[201]

The 1957 Asian Influenza Pandemic offered the first opportunity to study how an influenza epidemic subsides. The decreasing incidence of clinical cases was attributed to either an increase in antibody levels in the community or a change in virus virulence.

1962: Nobel Prize Given for Discovery of the Structure of DNA.[202]

Englishman Francis Crick, American James Watson, and New Zealander Maurice Wilkins received the Nobel Prize for describing the structure of DNA (deoxyribo-nucleic-acid).

1968: Influenza A Virus (H3N2) Pandemic.[201]

As in 1957, a pandemic influenza virus came out of Southwest Asia; the event became known as the 1968 Hong Kong Influenza Pandemic.

1970: Occupational Safety and Health Administration (OSHA) Created.[203]

OSHA was created by the Occupational Safety and Health Act of 1970 to assure safe and healthful working conditions by setting and enforcing standards and providing training, education, and assistance.

1970: National Institute for Occupational Safety and Health (NIOSH) Established.[204]

NIOSH was established by the Occupational Safety and Health Act of 1970 as part of the US Centers for Disease Control and Prevention. The first goal for NIOSH was to conduct research in order to reduce worker illness and injury.

1976: Dioxin Industrial Accident Contaminates Seveso, Italy.[205]

An industrial accident contaminated Seveso, Italy, and other towns with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), resulting in the highest known exposure of a residential population to this compound. Subsequent studies found the main health effect to be chloracne, with possible links to other serious conditions.

1978: Love Canal (New York) Residential Community Contaminated by Industrial Waste.[206]

At Love Canal, New York, after heavy rains, 82 different chemicals, including 11 suspected carcinogens, percolated from industrial waste buried in a covered-over canal into the yards and basements of 100 homes and a school.

1979: Partial Meltdown at Three Mile Island (Pennsylvania) Nuclear Power Plant.[207]

Three Mile Island (Pennsylvania) Unit 2 nuclear reactor partially melted down. This was the most serious accident in US nuclear power plant history, but the radioactive release was small. Studies done by Columbia University (New York) and the University of Pittsburgh (Pennsylvania) found the release had negligible effects on human physical health or the environment.

1979: Anthrax Spores Released in the Soviet Union.208

A Soviet Union military facility in Sverdlovsk/Yekaterinburg accidentally released anthrax spores that produced death and disease in humans and animals over a 50 kilometer path. In the deadliest human outbreak of inhalational anthrax, at least 66 people died.

1981: Acquired Immunodeficiency Syndrome (AIDS) Cases Reported.[209]

The first cases of acquired immunodeficiency syndrome (AIDS) were reported.

1982: Town of Times Beach Contaminated by Dioxin.[210]

Times Beach, Missouri, a town of fewer than 2,000 people learned it was contaminated by dioxin. Oil used to control dust on roads and other areas had been contaminated with dioxin industrial waste. The town was evacuated, becoming a ghost town with a generation of health concerns and the loss of property, community, neighbors, friends, identity, and security.

1984: Worst Industrial Accident in History Occurs in Bhopal, India.[211,212]

A leak released more than 40 tons of methyl isocyanate gas from a pesticide plant, killing more than 3,800 people and causing premature death and morbidity for thousands more.

1986: Largest Uncontrolled Radioactive Release in History Occurs oin Ukraine.[213]

A power surge at the Chernobyl Nuclear Power Plant in the Ukraine caused a fire and the release of massive amounts of radiation into the environment. Severe radiation effects killed 28 workers within four months; more than 100 workers received doses high enough to cause radiation sickness.

1989: Gigantic Oil Spill Devastates Alaska Environment.[214]

The oil tanker Exxon Valdez ran aground on Bligh Reef, Alaska, releasing approximately 11 million gallons of

oil. Estimated animal deaths include 250,000 seabirds, 2,800 sea otters, 300 harbor seals, 250 bald eagles, and up to 22 killer whales.

1993: Largest Drinking Water Outbreak of Gastrointestinal Disease in US History.[215,216]

The outbreak, caused by cryptosporidium, occurred in the Milwaukee, Wisconsin, area; more than 400,000 people were estimated to have been affected.

1993: Polymerase Chain Reaction (PCR) Process Discovered.[217]

Dr. Kary Banks Mullis received the Nobel Prize in chemistry for his invention of the polymerase chain reaction (PCR), a process he conceptualized in 1983. PCR is used in a wide variety of applications in clinical and research laboratories, to include multiple diagnostic tests.

1993: World War I Chemical Agents Found in Washington, DC.[218]

Toxic waste from chemical warfare agent experiments by the US Army and American University were discovered in the elite neighborhood of Spring Valley, Washington, DC. Cleanup work (excavation and restoration) is ongoing.

2001: World Trade Center and Pentagon Attacked on September 11.[219]

In the attack on America, 19 Islamic terrorists hijacked four commercial airliners, flying three into the World Trade Center in New York and the Pentagon in Washington, DC. The fourth plane crashed in Pennsylvania. More than 3,000 died and many were exposed to the pollution from the destroyed buildings and the combustion products of the fires that occurred.

2001: Five Die in Anthrax Attacks on America.[220]

An anthrax attack on America began soon after the airplane terrorist attacks of September 11. In the worst biological attack in US history, anthrax spores were sent in the US mail, killing five and causing illness in 17.

2003: SARS-CoV Spreads Rapidly and Kills Many.[221]

Severe acute respiratory syndrome-associated coronavirus (SARS-CoV) was first reported in Asia in February. Within a few months, it spread to more than 24 countries on four continents. Before being contained in 2003, 8,098 became sick and 774 died.

2005: Asbestos Banned Throughout the European Union.[193]

More than 50 countries have banned asbestos. The US has not.

2009: Influenza A (H1N1) Pandemic.[177,178]

The first case of Influenza A (H1N1) was identified in a young boy in southern California.

2010: Largest Marine Oil Spill in History Occurs in the Gulf of Mexico.[222]

Deepwater Horizon oil spill, caused by an explosion in an offshore oil rig in the Gulf of Mexico, released up to 60,000 barrels of oil per day from April 20 to September 17, resulting in the disruption of Gulf fishing industries and taking a heavy toll on the environment.

2011: Second Worst Nuclear Power Accident in History Occurs in Japan.[223]

The Fukushima Daiichi nuclear plant accident occurred in Japan. Following an earthquake, Tsunami waves damaged the plant, leading to the release of radiation and causing the second worst nuclear accident in nuclear power generation.

2014: Largest and most Complex Ebola Outbreak in History Starts in West Africa.[224,225]

The deadly Ebola virus disease has a case fatality rate of about 50%. The virus was first discovered in 1976, and passes from person-to-person. The 2014-2016 West Africa outbreak presented a global health emergency; the Ebola virus disease continues to remain a global health threat.

2016: World Health Organization Declares a Public Health Emergency for Zika Virus.[226]

The World Health Organization declared a Public Health Emergency of International Concern because infections with the mosquito-borne Zika virus were associated with microcephaly and other severe fetal nervous system defects. Zika transmission and infection remain significant, ongoing public health challenges.

Timeline 4: Legal and Regulatory Actions, Preventive, Occupational and Environmental Medicine and Public Health History

1916: Federal Employees' Compensation Act (FECA).[227]

The Federal Employees' Compensation Act (FECA, 5 USC. 8101 et seq.) established a comprehensive workers' compensation program which paid for disability or death of a federal employee from injury sustained in the performance of their work.

1942: Public Law 530 Paved the Way for the Army Industrial Hygiene Laboratory.[2]

Passed by the 77th Congress in April, the law, pursuant to provisions of the act and the designation by the Secretary of War, required the Division of Engineers, Middle Atlantic Division, to make alterations to the premises of the Johns Hopkins University for the Army Industrial Hygiene Laboratory, for military purposes necessary for the prosecution of the war.

1946: Congress Mandates Health Programs for Government Employees.[2]

Public Law 658, passed by the 79th Congress in August, required Health Programs for Government Employees and required the Office of the Army Surgeon General to carry forward the Army Industrial Hygiene Program, conducting research and plans for the integration of Public Law 658 in the program of public health for all civilian employees of the War Department.

1947: California Air Pollution Control Act.[228]

This Air Pollution Control Act authorized the creation of an Air Pollution Control District in every county of the state of California, including the Los Angeles County Air Pollution Control District. It was the first of its kind in the nation.

1948: Federal Water Pollution Control Act.[229]

The Federal Water Pollution Control Act (Clean Water Act, 33 USC. 1251 - 1376; Chapter 758; PL 845, June 30, 1948; 62 Stat. 1155) authorized the Surgeon General of the Public Health Service, with other federal, state and local entities, to prepare comprehensive programs for eliminating or reducing pollution of interstate waters and tributaries and improving the sanitary condition of surface and underground waters.

1955: Air Pollution Control Act of 1955.[230]

This Act (PL 84–159, chapter 360, 69 Stat. 322) was the first Clean Air Act in the US enacted by Congress to address national air pollution issues and provide research funds.

1963: Clean Air Act (CAA) of 1963.[230]

This Act (PL 88-206 42 US Code § 7401 et seq., 40 C.F.R. Subchapter C, Parts 50-97) was the first federal legislation to actually pertain to controlling air pollution. It established a federal program within the US Public Health Service and authorized research into techniques for monitoring and controlling air pollution.

1964: Wilderness Act of 1964.[231]

This Act (PL 88-577) created the legal definition of wilderness in the US and protected 9.1 million acres of federal land.

1965: National Emissions Standards Act.[232]

This Act (PL 90-148, 81 Stat. 485, Title II of the Clean Air Act (CAA)) represents an evolving federal framework in which automobile pollution was regulated. Originally, Title II was originally called the Motor Vehicle Pollution Control Act when enacted in 1965. The goal of Congress was to establish national automobile pollution standards.

1965: Solid Waste Disposal Act of 1965.[233]

This act was the first federal effort to improve waste disposal technology in response to an increase in solid waste generation.

1967: Air Quality Act of 1967.[234,235]

This act ((Clean Air Act (CAA) (42 USC. 7401 et seq.)) mandated enforcement of interstate air pollution standards and authorized ambient monitoring studies and stationary source inspections.

1969: Federal Coal Mine Health and Safety Act of 1969.[236]

This act established standards to reduce dust in mines and created the Black Lung Disability Trust to provide compensation for black lung disease.

1970: National Environmental Policy Act (NEPA).[237]

NEPA promoted the enhancement of the environment and established the president's Council on Environmental Quality.

1970: Birth of the US Environmental Protection Agency (EPA).[238]

In July, President Nixon signed Reorganization Plan Number 3, establishing the US Environmental Protection Agency (USEPA) and the National Oceanic and Atmospheric Administration (NOAA). On December 2, EPA's first Administrator, William Ruckelshaus, was confirmed by the Senate.

1970: Occupational Safety and Health Act.[239]

This act mandated employers to provide employees with sanitary working environments free of recognized hazards, to include toxic chemicals, hazardous noise, heat and cold stress, and mechanical dangers.

1970: Clean Air Act (CAA) of 1970.[239]

Act 42 ((USC. §7401 et seq. (1970)) represented a major revision of the CAA of 1963. The 1970 CAA established National Ambient Air Quality Standards and National Emission Standards for Hazardous Air Pollutants, among many other provisions.

1972: Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act).[240]

This legislation amended the first major US water pollution law, the Federal Water Pollution Control Act of 1948. This act added the National Pollutant Discharge Elimination System (NPDES), a permit system for regulating point sources of pollution and other innovations. Amendments followed in the Clean Water Act of 1977 and the Water Quality Act of 1987.

1972: Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).[241]

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) set up the basic US system of pesticide regulations to protect applicators, consumers, as well as the environment.

1972: Marine Protection, Research, and Sanctuaries Act (MPRSA).[242]

MPRSA, also known as the Ocean Dumping Act, prohibited the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment.

1973: Endangered Species Act of 1973.[243]

This act (ESA; 16 USC. § 1531 et seq.) carried out the provisions of The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which were designed to protect imperiled species from extinction. The act is administered by United States Fish and Wildlife Service and the National Oceanic and Atmospheric Administration.

1974: Safe Drinking Water Act (SDWA).[244,245]

The Safe Drinking Water Act (SDWA) is the principal US law for ensuring safe drinking water for the public. The EPA is required to set drinking water quality standards and oversee all states, localities, and water suppliers who implement these standards.

1976: Resource Conservation and Recovery Act (RCRA).[246]

RCRA is the principal US law governing the disposal of solid and hazardous waste. It is known for regulations that set standards for the treatment, storage, and disposal of hazardous waste.

1976: Toxic Substances Control Act (TSCA).[247]

TSCA is administered by the EPA and regulates the introduction of new and existing chemicals. When TSCA came into effect, all existing chemicals were considered safe for use.

1977: Surface Mining Control and Reclamation Act (SMCRA).[248]

The Surface Mining Control and Reclamation Act (SMCRA) provided for cooperation between the Secretary of the Interior and states for the regulation of surface coal mining operations, the acquisition and reclamation of abandoned mines, and for other purposes.

1980: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[249]

CERCLA created the "Superfund Program," authorizing federal agencies, primarily the EPA, states and Native American tribes to recover natural resource damages caused by hazardous substances. It created the Agency for Toxic Substances and Disease Registry.

1982: The Nuclear Waste Policy Act of 1982.[250]

This US law established a comprehensive national program for the safe, permanent disposal of highly radioactive wastes.

1984: Veterans' Dioxin and Radiation Exposure Compensation Standards Act (PL 98-542).[251]

This law provided compensation for veterans exposed to Agent Orange defoliant used in Vietnam and ionizing radiation from the detonation of nuclear devices in connection with testing or the occupation of Hiroshima or Nagasaki, Japan, before July 1, 1946.

1986: Safe Drinking Water Act Amendments of 1986.[252]

These required the EPA to apply future National Primary Drinking Water Regulations (NPDWRs) to both community and non-transient, non-community water systems (e.g., schools, factories, office buildings, and hospitals having their own water systems) when it evaluated and revised current regulations.

1986: Emergency Planning and Community Right-to-Know Act (EPCRKA) of 1986.[253]

In response to concerns after the 1984 disaster in Bhopal, India, this US law, dealing with emergency response preparedness, was created to help communities plan for chemical emergencies. It required industry to report on the storage, use, and releases of hazardous materials and substances.

1986: Superfund Amendments and Re-Authorization Act (SARA).[254]

SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), reflecting EPA's experience in administering the

Superfund program. It made important changes and additions to the program, stressing permanent remedies and innovative treatment technologies in cleaning up hazardous sites.

1989: Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and Their Disposal.[255]

Known as the Basel Convention, this international treaty was designed to reduce movement of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries.

1989: Montreal Protocol on Substances that Deplete the Ozone Layer.[256]

This international treaty, signed by the US, was designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion.

1990: Clean Air Act Amendments of 1990.[257]

These amendments increased the authority and responsibility of the federal government and greatly expanded controls for toxic air pollutants. New regulatory programs were authorized for control of acid deposition (acid rain) and for the issuance of stationary source operating permits.

1990: The Oil Pollution Act of 1990 (101 H.R. 1465, PL 101-380).[258]

This act works to avoid oil spills from vessels and facilities by enforcing removal of spilled oil and assigning liability. It requires specific operating procedures, implements processes for measuring damages for which violators are liable, and establishes a fund for damages, cleanup, and removal costs.

1992: The Residential Lead-Based Paint Hazard Reduction Act.[259]

The Residential Lead-Based Paint Hazard Reduction Act was passed to protect young children and families from harmful exposure to lead in paint, dust, and soil.

1994: Executive Order 12898 on Environmental Justice.[260]

This executive order was issued to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

1996: Mercury-Containing and Rechargeable Battery Management Act.[261]

This law (PL 104-142) phased out the use of mercury in batteries and provided for the efficient and cost-effective collection and recycling, or proper disposal of, used nickel cadmium batteries, small sealed lead-acid batteries, and certain other batteries

1996: Food Quality Protection Act (FQPA).[262]

The FQPA (H.R.1627) standardized how the EPA would manage the use of pesticides and amended the Federal Insecticide, Fungicide and Rodenticide Act, and the Federal Food Drug and Cosmetic Act. It mandated a health-based standard for pesticides used in foods and provided special protections for babies and infants, among other provisions.

1996: Safe Drinking Water Act Amendments.[244,245]

Congress amended the existing Safe Drinking Water Act to emphasize sound science and risk-based standard setting small water supply system flexibility, community-empowered source water assessment and protection, public right-to-know, and water system infrastructure assistance through a multibillion-dollar state revolving loan fund.

1997: Kyoto Protocol.[263]

The Kyoto Protocol, an international treaty, extended the 1992 United Nations Framework Convention on Climate Change that committed state parties to reduce greenhouse gas emissions, based on the premise that (a) global warming exists, and (b) human-made CO2 emissions have caused it. The protocol was adopted in Kyoto, Japan, on 11 December, and entered into force on 16 February 2005.

2002: Small Business Liability Relief and Brownfields Revitalization Act.[264]

PL 107-118, 115 stat. 2356, "the Brownfields Law," amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund Program) by providing funds to assess and clean brownfields (real property complicated by actual or possible hazardous contamination), clarifying CERCLA liability protections and providing funds to enhance state and tribal response programs.

2005: The Energy Policy Act of 2005 (PL 109–58).[265]

This bill attempted to combat growing energy problems and change US energy policy by providing tax incentives and loan guarantees for energy production

of various types.

2007: The Energy Independence and Security Act of 2007 (PL 110-140).[266]

This act was "to move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes."

2016: Frank R. Lautenberg Chemical Safety for the 21st Century Act (PL 114-182).[267]

This act modernized the 1976 Toxic Substances Control Act (TSCA). It provided the EPA with the tools needed to ensure chemicals in commerce are safe for consumers, created a new system for EPA to evaluate and manage risks associated with chemicals already on the market, and set deadlines for EPA to take action.

Timeline 5: United States Wars, Military Conflicts, and Operations

1775 – 1783: American Revolution[268]

1812 – 1815: War of 1812[269]

1846 – 1848: Mexican-American War[270]

1861 - 1865: American Civil War[27]

1866 – 1890: Western Indian Wars[272]

1898 – 1898: Spanish American War[273]

1917 – 1918: World War I[274]

1941 – 1945: World War II[275]

1950 – 1953: Korean War[276]

1965 – 1973: Vietnam War[277]

1980 - 2015: Operation Bright Star (Joint Biannual Military Exercise)[278]

1983: Invasion of Grenada (Operation Urgent Fury)[279]

1989 - 1990: Invasion of Panama (Operation Just Cause)[280]

1990 – 1991: Persian Gulf War (First Gulf War, Operations Desert Shield/ Desert Storm)[281,282]

1991: Humanitarian Assistance for Iraqi Kurds (Operation Provide Comfort)[283,284,285]

1992 – 1996: Assistance for Bosnia-Herzegovina in the Yugoslav Wars (Operation Provide Promise)[286]

1992 – 1995: Civil War in Somalia (Operations Provide Relief and Restore Hope)[287,288]

1994 – 1995: Restoring Democracy in Haiti (Operation Uphold Democracy)[289]

1994: Protection of Kuwait from Advancing Iraqi Forces (Operation Vigilant Warrior)[290]

1995: Operation Deliberate Force (Bosnia-Herzegovina, air power brought warring parties to negotiation)[291]

1996 – 1998: Stabilization of Bosnia-Herzegovina (Operation Joint Guard)[292]

1998 – 2004: Stabilization of Bosnia-Herzegovina (Operation Joint Forge)[293]

1999: North Atlantic Treaty Organization (NATO) Bombing of Yugoslavia (Operation Allied Force/Operation Noble Anvil)[294]

2001 – 2014: War in Afghanistan (US-Led 2001-2014 Phase)[295]

Operation Enduring Freedom/War on Terror (OEF): 2001-2014. On October 7, 2001, the US initiated military action in Afghanistan to destroy al-Qaeda's safe base of operations.

2003 – 2010: War in Iraq - Operation Iraqi Freedom (OIF)[296]

2010 – 2011: War in Iraq - Operation New Dawn (OND)[296]

2011: Protection of Libya's Civilians (Operations Odyssey Dawn & Unified Protector)[297]

Air power used under a United Nations mandate.

2014 – Present: Afghanistan mission to train, advise, and assist (Operation Freedom's Sentinel)[298,299]

Operation Freedom's Sentinel is a contingency operation in accordance with Title 10 USC 101(a)(13).

Conclusion

This report provides an overview of an Army organization that has served for 75 years. Some reviewers will identify omissions, while others may criticize items that were included. We invite all of them to present their perspectives. We hope this document provides a

focal point for future discussions regarding the work of the Army Industrial Hygiene Laboratory and each of its successor organizations.

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Timeline 1: US Army Public Health Center – The First 75 Years

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Timeline 2: Military Preventive, Occupational and Environmental Medicine and Public Health History

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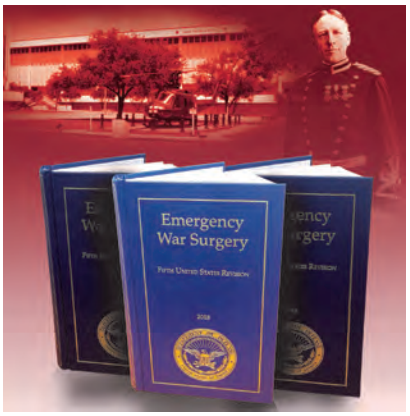

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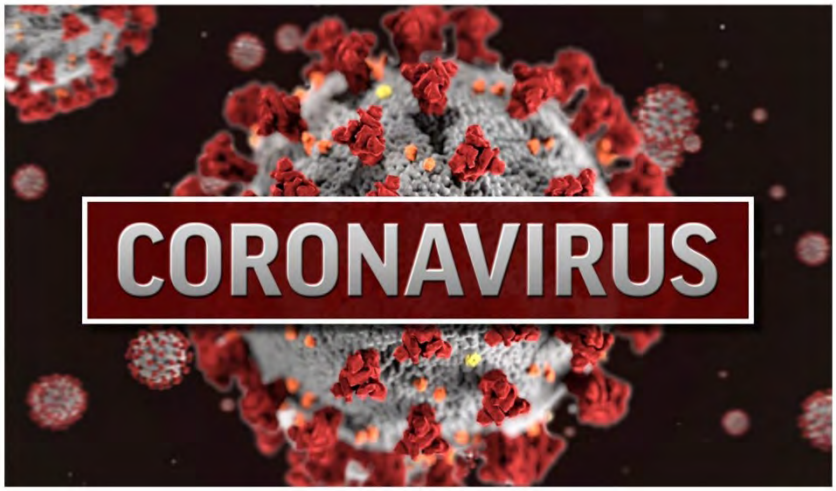

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