



CENTER TECHNICAL DIRECTOR ARRIVES

Mr. J. H. (Jim) Zarzycki reported as the Technical Director of the Edgewood Research, Development and Engineering Center in April.

As Technical Director, Mr. Zarzycki directs the efforts of center personnel conducting research, development, and engineering in areas of non-medical chemical and biological defense and smoke/obscurants. Mr. Zarzycki also manages strategic and long-range planning for these programs.



Mr. J. H. (Jim) Zarzycki

Prior to his appointment as Technical Director, Mr. Zarzycki served as Senior Vice President with Dynamac Corporation in Rockville, Maryland, having both operational and strategic responsibility. Mr. Zarzycki was also a Senior Vice President at EA Engineering, Science & Technology, Inc., headquartered in Hunt Valley, Maryland. In this capacity, Mr. Zarzycki was responsible for EA Engineering's largest business unit including operations at 15 locations nationally and internationally.

Before working in the private sector, Mr. Zarzycki held positions of increasing responsibility and authority on Aberdeen Proving Ground and with the U.S. Army Electronics Command in Fort Monmouth, New Jersey. While with the U.S. Army Chemical Research, Development and Engineering Center (predecessor to the U.S. Army Chemical and Biological Defense Command), he served as the Director of Physical Protection subsequent to holding management positions in the former Munitions and Detection Directorates.

Mr. Zarzycki is a native of New Jersey and holds a Master's of Public Administration from the Harvard University Kennedy School of Government. He received his B.S. in Chemical Engineering in 1969 from the New Jersey Institute of Technology and his M.E. in Industrial Engineering from Texas A&M University in 1970. Mr. Zarzycki is also a graduate of the Program Manager's Course at the Defense Systems Management College.

Mr. Zarzycki is licensed in both Maryland and New Jersey as a professional engineer and resides in New Jersey.

*Effective 26 July 1998, Edgewood no longer has 612 or 671 prefixes. All prefixes changed to 436.
The DSN and area code are not affected and extensions remain the same.*

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This journal is distributed to over 900 addressees throughout the Joint Services, industry, and academic R&D community and would be a good vehicle to publicize what is going on where you are. Please submit articles to Technical Director, Edgewood Research, Development and Engineering Center, ATTN: SCBRD-ASC, Aberdeen Proving Ground, MD 21010-5423, or by electronic mail to scbrd-asc@apega.army.mil. All submissions are accepted at the discretion of the editor and are subject to editing. This journal is prepared for publication by the Corporate Enhancement Team:

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ASSUMPTION OF COMMAND

By Authority AR 600-20, Paragraph 2-3, Major General John C. Doesburg assumed command of the U.S. Army Chemical and Biological Defense Command, Aberdeen Proving Ground, Maryland 21010-5423 (W4MLAA) effective 2 July 1998.

Major General John C. Doesburg was born in Milwaukee, Wisconsin, on 15 May 1947. He is from an Army family and traveled extensively as a child. He attended schools in Pennsylvania, Texas, Germany, Oklahoma, and graduated from high school in Fort Smith, Arkansas. He entered the Army through the ROTC Program at the University of Oklahoma in 1970.

His assignments include: Battery Executive Officer, A Battery, 1st Battalion, 10th Field Artillery; Brigade Chemical Officer and later Commander, Headquarters Company, 2nd Brigade, 82nd Airborne Division; Commander, Headquarters Company, 2nd Brigade, 82nd Airborne Division; Commander, 21st Chemical Company, 82nd Airborne Division; Career Program Manager, MILPERCEN; member of the United States Negotiation Team for a Chemical Weapons Treaty, United States Arms Control and Disarmament Agency; Executive Officer, U. S. Army Chemical Activity, Western Command (Johnston Island); Division Chemical Officer, 25th Infantry Division (Light); Commander, 84th Chemical Battalion; Commander, U. S. Army Chemical Activity, Pacific; and Chief, Chemical and NBC Defense Division, Office of the Deputy Chief of Staff for Operations and Plans, Headquarters, DA. He most recently held the position of Joint Program Manager, Joint Program Office for Biological Defense. In addition to his position as Commanding General of the U.S. Army Chemical and Biological Defense Command, he also serves as Deputy Chief of Staff for Chemical and Biological Matters of the Army Materiel Command, Alexandria, VA.



Major General Doesburg's military education includes the Field Artillery Officer Basic Course, the Chemical Officer Advanced Course, the Command and General Staff College, and the Army War College.

His award and decorations include the Legion of Merit with oak leaf cluster, the Defense Meritorious Service Medal, the Army Meritorious Service Medal with five oak leaf clusters, the Army Commendation Medal with oak leaf cluster, the Air Assault Badge, the Master Parachutist Badge, and the Army General Staff Identification Badge.

Major General Doesburg currently resides with his wife, Denise, and sons, Sean and Russell, at the Edgewood Area of Aberdeen Proving Ground.

For more information, contact the CBDCOM Public Affairs Office at (410) 436-4345 or visit the web site at www.cbdcom.apgea.army.mil



DOMESTIC PREPAREDNESS

Video — *Terror at Harford Mall* — Nationally Recognized

In July 1997, an alarming scenario: *terrorists unleashing deadly gas in a food court in a crowded mall.* This scenario was used in a video to train “first responders” to safely deal with terrorist incidents involving nuclear, biological, or chemical warfare agents or Weapons of Mass Destruction. These individuals may be fire fighters, police, medics, or other emergency workers.



With cameras rolling, a mock gas attack was staged at Harford Mall.

As the scene unfolds,

. . . a man enters the mall and goes to the food court. He carries a large shopping bag and sits at a table near a trash can. The man puts some trash in a torn paper bag, places it on the floor, and quickly leaves. A damp spot appears and begins to spread on the side of the bag. An elderly man notices the leaking bag while emptying his food tray and peers inside. An *unseen, odorless* gas begins to rise from the bag

The concept for a video was the result of the 1996 Congressional Law that directed the Department of Defense form a Domestic Preparedness Program to assist federal, state, and local agencies in enhancing preparedness for terrorist attacks using weapons of mass destruction. CBDCOM’s Domestic Preparedness Office is responsible for providing training to “first responders” in 120 cities across the United States. This video is an integral part of that training program.

Filming was done at the Harford Mall in Harford County, Maryland. Approximately 100 people participated, including members of the Bel Air High School drama company, mall employees, and volunteers from Harford County emergency response organizations. When we first approached them to participate in the video, it was only 6 days prior to the actual filming. We had very little time to put the video together, and we didn’t have a script yet. Rather than asking us if we were crazy and showing us the door, the Harford County folks stepped forward and enthusiastically offered support in any way we needed it.

Members of the Hazmat Team made valuable suggestions on how a typical emergency response would be conducted, which helped to generate our script. They provided law enforcement, firefighters, paramedics, their Emergency Operations Center and 911 Center. The Hazmat Team, fully suited in Level A in 90 degree heat after being up all night on a Hazmat call, participated. They set up an emergency decon station and decontaminated our mock casualties— *all this on their day off!*



Hazmat Team performs decontamination on mock casualties.

The members of the Hazmat Team reviewed the “rough cut” of the video and made very constructive comments that greatly enhanced the realism of the video. By being an active participant in the making of this video, Harford County made a major contribution to a vital national defense program.

The video has been used in about 25 major cities across the United States to date and has been extremely well received. In fact, many responders actually thought it was a real incident and asked when this event took place.



Major General Friel presents a Commander's coin to Chief Terrill

At a special ceremony in June 1998, Major General Friel, CBDCOM's Commander, presented Commander's coins and copies of the video to some of the Harford County participants, which included the Emergency Operations Center, the Sheriff's Department, the Bel Air Police Department, the Bel Air Volunteer Fire Department and Emergency Medical Services, and the Harford County Hazmat Team. A special Thank you was extended to the Harford Mall Marketing Director for allowing us to use the Mall for making the film. When the call went out for assistance in the filming, there was an overwhelming community response. We, as the Army, are proud to be part of this concerned, prepared community.



TELLY AWARD – We recently learned that the video, “Terror at Harford Mall,” was selected as a finalist in the **Telly Award**. “Terror at Harford Mall” was selected for a bronze in the Nonbroadcast, corporate training category. The **Telly Award** is a national award for recognizing excellence in broadcast as well as nonbroadcast film, video, and TV. This year there were over 10,000 entries from companies like Columbia Pictures, Paramount, PBS, Microsoft, Bell Atlantic, CBS/Fox Video, etc.

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EDGEWOOD AREA PILOT PLANT DESTRUCTION BEGINS

A piece of Edgewood history is finally coming down. Building E5625 (old Building 87), commonly known as The Pilot Plant, is slowly being demolished after years of waiting.

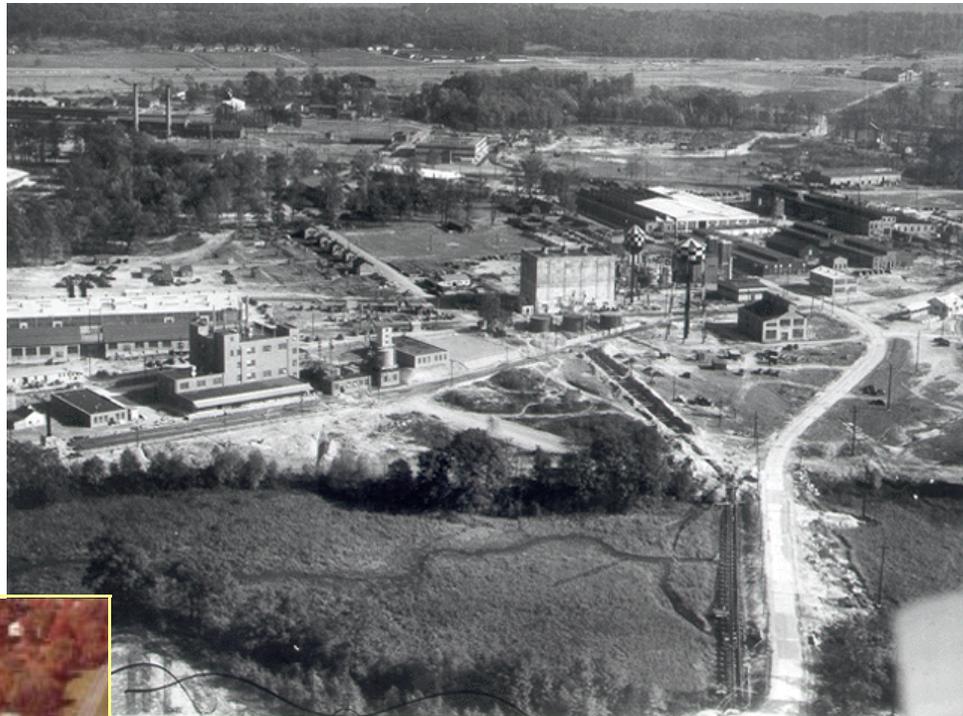
The building was constructed in 1942 for the production of CC2 (also called Impregnite I) used to make clothing impermeable to chemical agents. The plant could produce about five tons of CC2 per 24-hours of operation. The building design was a copy of a similar plant in Niagara Falls built by the Dupont Company.

At the end of the war, the CC2 production aspect was shut down and the building converted to a pilot plant to examine the process for developing German nerve agents, discovered as Allied troops overran Germany. Although always referred to as The Pilot Plant, there were actually many other pilot plants around the post. Over the years, the plant was used to develop production processes

for most of the nerve agents including the new binary agents, and also incapacitating and riot control agents.

The wear and tear on the building over the years became very obvious in the 1980s. In 1983, a large section of the fourth floor roof collapsed into a laboratory. The laboratory was being used to store drums of a binary agent precursor. Several of the drums were damaged, and the chemical leaked throughout the building and into the sumps.

In September 1985, a small leak started an enormous chain of events that ended up changing the way the Army did business throughout the



nation. A small leak in a sulfuric acid tank adjacent to the plant was detected and a drip pan placed to collect the drips. By the next day, the drip was a major gush and the protective berm around the tank failed to contain the spill. This allowed the acid to flow into the storm water drain

which then fed into Canal Creek. Following the accident, the tank was drained and all tanks with berms throughout the post were examined to ensure correct operation.

Although these corrective actions were ongoing, in February 1986, a memo on the plant was leaked to the *Baltimore Sun*. The memo called the plant “a Pandora’s box of potential sources of contamination of surface water and ground water.” This led to the plant being shut down and operations moved to other buildings. It also initiated several investigations by Federal and State agencies.

These investigations eventually resulted in three Edgewood Area employees being convicted of environmental violations concerning the building

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and another pilot plant located across post. Although convicted, none received fines or prison terms.

The following year, the plant was recommended for disposal and clean up began. This proved a long and slow process to remove the lab equipment and render it safe for disposal. The next hurdle was to figure out what to do with the shell of the building.

After many costly studies of how to correctly tear down the building, a contract was finally completed and destruction began in April and is scheduled for completion in June 1999.

ATTENTION

On July 31, 1998, a fire destroyed a Real-Time Analytical Platform (RTAP) mobile laboratory at Pine Bluff Chemical Activity. The preliminary assessment indicates that a frayed/worn cable running from the battery box (auxiliary batteries) to the generator grounded out on metal conduit. The heat generated ignited the wiring insulation in the wall of the vehicle. The fire spread throughout the inside of the vehicle. The vehicle was on shore power per the operating manual. The following guidance is provided:

1. Vehicle maintenance personnel and electricians should check all connections, battery boxes, cables, and wiring to ensure no frayed/worn insulation is present.
2. After maintenance personnel certify that wiring is in operating condition, RTAPs may be used for operations.
3. Until the investigation is finalized, take prudent measures to inspect wiring, inform personnel of the potential hazard, and separate RTAPs (by distance) to prevent spread of fire.

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PARTNERING BETWEEN SSCOM AND CBDCOM

On October 1st, the Soldier Systems Command (SSCOM) and the Chemical and Biological Defense Command (CBDCOM) will officially merge and form the *Soldier Biological and Chemical Command (SBCCOM)*. We at the Office of the Project Manager for NBC Defense Systems are looking forward to this merger. We see it as an opportunity to expand upon successes of past partnering endeavors along the lines of our efforts with the M45 Mask, Joint Service Lightweight Integrated Suit Technology (JSLIST), and the PM Soldier's Soldier Enhancement Program (SEP) and Land Warrior Program. We also have some additional joint service programs like the Joint Chemical Agent Detector (JCAD) and the Joint Service General Purpose Mask (JSGPM) that will focus on our ability to team and partner with the other services and elements of SSCOM.

The M45 Mask Team along with JSLIST Team, PM Soldier, TEXCOM, and Test and Evaluation Command developed a joint Initial Operational Testing and Evaluation and joint Development Testing excursions, which significantly reduced the test cost of both programs. These teams also worked together to solve difficult test methodology issues regarding the man in stimulant test (MIST) required to fully test a soldier in MOPP (Mission Oriented Protective Posture) gear as a system. The Office of the Project Manager for NBC Defense Systems has worked closely with PM Soldier on two SEPs and on the Land Warrior System. The PMs developed dialog early in these programs so the systems would compliment each other and



technical problems could be solved up-front. The close working relationship cultivated during all these endeavors is expected to be the groundwork for forging relationships among the individual teams of the new command.

The Joint Chemical Agent Detector program management team was officially formed in January 1996. Designation of the Air Force as the *lead service* was assigned under the authority of the Joint Service Materiel Group (JSMG) for NBC Defense. As part of the overall goal of combining similar contamination avoidance programs to minimize life cycle and personnel costs, the JCAD program integrated the requirements of seven previously separate chemical defense point detection development programs.



From the beginning, representatives of the four services met monthly to plan the program. The project manager that was designated as the *lead service* was very diligent in preparing a very detailed road map of events required to accomplish the program objectives. The critical documents such as the operational requirements document, acquisition strategy, performance specification, request for proposal, evaluation plan, and Test and Evaluation Master Plan were prepared through face-to-face working sessions attended by technical and subject matter experts from all services. It meant a lot of travel duty; but in retrospect, it was the only way we could get it done and stay on schedule. Success was heavily dependent on our ability to come to a consensus and move on. We remained focused on the objective of the program; the warfighter needs.

The program management team for the Joint Service General Purpose Mask was officially formed after the Milestone I in January 1997. The

Army was designated as the *lead service* under the authority of the Joint Service Materiel Group for NBC Defense. The



JSGPM system is being developed to replace the M40/42 series of masks for the U.S. Army, U.S. Marine Corps (USMC) ground and combat vehicle operations, and the MCU-2/P series of masks for the U.S. Air Force (USAF) and U.S. Navy (USN) ground and ship applications. Since January 1997, the JSGPM program has worked to develop the operational requirements document and acquisition strategy and to conduct marker surveys and testing of potential candidates.

The JSGPM operational requirements document, which has already been approved by the USAF and USMC, defines a lightweight protective mask that will provide 24 hours of protection, lower the weight and bulk, and improve overall mission performance of the wearer. The mask components will be configured to reduce the overall profile of the masks, lowest possible life cycle cost, and to allow for the improved integration with future soldier systems. The operational requirements document also challenges the team to develop the protective mask to meet the needs of the police, fire fighters, and rescue civilian personnel for Domestic Preparedness against all Weapons of Mass Destruction and Toxic Industrial Materials.

The JSGPM program will use Joint Integrated Product Teams to manage all integrated Product and Process Development activities. SSCOM

participation and teaming is critical to the success of this product. The JSGPM has completed the initial research and technology phase and will transition to Product Definition and Risk Reduction Phase at the Milestone I In-Process Review in September 1998. The JSGPM team is looking forward to building on the successes of the M45 team, JCAD team, and other joint service programs, by expanding the teaming approach with SSCOM and other services. Only together will we develop, procure, and deploy the best equipment for our soldiers, sailors, marines, and airmen.

A start-of-work meeting was held in June in Omaha, NE, for a weapons of mass destruction vulnerability assessment of the Strategic Command Headquarters. At the Edgewood RDE Center, we teamed with the Army Corps of Engineers Protective Design Center to conduct the assessment, which is required of commanders every 3 years under new Department of Defense standards. The assessment will focus primarily on building protection against chemical and biological agents but will also examine other areas of CB defense. A report will be provided to the commander of the U.S. Army Simulation, Training and Instrumentation Command (STRICOM) in August.

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ADVANCED CONCEPTS AND TECHNOLOGY II (ACT II) DEMONSTRATION OF CHEMICAL AGENT WATER MONITOR

Because we consider *customer satisfaction of ultimate importance*, we queried our primary customers in FY96 to learn how we are doing. Surveys were sent to the four battle laboratories and 139 other customers. Our Customer Satisfaction Advocate visited all of the Battle Labs, and every Battle Lab responded to our survey.

However, the customers identified some needs that were not being addressed, and we were able to drive solutions to these problems. One deficiency noted on the returned *customer surveys* prompted us to push the *Water Monitor* program in the Tech Base Plan and to leverage the Advanced Concepts and Technology II (ACT II) Program. This enabled our Research and Technology Directorate to investigate a promising technology for a water monitor in FY97.

The objective of the ACT II program was to develop a prototype of a Chemical Agent Water Monitor that shows the feasibility of a portable instrument (based on Surface Enhanced Raman Spectroscopy) for easy, reliable, and timely detection of chemical agents in field water.

- Portable means less than 15 pounds and about the size of the present M272 Chemical Agent Detection Kit.

- Ease of use means that the test consists of a minimal number of steps and requires a minimum of training and that the instrument is easy to use by warfighters dressed in a chemical protective suit.

- Timely means that the entire test can be performed in less than 3 minutes.

The ACT II demonstration was recently held in the Morrisett Conference Room, Fort Lee, VA. Representatives from the HQDA (DCSLOG), the U.S. Army Training and Doctrine Command, the OPTEC, AMEDD C&S, Edgewood RDE Center, CHPPM, PWD, and CENTCOM were in attendance.

This demonstration represented the conclusion of a 12-month ACT II project conducted at Boston University by Dr. Edward Womble to develop a prototype of the Chemical Agent Water Monitor based on the Surface Enhanced Raman Spectroscopy. Dr. Womble's presentation was well received, and the research appears promising to the Army as well as the Department of Defense's need for a Joint Chemical-Biological Agent Water Monitor to detect, identify, and quantify chemical-biological agents in field water.

It was a group consensus that the demonstrated technology (Surface Enhanced Raman Spectroscopy) has potential, and they agreed with the recommendation of Dr. Steve Christesen, Edgewood Research, Development and Engineering Center, to transition this technology to the Edgewood RDE Center for further testing and improvements.

A production-ready Chemical Agent Water Monitor is not the final product for this ACT II program. However, the information and lessons learned from this effort will enhance the development program for a Joint Chemical-Biological Agent Water Monitor.

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ARMORED SYSTEMS MODERNIZATION TEAM

The Link Between Weapons System Platforms and the Edgewood RDE Center

The Armored Systems Modernization (ASM) Team plays a unique role at the Edgewood RDE Center. The team's mission is: "Conduct Nuclear, Biological, and Chemical and Smoke survivability platform technology base investigations and provide applications interface and expertise to program managers and schools."



During the ASM Team's visit to Fort Hood, TX, we participated in extensive interface with MIAI Abrams tank crews. We had an opportunity to drive and conduct actual live fire exercises on the vehicles.

The name "Armored Systems Modernization Team" is somewhat of a misnomer based on the original mission of the team. Our team's mission has evolved from the early 1990's when the focus was on conducting or monitoring technology base activities in the advanced filtration, detection, smoke, environmental control, and NBC contamination survivability areas in support of the development of the next generation of armored vehicles. We also served as technical assistants to

various armored vehicle Program Managers in the integration of various NBC disciplines. With the decrease in the priority placed on armored systems modernization efforts and the emphasis on servicing the Joint Services, the ASM Team has a much broader spectrum of customers. Today, ASM Team customer platforms can be found on the ocean, in the air, and on the ground.

The ASM Team's focus is first, and foremost, **customer service**. This service is focused on

providing advice and assistance to systems' Program Managers and other military users in the application of NBC hardware. A secondary focus, which is less visible but certainly important, is technology base investigations of advanced vapor and particle NBC filtration technology for collective protection and investigations of rapid and sustaining obscurant methods for vehicle survivability enhancement.

Equipment Application Efforts:

The list of programs currently supported by the team looks like a "who's-who" of today's major combat systems platforms and programs. Programs supported include fielded systems such as the M1A2 Abrams and M2/3 Bradley vehicle systems. Systems under development being supported include the RAH-66 Comanche helicopter, the Crusader field artillery system, the U.S. Marine Corps' Advanced Amphibious Assault Vehicle, Future Scout and Cavalry Vehicle, and the Armored Treatment and Transport Vehicle.

The Team serves as a ***one-stop shopping*** point-of-contact for customers seeking technical information in the areas of NBC detection, decontamination, individual protection, as well as current and advanced collective protection equipment and smoke systems. Past experience indicates that customers prefer one point-of-contact to handle the many diverse areas of NBC survivability. The breadth of the Team's ability is to support our customers' systems from program inception to production, fielding, and product improvements. The Team has provided technical input and guidance in the preparation of NBC requirements documents, Requests For Proposals, Statements Of Work, and Specifications. We have also participated in the Source Selection and Evaluating Board process; monitored contracts; and reviewed drawings, concepts, and plans. We even participated in selected tests. Team members have "at hand" the expertise in all areas of NBC equipment integration.

The ultimate Team goal is to put the optimum NBC survivability architecture and smoke systems

on each user platform to allow effective operations, and to prevent technological surprise and obsolescence on the NBC battlefield. This goal often means seeking guidance and advice from other teams at the Center and trying to establish users for various pieces of NBC equipment.

In order to facilitate this goal, the ASM Team has visited several sites in the continental U.S. to better understand the environment in which these platforms operate.



The ASM Team visited Fort Sill and witnessed a reload operation of the Multiple Launch Rocket System



While visiting Fort Sill, the team also participated in a live fire exercise with the M109A6 Paladin Self-Propelled Howitzer and companion Armored Resupply Vehicle. We observed the operations of the Fire Detection Center that controls the operation of the Howitzer.

Among those sites visited were Fort Sill, OK, to

learn about and participate in artillery operations; Fort Hood, TX, to participate in tank training; i.e., driving the tank and firing the main gun; and to the U.S. Marine Corps' Amphibious Vehicle Test Branch (AVTB) at Camp Pendleton, CA, to learn about and participate in Marine amphibious

Comanche NBC/Environmental Control System (ECS) (see the article on the Comanche ECS, beginning on page 11). The ASM team continues to support the Comanche program by participation on the ECS Integrated Product Team (IPT) and by performing PSA bed testing.



Members of the ASM Team visited the U.S. Marine Corps' base at Camp Pendleton, CA, where we participated in an amphibious exercise aboard the USMC's Amphibious Assault Vehicle Personnel (AAVP7A1). The AAVP7A1 is the current Marine Corps' amphibious assault vehicle. We are currently supporting the USMC's *Advanced* Amphibious Assault Vehicle (AAAV) development program. The picture (far left) shows the group of vehicles that were on a simulated road march along the beach at Camp Pendleton.



operations, i.e, vehicle land and sea-borne operations.

One of the more "high profile" successes the team has recently enjoyed has been our assistance in the redesign of the Pressure Swing Adsorption (PSA) air drying/chemical vapor filtration system on the Comanche helicopter.

The ASM team and the CB Filtration team, using in-house expertise and lessons learned from previous ASM tech base work, rescued the program from an expensive total redesign of the

Smoke countermeasures are being used extensively in the Vehicle Integrated Defense System (VIDS) laboratory. The Team is also transitioning state-of-the-art smoke and obscurant protection to new vehicle systems.

Technology Base Efforts:

The ASM Team has continued to conduct technology base investigations in the area of advanced systems for NBC agent vapor filtration, particle removal/filtration and smoke systems.



The Team continues to investigate technology for the destruction and adsorption/regeneration of agent vapors by the use of catalytic oxidation (CATOX) and Pressure and Temperature Swing Adsorption (TSA/PSA). These approaches use entirely different technologies to solve the limitations inherent in traditional single pass carbon filters. In a CATOX system, chemical warfare agents (CWA) are destroyed by decomposition much like an automotive catalytic converter.

In a PSA system, chemically contaminated air streams are purified by the same technology as standard carbon filtration except in this system, there are two sorbent beds. While one sorbent bed “on-line” is filtering the air stream at high pressure, the second bed is being regenerated in situ by bleeding a portion of the clean air stream to back-flush this “off-line” bed. TSA uses swings in temperature with chemical adsorption at lower temperature and purging at higher temperatures. The process then switches, where the contaminated bed is purged and the clean bed removes contaminants. Contaminants are vented “over-board.”

These advanced vapor filtration studies are being executed in six steps. These steps are:

- Perform paper studies to identify optimum adsorbents.
- Conduct laboratory scale tests to develop performance predictive math models.
- Conduct follow up testing to verify the math models.
- Conduct bread-board scale testing to validate lab scale and model results.
- Conduct full-scale testing to validate lab scale, bread-board and model results.
- Conduct full-scale system integration efforts to determine the effects an actual system would have on a test bed and vice versa.

The Team has invested heavily, since it's inception, in developing a data base on the operation of advanced filtration systems such as PSA and catalytic oxidation. Part of this investment focused on the development of mathematical models (outlined above) for predicting the efficiency of the advanced vapor NBC filtration system. These models use the operating parameters of the system, the flows, system cycle time, pressures and type of adsorbent to predict the filtration system's agent removal performance at untested conditions. This investment yielded significant payoff during the Teams recent work with the Comanche helicopter program by predicting the Comanche PSA performance prior to actual testing. This model has been used as a tool to evaluate Comanche PSA system configurations, resulting in significant program cost savings.

Currently, the team has an ongoing effort to apply an advanced prototype chemical vapor filtration system onto an M1A1 Abrams tank. The Team has also begun installation of an Auxiliary Powered Environmental Control System (APECS) onto an USMC Amphibious Assault Vehicle (AAVP7A1). This current generation vehicle transports Marines from ship to shore. In addition to the Environmental Control and the Auxiliary Power Unit, the systems incorporates a PSA advanced NBC filtration system. The APECS is a product of earlier ASM Team tech base efforts.

These efforts are joint in nature with close cooperation between the ASM and the CB Filtration Teams.

In the area of smoke technology, the Team is investigating a new propellant obscurant dissemination technique that will significantly reduce vehicle burden in providing broad spectrum protection from guided and smart weapons. Significant improvements are also being made in smoke modeling that will improve future VIDS and wargaming capabilities.

An important part of the ASM Team effort involves interface with other Edgewood RDE Center teams. This is particularly true of the

Smoke Core Team and the CB Filtration Team. These teams are focused on laboratory and field testing, hands-on developmental efforts, and computer modeling which is beyond the immediate capability of the ASM Team.

In the area of advanced/cleanable particle filtration, the team has ongoing work to investigate new and improved particle filtration media and is investigating innovative techniques for self-cleaning particle filters. This area is a natural progression since extensive work has been done to investigate regenerable vapor filtration mechanisms while little has been done to investigate extending the life of particle filters by the use of regenerable/cleanable filters.

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To support these many and varied efforts, the team possesses an impressive assembly of tracked vehicle platforms to support these programs and the team's customers. Included are two M113 armored personnel carriers, an M1A1 Abrams tank and a USMC AAV.

In conclusion, the ASM Team is a customer focused, viable link between weapons system platforms and the Edgewood RDE Center. The team is dedicated to providing quality service in the application of NBC hardware and advanced NBC filtration and smoke technology to our customers.

 <i>Upcoming Conferences</i>		
<i>Date and Place</i>	<i>Title</i>	<i>POC</i>
26-29 October 1998 Long Beach, CA	<i>CALS Expo International and 21st Century Commerce 1998</i>	<i>Mr. Thomas P. Murphy (410) 436-4416 email: tpmurphy@apgea.army.mil</i>
17-20 November 1998 Edgewood RDE Center	<i>1998 Scientific Conference on Chemical and Biological Defense Research</i>	<i>Ms. Dorothy Berg (410) 436-4883 email: dxberg@apgea.army.mil</i>



REDESIGN OF COMANCHE'S ENVIRONMENTAL CONTROL SYSTEM

The RAH-66 Comanche Helicopter is being developed to be the U.S. Army's new light attack/reconnaissance aircraft to modernize the current fleet and provide combat superiority as well as battlefield survivability against current and future threats. Among many advanced technology advancements in development for the Comanche is the environmental control system (ECS), which provides nuclear, biological, and chemical (NBC) protection and provides all of the cooling load for the aircraft including the air conditioning and electronics heat loads.

A major sub-component of the Comanche's ECS air filtration system is the pressure-swing adsorption (PSA) system. PSA is a regenerative vapor filtration process that takes advantage of high pressure to remove contamination in a working adsorption bed while regenerating an off-stream bed with a fraction of the purified product flowing counter-current to the feed at ambient pressure. By frequently switching the flow paths, the process continually generates purified product air at the required flow rate. PSA is a well-known industrial process used primarily to dry air and separate components of air. The Comanche's ECS is fed by bleed air from an on-board turbine engine at a high flow rate, ca. 450 standard cubic feet per minute, and pressure, ca. 65 pounds per square inch. The functions of the PSA system are to dry the air and

filter chemical warfare agent vapors. Other ECS components will help condition the air as well as remove entrained water and biological and nuclear contamination upstream of the PSA system.

The Comanche's ECS, like other NBC collective protection systems, has unusual performance requirements and system constraints. Most importantly, the PSA unit must reduce the humidity of the feed air by as much as three orders of magnitude to -50°F so that frost does not form on the expansion turbine of the air-cycle machine chiller. In addition, the PSA system must remove all known chemical warfare agent vapors, in accord with the

Comanche filtration performance requirements, to levels below those that might impair a pilot's ability to complete the mission. Additionally, these performance requirements must be met using a system of minimal size and weight. The weight constraint for Comanche, and all military aircraft, is the most important and provides strong justification for optimizing system performance to reduce the total system weight. In addition, the Comanche's PSA only has available about 35 percent of the product air for purging the off-stream PSA bed. This latter constraint is unprecedented for any previously known PSA air-drying application.



Comanche Aircraft

Initial testing of the contractor-designed Comanche PSA system was performed in 1995 and revealed a significant water-removal performance deficit. Since the Edgewood RDE Center had been investigating PSA as part of its technology base efforts since 1989, the Comanche Program Manager's Office (PMO) asked the CB Filtration Team and the Armored Systems Modernization Team at Edgewood to assist in evaluation of the Comanche PSA approach and redesign of the PSA beds, if appropriate.

The Edgewood RDE Center's technology base effort has taken a very fundamental approach to understanding the PSA process. This approach included assessments of the following areas:

- adsorption phase equilibria for chemical warfare agent simulants, actual agents, and atmospheric gases and vapors, including water vapor
- rates of adsorbent internal and external mass transfer in the adsorption beds
- lab-scale PSA system performance evaluations using novel automated data acquisition systems
- full-scale system performance evaluations
- modeling of system performance incorporating material, energy, and momentum balances

In order to verify our understanding of any of the candidate advanced air filtration processes such as PSA, it is necessary to demonstrate the ability to predict system performance prior to measuring performance data. This capability was demonstrated for the Comanche's PSA system in a series of half-scale tests conducted in late 1995 and contributed to the decision by the Comanche PMO to have the Edgewood RDE Center perform the PSA bed redesign effort. After careful evaluation, the Edgewood RDE Center team recommended in February 1996 that PSA was a viable approach for Comanche and that a novel adsorption bed design would be required to meet

the water-removal requirements imposed by the severe Comanche's PSA system weight constraints and performance requirements. Following that assessment, the Comanche PMO asked the Edgewood RDE Center Teams to lead the PSA bed redesign effort.

The concept for the Edgewood Center's PSA bed redesign was based on a failure analysis of the half-scale tests. The adsorbent material proposed initially by the Comanche's PSA subcontractor was a single layer of 13X molecular sieve. Literature data indicated a very strong water affinity; that is, the 13X becomes saturated with adsorbed water at very low vapor phase concentrations, as opposed to an ideal adsorbent which would have a water affinity proportional to vapor phase concentration. It was clear that the 13X would regenerate too slowly because of its high affinity for water vapor at low concentration. Since no adsorbent materials has such an isotherm, it was proposed that a layered adsorption bed with successively increasing water vapor affinity might approximate the performance of a linear adsorption equilibrium material. In addition, since it is possible to have a small amount of entrained liquid water in the feed stream, it was felt important to have a material resistant to degradation by liquid water as the initial layer.

An intensive series of lab-scale (1% of full scale) and breadboard (40% of full scale) testing was conducted to identify and verify layered PSA bed designs that met the water removal performance requirements imposed by the Comanche's application. As a result of this testing, the Edgewood Center Team was able to recommend four potential bed design solutions for consideration by the team formed by the PMO, contractor, and the Edgewood RDE Center to address the ECS redesign problem. The final design incorporates five layers, including three layers of traditional metal oxide adsorbents, a layer of 13X molecular sieve, and a thin layer of activated carbon to remove any CW agent vapors that might make it through the inorganic adsorbent materials. During this work, it was discovered that activated carbon also has a surprising water-removal performance at low concentrations.

The five-layer PSA bed design was optimized through further lab- and breadboard-scale testing prior to transitioning to the Comanche's ECS Integrated Process Team. The novel PSA system design was validated for water vapor removal by a battery of full-scale prototype ECS system tests conducted at the Comanche contractor's site in FY97 and adopted for use in the initial Comanche production lot. Further water removal and chemical warfare agent simulant testing was then successfully completed in early 1998, again using the full-scale prototype test system. The Edgewood RDE Center played a major role in this testing due to its extensive experience in chemical testing of this type. The chemical warfare agent simulant testing revealed that the redesigned PSA system would meet the water-removal performance requirements even during exposure to multiple doses of low- and high-volatility simulant vapors, 2-hexanol and dichlorotrifluoroethane, respectively. Also, these tests provided initial confirmation that the redesigned PSA would protect the crew against exposure to ambient challenges of nerve agent and blood gases at the expected levels. While the chemical warfare agent simulant tests were very successful, they also confirmed earlier results showing slow regeneration of the PSA beds following exposure to low-volatility materials like nerve agents.

Further technology base work is now under way to identify novel sorbent materials that will more readily release low-volatility vapors during purge. Other approaches, including use of on-demand thermally assisted purge to periodically regenerate the PSA beds, are also under investigation. These novel approaches are under consideration for later Comanche aircraft and other applications considering regenerative filtration, as appropriate.

More work remains to improve the performance of other Comanche's ECS components, notably switching valves and particulate filters, and to optimize the integration of the system within the aircraft. Given the extreme performance requirements and system weight constraint, the successful redesign of the PSA beds may be considered a major accomplishment by the Edgewood RDE Center and its technical support contractor, Guild Associates, in part because no viable alternative ECS approach that meets the severe system weight constraints has been identified.



*Test pilot Lorren Stiles is quoted in the July 1998 issue of **Soldiers Magazine**, "Everything about the Comanche is new. It is very fast, very agile and designed to be less observable. It's stealthy, which will make it hard to knock down with shoulder-launched missiles."*

The author wishes to express his appreciation to Mr. Frank Mokry, Office of the Program Manager for Comanche, for his helpful discussion concerning this article.

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PARTNERSHIP AND SMOKE

Partnering and teaming between industry and the Government works!! A team was formed with members from TACOM-ACALA, the Edgewood RDE Center personnel at Rock Island Arsenal, and the Product Manager for Smoke and Obscurants' M3A4/M157/M157A2 team. Using the benefits of teaming, this partnership led to the successful replacement of obsolete WW II equipment and to modernization of the Army's large area smoke fleet. The Team

- converted a level III Technical Data Package into a performance specification,
- significantly improved readiness through a successful Modernization Through Spares* program,
- awarded a benchmark best value contract,
- qualified, produced, and deployed over 500 M157A2 systems,
- displaced over 100 M157 MOGAS systems, and
- retired over 400 M3A4 systems, while sustaining the existing systems.

The existing large area smoke fleet was rapidly aging and consisted of equal numbers of the WW II M3A4 static smoke generator and the mobile M157 MOGAS motorized and mechanized smoke systems. During Operation Desert Shield/Storm, several deficiencies were outlined by the user. Overall readiness of the existing systems dropped to the low 60 percent. The responsibilities of the sustainment and future development were fragmented between two Major Subordinate Commands.

The Product Manager for Smoke and Obscurants

* Article on this successful program was published in the Edgewood Quarterly, Issue No. 14, April 1998.



worked directly with the Integrated Materiel Management Center at TACOM-ACALA to establish a joint Integrated Product Team (IPT) and initiated a focused materiel change to incorporate specific critical improvements in safety and operational capability. The M157 Materiel Change was initiated in October 1992, and the M157A1 was type classified in September 1993.

Unfortunately, this was the first year the Army experienced a major downsizing in the defense budget. All production for the M157A1 was eliminated in the Fall mini-POM. The fleet readiness was approaching the lowest in 10 years. An aggressive initiative by the Product Manager for Smoke and Obscurants successfully convinced the Department of the Army to return the production funding in FY96/97. The team was desperate to find a way to implement the improvements of this materiel change prior to the new funding profile. The IPT looked *outside the box* and tried several different approaches to the problem.

The first approach was to take advantage of a pulse jet fuel technology breakthrough by Mr. Bill Adams of the Smoke and Technology Team within the Edgewood RDE Center's Research and Technology Directorate. At the type classification In-Process Review (IPR) for the M157A1, the IPT outlined plans to keep the developmental team

together and accelerate a follow-on Materiel Change to permit the M157 pulse jet to work on all mid-viscosity fuels in accordance with DOD Directive 4140.43.

The second approach was to use the existing Army Capital Working Fund resources and initiate a *Modernization Through Spares Program*. The IPT accelerated the introduction of improved common components of both the M157 “MOGAS ONLY” and M157A2 “Multifuel” systems. This action allowed the team to limit continued investment in soon to be obsolete spare/repair parts and expanded the capability of the existing MOGAS systems, prior to the application of the Maintenance Work Order (MWO) retrofit kit. These items included the engine run and high temperature thermal switches; fuel can lid assembly, and fuel filter water separator. The rapid introduction of these parts saved the Army over \$2M in cost savings and cost avoidance from FY94 to FY98. Our success was briefed at the CBDCOM’s Acquisition day in June 1998 and will be briefed during Army Acquisition FY98 at Fort Monmouth, NJ, in August 1998.

The third approach was to convert the Level III Technical Data Package to a performance specification. The performance specification was designed to incorporate both the end item and all the spare and repair parts. The IPT identified five major subassemblies that comprise the M157A2 systems. This reinforced the dependence and interchangeability between the total system and the critical spare and repair parts that make up the system. All members of the joint integrated multi-functional team participated in the development. Some of the best “common sense” suggestions/comments came from some of the nontechnical individuals.

The fourth approach was to prepare and competitively award a best value contract based on the performance specification for both the end items and the spare/repair items. The IPT accelerated the preparation of the performance specification and other documents to support this action. The IPT and particularly the procurement members were challenged to accept, share, and

manage risk. This was new for many members of the team; however, the contract was awarded in March 1996 to Minowitz Manufacturing Company, Roseville, MI. The contractor was added to the partnership using professional “team” training. This turned out to be the best value expenditure to date. Our new partner in industry welcomed our “new way of doing business” and rose to the challenge. The new combined IPT was able to hold an accelerated schedule and combine the normal first article production testing with the Government’s Production Qualification Testing. Our industry partners completed all the deliveries, and the IPT has fielded 450 M157A2 Multifuel systems since FY96.

Minowitz Manufacturing Company won the 1998 Small Business Prime Contractor of the Year for Region V from the U.S. Small Business Administration. Minowitz Manufacturing Company accepted their award, with the Government IPT partners in Washington, DC, on June 4th, and held their own award celebration with their entire workforce on July 2nd.

Our work is still not done; however, the IPT is looking forward to completing the job. Our recent increase in mission readiness and other successes have convinced us that Partnering and teaming work, and no obstacle is too difficult to overcome.

POC: Ms. Janice Nordin, Deputy System Manager for M157/JP, Commercial (410) 436-2838, DSN 584-2838, or email janordin@apea.army.mil; or Mr. Ray Muskevalley, Team Leader, Smoke/decon, TACOM-ACALA; or Mr. John N. Kerch, Team Leader, Smoke/Decon, ERDEC@RIA DSN 793-6818, or jkerch@ria-emh2.army.mil



THE ORDNANCE CENTER AND SCHOOL IS *SMOKING*

The M157/JP team recently built a better “mousetrap” for the Ordnance Center and School (OC&S) located at Aberdeen Proving Ground, MD. The Edgewood portion of the joint TACOM-ACALA, Edgewood RDE Center personnel at Rock Island Arsenal, and Product Manager for Smoke team discovered that the maintenance instruction training for the M157A2 “Multifuel” smoke generator system was time consuming and resulted in excess wear to the equipment.

The M157A2 system uses two M54A2 “pulse jet” smoke generators to produce heat to vaporize highly refined mineral oil (fog-oil) which then re-condenses into large visual clouds. The OC&S mission is to provide hands-on maintenance



instruction to the soldiers that will maintain and repair this equipment at the organization level. The non-commissioned officer/instructors at the OC&S would secretly disassemble or disconnect one or more sub-components of the M157A2, thereby generating a failure in the system or major sub-system. The soldier/student would then try to isolate the failure. This continuous disassembly and reassembly for each new rotation of students take its toll on even the most reliable components of this rugged system.

Mr. Robert E. Walter and MSG Robert J. Slaughter designed and fabricated a duplicate M157A2 system with a built-in “fault box” which artificially generates failures. The equipment is identical to the fielded version with the exception that there is an extra “black box” which is attached to both M54A2s.

The fault box can be opened only by the instructor and has a series of single-pole electrical switches that interrupt the circuit of up to nineteen sub-components of the generator. For example, if the switch for the fuel pressure sensor is activated, it interrupts the return signal to the control panel and the fuel ready light will never properly function. The OC&S instructor can use this artificially generated fault to evaluate a student’s trouble-shooting procedures and techniques. The use of this separate fault box allows the OC&S instructor to easily create failures in the blink of an eye, without damage to the overall system, to evaluate training techniques.

The complete list of potential faults are listed on the following table:

FAULT BOX KEY

For instructors' reference only.

All switches when moved to the up position will be OFF. Each of the items listed below can be artificially disconnected and made to appear defective. Next to the items are the possible symptoms for that disconnected item.

1. Hi temp off — K101 will not activate. Fuel pump will not run.
2. K101 off — K101 will not activate. Fuel pump will not run.
3. Air pressure solenoid (both Gen.1- Gen.2) off — No air light on the control panel. Air compressor runs.
4. CB102 off — Fuel pump will not run.
5. K101 off — Fuel pump will not run.
6. Fuel pump off — Fuel pump will not run.
7. Oil pressure off — Oil light on control panel will not illuminate.
8. Engine run off — Engine will start and run as long as the engine (on the control panel) switch is held in the start position. When the engine switch (on the control panel) is moved to the run position, the generator will stop.
9. Fuel pressure off — Fuel light on control panel not illuminate.
10. K101-B1 off — Fuel solenoid will not activate.
11. Fuel solenoid off — Fuel solenoid will not activate.
12. Purge air off — Purge air solenoid will not activate.
13. Diode on — Will cause the purge air, start air, fuel solenoids to activate simultaneously.
14. Start fuel off — Start fuel solenoid will not activate.
15. Start air off — Start air solenoid will not activate.
16. Hi voltage off — Ignitor coil will not activate.
17. SPARE
18. Temp. meter off — No temperature reading.
19. Fire sensors off — Fire light on control panel will illuminate.
20. K106 X1 off — Glow plug/band heater relay will not activate.
21. SPARE

Mr. James Cann, senior New Equipment Training Coordinator, OC&S is looking forward to integrating this maintenance trainer into his existing lesson plans. MSG Robert J. Slaughter has provided preliminary instruction on the new instruction equipment and we anticipate that the equipment will be operational at the OC&S by the end of August 1998. The joint team anticipates that this equipment will simplify and accelerate training opportunities resulting in more experienced soldiers, lower operational and sustainment costs and improved overall mission readiness.

This new equipment resulted in several unexpected benefits in the overall smoke mission. First, the new equipment was used to help train several new members of the team in “troubleshooting” problems commonly discovered during fielding and deprocessing. MSG Slaughter has held three in-house classes, which included members of each portion of the joint team. We have already seen the benefits of this training. The last fielding to Fort McCoy, WI, was the smoothest and quickest fielding due to minimal problems during deprocessing. Second, LTC Dave McDonald, NBC and Smoke coordinator, USARC,

Fort McPherson, GA, has asked the team to provide the reserves with an estimated cost and schedule for five duplicates. LTC McDonald anticipates that the Regional Support Commands could significantly benefit from this equipment during their own in-house maintenance training.

The Office of the Product Manager for Smoke works very closely with the Integrated Materiel Management Center at the Tank and Automotive Command-Armament and Chemical Acquisition and Logistics Activity combined with the

Edgewood Research, Development and Engineering Center at Rock Island Arsenal. The joint M157A2 Team is serious about the life-cycle management of over 450 large area M157A2 smoke systems in the inventory today. Prior to the introduction of the M157A2 and other *Modernization Through Spares* initiatives, the M157 "MOGAS ONLY" fleet reported readiness in the mid-70 %, just 3 years ago. The team is especially proud of today's reported readiness of the M157A2 system in the mid-to-high 90%.

POC: Mr. Robert E. Walter, Senior Electronic Technician, PM Smoke M157 Team, Commercial (410) 436-2694, DSN 584-2694, or email rewalter@apega.army.mil or MSG Robert J. Slaughter, Chief Maintenance Technician, PM Smoke, Commercial (410)-436-2694, DSN 584-2694, or email rjsalugh@apega.army.mil

COWS LIKE SMOKE

During recent smoke training in the Black Hills National Forest, cattle were observed moving into smoke curtains. The 300th Chemical Company deployed to a location near the Orman Dam, Belle Fourche, South Dakota to provide a smoke curtain in support of a Medium Grider Bridge company. This location is open and private ranch land punctuated with gently rolling, grass covered hills. Upon arrival there were no cattle in sight.

About 1.5 hours into the 3.5-hour smoke operation, over 100 head of cattle were observed grazing contentedly in the smoke curtain.

The cattle were actually observed moving into the smoke. We can only surmise that the smoke was driving off the flies that harassed the cattle or the cattle were enjoying a bit of shade. This operation lasted for a total of 3.5 hours. Others ranged from less than 15 minutes to over 2.5 hours. The locals understood why we were there and supported our operations. The U.S. Army Reserve Command appreciated the exceptional support from the local citizens, elected officials, and the joint TACOM-ACALA, ERDEC at RIA and PM Smoke M157A2 team. Because PM Smoke performed so well in this Operation Rio Grande 98, they have been invited to participate in Operation Rio Grande 99, which will occur in June 1999.

POC: Mr. Richard W. Decker, III, Smoke/Obscurants, Commercial (410) 436-8374, DSN 584-8374, or email rwdecker@apega.army.mil

JOINT WARNING AND REPORTING NETWORK (JWARN)

The Joint Services are pleased to announce the release of the Phase IA Joint Warning and Reporting Network (JWARN) software. The goal of the JWARN program is to automate and standardize NBC warning and reporting practices across the Joint Services.

JWARN software will be delivered in several phases. Phase I software products will consist of commercial and government software. Capabilities will include ATP-45 and FM 3-3 based warning and reporting, detailed modeling, and tools to assist NBC personnel in performing daily tasks. There will be three versions of the Phase I product as indicated below. Please note that the Phase IA and IC software will be provided upon request and for evaluation purposes only.

JWARN for DOS/Windows (Phase IA)

Available August 98

Software Included:

NBC Analysis 4.2.1/P*
HPAC 3.0
VLSTRACK 1.6.3
EMIS 3.0
NBC Toolbox

System Requirements:

486DX490 Processor
16 MB RAM
500 MB free HD space
SVGA video
CDROM
DOS 5.0/Windows 3.X or Windows 95

**NBC Analysis must be run in the DOS mode and requires DOS mode drivers for network capability*

JWARN for MCS/P (Phase IB)

Available February 99

Software Included:

NBC Analysis for MCS/P with enhanced battlefield management capabilities.

System requirements:

Sun Sparc20
150 MHz Processor
256 MB RAM
500 MB Free Hard Space
CDROM
Solaris 2.4.1
MCS/P

JWARN for Windows 95 and Windows NT (Phase IC)

Available February 99

Software Included:

NBC Analysis for Windows 95/NT
HPAC 3.0 or latest release
VLSTRACK 1.6.3 or latest release
EMIS 3.0 or latest release
NBC Toolbox

Hardware Required:

486DX490 Processor
16 MB RAM
500 MB free HD space
SVGA video
CDROM
Windows 95/NT



JWARN (Phase II)

Available FY00/01

Will provide:

Software with enhanced functionality and ease of use

Communications devices to connect from NBC detectors to the first node in the Tactical Internet

Integration into GCCS, GCCS-A, MCS-P, FBCB2, and AFATDS

Hardware Requirements:

Integrated into Existing Command and Control Systems

For additional information or to request a copy of the Phase IA software, please provide the following information via email to JWARN@cbdcom.apgea.army.mil or fax (410) 436-8929 or DSN 584-8929.

POC: Mr. Robert C. Lyons, Joint Warning and Reporting Network Team, Commercial (410) 436-6587, DSN 584-6587, or email to rclyons@apgea.army.mil, or Mr. Edward K. Conley, Commercial (410) 436-4771, DSN 584-4771, or email ekconley@apgea.army.mil.

Requesting POC:

Requesting Unit:

Unit Mailing Address:

Commercial/DSN Phone Number:

Commercial/DSN FAX Number:

Email Address:

Training will be provided regionally based on availability of dedicated computer training facilities and density of user requests. Suggestions on regional locations and associated schedules are welcome. Individual training requests will be evaluated on a case-by-case basis.

Requests for the software are already being received, and we are entering the information a database for tracking purposes.

HELP LINES/TOLL-FREE NUMBERS

	<i>Telephone No.</i>	<i>fax no.</i>
Chemical Maintenance	Germany 0130810280 Korea 0078-14-800-0335 CONUS 1-800-831-4408	1-410-436-3912 (TOLL CALL)
Smoke/Obscurants	1-888-246-1013	1-410-436-2702 (TOLL CALL)
CB Helpline (NONEMERGENCY TECHNICAL ASSISTANCE)	1-800-368-6498	1-410-436-0715 (TOLL CALL)
Environmental Quality	1-410-436-6588 (TOLL CALL)	1-410-436-8484 (TOLL CALL)

Fieldings



	<p>Chemical School, Fort McClellan, AL Fort Hood, TX</p> <p>POC: Peter F. Annunziato AMSCB-PM-SM, DSN 584-2362</p>	<p>Apr 98 Aug 98</p>
 <p><i>M157A2 Motorized Maintenance Work Order (MWO) Retrofit Kit</i></p>	<p>Ordnance Center & School, APG, MD 8530th Training Co., Germany</p> <p>POC: Janice A. Nordin AMSCB-PM-SM/157, DSN 584-2838</p>	<p>May 98 Aug 98</p>
 <p><i>New M157A2 Smoke Generator/M284A1 Mounting Kit on M1097 HMMWV</i></p>	<p>370th Cml Co., Fort Chaffee, AR 172nd Cml Co., Fort Riley, KS 320th Cml Co., Fort Dix, NJ 323rd Cml Co., Fort McCoy, WI</p> <p>POC: Janice A. Nordin AMSCB-PM-SM/157, DSN: 584-2838</p>	<p>May 98 May 98 Jun 98 Jul 98</p>
 <p><i>M157A2 Mechanized Maintenance Work Order (MWO) Retrofit Kit</i></p>	<p>69th Cml Co., Germany AWR3, Goose Creek, SC</p> <p>POC: Janice A. Nordin AMSCB-PM-SM/157, DSN 584-2838</p>	<p>Aug 98 Aug 98</p>
 <p><i>M56 Smoke Generator</i></p>	<p>Chemical School, Fort McClellan, AL</p> <p>POC: Randal H. Loiland AMSCB-PM-SM, DSN 584-2806</p>	<p>May 98</p>

Fieldings (continued)



 <p><i>M22 Automatic Chemical Agent Alarm</i></p>	<p>U. S. Army Chemical School, Fort McClellan, AL TRADOC NBC Schools</p> <p>POC: CPT John M. O'Regan AMSCB-PM-NNL, DSN 584-6551</p>	<p>Jul/Aug 98</p>
 <p><i>M40A1/M42A2 Mask</i></p>	<p>77th RSC, New York and New Jersey Retrofit of M42 and M42A1 Masks, Germany</p> <p>POC: CPT John M. O'Regan AMSCB-PM-NNL, DSN: 584-6551</p>	<p>Jul 98 Jul 98</p>

END ITEM UPDATES

VALUE ENGINEERING CHANGE PROPOSALS (VECP):

M825A1 WP Smoke Projectile – Two ECPs were approved for the Burster of the M825A1 Projectile: the first provided a slight tolerance increase to the Burster length; and the second permitted some relief on the nondestructive testing at the weld joint. These changes will enhance producibility of the burster while having no impact on the functioning characteristics of the M825A1.

M12 Fuel Level Sender Unit – Extensive research was done to locate a supplier of a 0-90 ohm fuel level sender unit for the gasoline tank on the M12A1 Decontaminating Apparatus. An ECP was written and approved to allow the use of the new sender unit. This action will allow the Defense Logistics Agency to procure the fuel sender unit.

EQUIPMENT UPDATES:

Joint Service Lightweight Standoff Chemical Agent Detector (JSLSCAD) – A contract modification was executed in May with Intellitec, Deland, FL, to change the software language from the use of ADA to C++ throughout the development cycle of the JSLSCAD. The action resulted in a contract savings of approximately \$150,000.

M825A1 WP Smoke Projectile –A full materiel release was approved in April for the M825A1 Projectile, which provided the field with a top zone 8S compatible smoke round.

M8A1 Chemical Agent Alarm – After two months into the Inspection Program, at least 1,000 alarms have been inspected and 51% have been reissued to the field as functional units. The rate of functional units produced from the program is up from the 40% reported in the first month of production. It appears that the



program will deliver over 1,600 alarms to the field by August and save over \$1.3M in maintenance costs.

M273 Maintenance Kit – The M273 Maintenance Kit contains 10 test paddles and 10 filter paddles and is used to support the M8A1 Chemical Agent Alarm. There is also a M293 Maintenance Kit, which contains 20 filter paddles only. The test paddles are shelf life items, but the filter paddles are not. Currently, if the shelf life expires on the test paddles the entire M273 Kit must be disposed of, including the good filter paddles. In order to reduce operation and support costs, a kit containing five test paddles only will replace the M273 Kit. Users will obtain filter paddles by requisitioning the M293 Kit; the new kit should be ready for procurement by October 1998.

Automatic Chemical Agent Alarm (ACADA) – A contract for 1,570 ACADA Detectors, 284 ACADA power supplies, 277 ACADA vehicle mounts, and associated warranties was awarded to Graseby Dynamics Ltd., Watford, England, in April for \$12,792,432.78. Deliveries will begin in November 1998 and continue through May 1999.

M43A1 Battery Box – The ACADA team has expressed an interest in using the battery box to supplement the existing GID-3 battery enclosure for training, and possibly, low-temperature operations. Significant life cycle cost savings are envisioned by providing for system training with low cost D-Cell batteries. The M43A1 Battery Box, with BA-5590 batteries installed, would also provide a substantial increase in detector operational life at lower temperatures.

Joint Warning and Reporting Network (JWARN) – In April, a Request for Information was published in the Commerce Business Daily for new technologies and innovations to analyze data bus commonalities across the services and to recommend a common data bus architecture which can be used for NBC warning, reporting and battlefield management.

M40/42 Masks – An Urgent/Sole Source contract was awarded to Mid Atlantic Cable for 500 Cable Tie Kits in support of a Modification Work Order/Durability Enhancement Program from the Project Manager for NBC Defense Systems. The plan to retrofit and upgrade all existing fielded M40/M42 Masks with the cable ties beginning in June.

M93A1 Fox – The production team (consisting of Anniston Army Depot, PM NBC Defense, and General Dynamic Land Systems) co-hosted the Fox M93A1 Acceptance Ceremony in April. MG Wooten accepted the new Digital M93A1 Fox on behalf of the U.S. Army during the ceremonial signing at Anniston Army Depot. Congressman Bob Riley (D-Alabama) was a special guest and provided formal remarks in support of the Fox Block 1 Modification Program and the role of the Depot Production Team. Congressional staffers from Senators Shelby and Sessions were also in attendance as well as Mr. Bergmann, Consular for Research, Development and Acquisition, German Embassy, and Colonel Wollny, Chief of Staff, German Armed Forces.

Advanced Integrated Collective Protection System (AICPS) – The AICPS was recently demonstrated on the U.S. Marines Corps Joint Task Force Enabler Enhanced Core Communications System at Camp LeJeune, NC. The AICPS provided the JECCS with NBC filtered and environmentally conditioned air throughout the duration of the demonstrations. The JECCS satellite communications package was operated using the AICPS exportable electrical power.



Low Cost Advanced Airborne Radiac – Personnel from the Army Test Center at Aberdeen Pulse Reactor Facility were trained in the use of the prototype we developed last year under a *skunk works* project. They will take it to Bourges, France, in June and will test it over the French Government’s radioactive test area.

M58 Wolf – A Conditional New Materiel Release was approved for the M58 Wolf Smoke System to all Force Package 1 and 2 FORSCOM units. The conditional release is due to the unavailability of the Driver’s Vision Enhancer for fielding.

M157 Lynx –

- Messrs. Paul Rambo and Bob Walter packed and labeled 50 Voltmeters (M157/M157A2 Temperature Gauges from excess M157 Control Panels) for acceptance as National Stock Number supply items at New Cumberland Army Depot, PA. The Voltmeters were refurbished with new dials (as required), verified for operational accuracy, and packed per the SPI. This delivery was requested by TACOM-ACALA Item Manager to provide spare parts, saving 6 months lead time and 60% of the cost of procuring the Voltmeters commercially.

- Messrs. Paul Rambo and Nate Fahlsing prepared the electronic version of the M157A2 –10 Operator’s Technical Manual and M157A2 –20&P Unit Maintenance Technical Manual for the TACOM-ACALA New Equipment Training Team for use in their CD-ROM Training Materials. TACOM-ACALA NET will convert training materials and Technical Manuals to Adobe Acrobat format (Adobe Acrobat is a read only format which prevents unauthorized changes) and copy this material to a CD-ROM which will remain with the unit after the NET classes are conducted. The 323rd Chemical Company will be the first to receive CD-ROM as part of the M157A2 fielding currently taking place in Fort. McCoy.

- As a result of the M157 Team’s risk reduction efforts and substantial operational and sustainment cost savings/avoidance, we received an increase in modification kit funding. We have received sufficient funding for the purchase of ninety-eight (98) additional motorized modification kits and for the follow-on application.

- Seven M1059 Smoke Generators were forward deployed by the 92nd Chemical Company in support of Operation Desert Thunder. Our M157/JP Team was contacted about potential improvements to the M157 Smoke Generator System to improve readiness. We accelerated the application of the new fuel can lid assembly which permits hot refueling; the fuel filter water separator, which protects the fuel components from contamination; and associated hoses and fittings.

- An abbreviated procedural placard (laminated) for start-up/shutdown of the M157A2 Smoke Generator System was developed by our M157/JP Team. Mr. Paul Rambo arranged for the placard to be distributed to the field through a forthcoming PS-Magazine article. The placard was a result of a request received during fielding and new equipment training.

Light Vehicle Obscuration Smoke System (LVOSS) –The LVOSS is scheduled to participate in a U.S. Marine Corps Limited Technology Assessment at Camp LeJeune, NC, in June. The Product Manager for Smoke/Obscurants will provide a prototype adjustable discharger mount along with the standard installation hardware. The U.S. Marine Corps will evaluate limited tactics, techniques, and procedures associated with the LVOSS system mounted in both the current type classified “fixed” positions and as a system that can be adjusted by the gunner without moving the vehicle.

Impregnated Undergarment (IU) – The Defense Supply Center, Philadelphia, extended the shelf life of Lot Number PB91K007002, NSN 8415-00-782-3243, size large, of the IU by 18 months to 5 November 1999.



Lot Number PB91K007002 is the only remaining lot of IUs in the supply system, and there are about 6,000 sets in stock. The Army replaced the IU with the Chemical Protective Undergarment (CPU) in March 1996; however, there is a scarcity of the larger sizes of CPUs in the supply system. The 18-month shelf life extension for the large IUs will help fill the undergarment size gap until the Defense Supply Center, Philadelphia, is able to procure larger sized CPUs.

Chemical Protective Clothing – The AMC Acquisition Center will award a sole source contract for the Trellborg High Performance Suit (HPS), which is a commercial, OSHA Level A, chemical protective suit. The basis for the sole source procurement is that the Trellborg HPS is the only DA Safety-approved reusable suit. The contract will be a multi-year requirements contract. Accordingly, the government will not be required to procure a minimum yearly quantity of suits during the three-year term of the contract. Although the basic requirement for the Trellborg HPS comes from our customers, the AMC Acquisition Center will make the contract available to all government activities that have a need for the suits. Requiring activities will submit funded delivery orders directly to the AMC Acquisition Center for their requirements. This contract endeavor is a consolidated effort by CASHPAC, AMC Acquisition Center, and Logistics Directorate personnel.

FACILITIES –

AMC Treaty Laboratory – Our AMC Treaty Laboratory is replacing the zero air/Nitrogen generators currently fielded in its Fly Away Laboratory with new generators that were designed and developed in a collaborative effort with Dominic Hunter Corp. A prototype of the generator has been running for three months without a single interruption in service. The replacement allows for much more reliable operation of the Fly Away Laboratory.

Chemical Evaluation Laboratory – In June 1998, Major General George E. Friel presented to the Chemical Evaluation Laboratory the certificate, emblem, and flag that denote certification under the AMC's Contractor Performance Certification Program. This achievement of certification caps a 1½-year effort by the Chemical Evaluation Laboratory to align its operations and procedures to conform to AMC's standards of excellence. The major effect of certification is the increase of efficiency and quality of the laboratory's operations in addition to the enhancement of the laboratory's customer base throughout the Department of Defense.



WEB SITE ON LINE

Please visit the NBC RDA Business Area of CBDCOM, known as the Edgewood Enterprise, on the world wide web. Our url address is:

<http://www.apgea.army.mil/RDA>

DIRECTOR OF THE OFFICE OF INTELLIGENCE REVIEW IN THE DOD INSPECTOR GENERAL'S OFFICE VISITS CBDCOM

In June Mr. David M. Crane, Director of the Office of Intelligence Review in the DoD Inspector General's office, visited CBDCOM for CB defense information updates. After an office call with MG George E. Friel, CBDCOM's commander, Mr. Crane was briefed on Domestic Preparedness, CB Intelligence, PM Smoke, Technical Escort Unit mission, CB Response Team, and PM NBC Defense.



SFC Walter Williams, Operations, Project Manager for NBC Defense Systems, briefs Mr. Crane on protective masks fielded from the PM.



CPT John M. O'Regan, Assistant PM for Logistics and Fielding, gives Mr. Crane a detailed explanation of the operation of the Fox.

He also received systems briefings during an NBC Defense and Smoke equipment display that included CB detectors, masks, Fox, Wolf, Coyote, Light Vehicle Obscuration Smoke System, and the Biological Integrated Detection System. MAJ Gary Nasers, the Acting CBDCOM Inspector General was the command host and presented the command overview briefing.



A proven combat multiplier, the Coyote smoke system is briefed by Mr. Timothy Karschner of PM Smoke

Mr. Peter F. Annunziato cries, "Wolf," while extolling the benefits of the M58 smoke obscurant system to Mr. Crane.





Light Vehicle Obscuration Smoke System (LVOSS) was the center of Mr. Kevin Shetterly's brief to the visiting Director of DoD Office of Intelligence Review



The Biological Integrated Detection System (BIDS) was demonstrated by MAJ Gary Nasers (left) during the visit of Mr. David Crane of DoD Inspector General staff

POC: MAJ Gary Nasers, Commercial (410) 436-2835, DSN 584-2835, or email gdnasers@apea.army.mil



RESERVES VISIT PM SMOKE

In June 1998, MAJ (P) Dave McDonald, NBC and Smoke coordinator for the U.S. Army Reserve Command visited the Office of the Program Manager for Smoke/Obscurants. He was here to attend the joint TACOM-ACALA, ERDEC@RIA, PM Smoke and ITA Inc. M157A2 team's kick-off meeting on a computer-based training CD-ROM.



Representatives from each portion of the joint M157A2 team were able to attend and provide our contractor and new partner with an exceptional new start.

MAJ Patrice Manuel, APM Smoke, and MAJ (P) McDonald were instrumental in initiating this program to take advantage of the latest technology to train the M157A2 "Multifuel" Smoke system and compliment the over \$25M investment by the reserves over the past five years in both motorized and mechanized mobile smoke. When completed by ITA Inc., the M157A2 CBT CD-ROM will be narrated by MSG Robert J. Slaughter, PM Smoke, and used by the soldiers of twenty-five motorized M157A2 motorized (mounted on HMMWV) and four M1059A3 mechanized (Track) smoke companies.

While visiting the Edgewood Area, LTC Christopher J. Parker, Program Manager of Smoke/Obscurants took the opportunity to present MAJ (P) McDonald with the PM Smoke flag in



appreciation for his continuous support of the smoke mission. MAJ(P) Dave McDonald was promoted to LTC on June 28th, 1998, by the U.S. Army Reserve Command, in part due to the exceptional success of the overall smoke mission of his command.

POCs: Janice A. Nordin, Deputy Systems Manager, M157/JP Team, Commercial (410) 436-2838, DSN 584-2838, or email janordin@apea.army.mil or Willard R. Betts, Systems Engineer, M157/JP Team, Commercial (410) 436-6743, DSN 584-6743, or email wrbetts@apea.army.mil



BG FLOYD ADDRESSES EDGEWOOD RDA WORKFORCE

On July 30th, Brigadier General Robert L. Floyd II, Commanding General, U.S. Army Soldier Systems Command, Natick, Massachusetts, held a town hall meeting at the U.S. Army Chemical and Biological Command. BG Floyd was here to rally the workforce for the upcoming merger of our two commands. Under the new organization, the U.S. Army Soldier Biological and Chemical Command (SBCCOM), which is to be activated on October 1st, 1998, BG Floyd will be the Deputy for Acquisition and Readiness (DAR). As DAR, BG Floyd will head the Research, Development and Acquisition (RDA) Enterprise of the SBCCOM. BG Floyd as the DAR will report to MG Doesburg, who will be the Commanding General of SBCCOM.

The RDA Enterprise will encompass the Edgewood and Natick Centers of Excellence, the Project/Program/Product Managers and Program Director, the Integrated Materiel Management Center, and other elements related to the materiel mission.



During his briefing, BG Floyd addressed the Board mandated "Exit Criteria" that must be met before standing up the SBCCOM RDA Enterprise, saying that the RDA Enterprise "is the only enterprise in AMC that is totally oriented, dedicated, and can actually execute Life Cycle Management."



MARINES AWARDED ARMY ACHIEVEMENT MEDALS

On March 24th, Major General George E. Friel, accompanied by Mr. Sean Funk, Ms. Tracey Kelly, and Ms. Brenda Eckstein, attended an awards ceremony at the New River Officers' Club, New River Marine Corps Air Station, NC. MG Friel presented **Army Achievement Medals** to SGT Chris Thornburgh, SGT Tom Navo, CPL Mike Tucker, CPL Dave Kelly, and CPL Corey Chapman for their participation in the ***Integrated NBC/Smoke Battlefield Demonstration*** held for the Joint Logistics Commanders at CBDCOM in June 1997. MG Friel praised their performance in this simulated battle and commended their genuine spirit of teamwork. Major General William Nyland, Deputy Commander, II Marine Expeditionary Force, Camp LeJeune, NC, hosted the ceremony.



From left to right: *LCPL David L. Kelly, LCPL Corey L. Chapman, CPL Michael A. Tucker, SGT Thomas J. Navo IV, and SGT Christopher L. Thornburgh.* (Not present were *CPL Heath B. Johnson, CPL Philip A. Oehler, LCPL Jason S. Ramsay, and CPL Erwin P. Reed II.*) NOTE: All ranks listed were as of 6 Jun 97



This Marine was one of the participants in the ***Integrated NBC/Smoke Battlefield Demonstration*** hosted at Aberdeen Proving Ground (Edgewood Area) for the Joint Logistics Commander's Conference. U.S. Army, Air Force, Navy, and Marine representatives attended the event. All guests were invited to view the demonstrations, including a variety of synergistic smoke systems, chemical warfare agent detection and alarm systems, reconnaissance operations, and the Modular Decontamination System, which neutralizes agent on combat vehicles .

POC: Ms. Brenda C. Eckstein, Commercial (410) 436-2879, DSN 584-2879, or email bceckste@apega.army.mil, or Ms. Tracey L. Kelly, Commercial (410) 436-4438, DSN 584-4438, or email tlkelly@apega.army.mil

R&D ACHIEVEMENT AWARDS

One of the highest honors the Assistant Secretary of the Army for Research, Development and Acquisition can bestow on members of the engineering and scientific community is the Department of the Army Research and Development (R&D) Achievement Award. This prestigious award recognizes outstanding Army engineering and science achievements that have resulted in improved U.S. Army capabilities and contributed to the nation's welfare. This year the NBC RDA Business Area of the U.S. Army Chemical and Biological Command had the following recipients:

- ***Bruce W. Jezek*** and ***V. James Cannaliato*** will be recognized for the planning and execution of developmental efforts to field the XM94 Long Range Biological Standoff Detection System (LRBSDS). The LRBSDS uses light detection and ranging technology to provide U.S. Forces the first biological standoff detection capability. Easily installed onto a UH-60 Blackhawk helicopter, the LRBSDS can detect and track aerosol clouds that are suspected of containing biological agents up to 30 kilometers away. This early detection allows Army commanders to warn personnel to take appropriate protective measures before they are exposed.

- ***Dr. Tu-Chen Cheng*** is receiving the award for exceptional scientific achievement in developing enzyme systems for the decontamination of nerve agents and for using molecular biological techniques to provide the materials necessary for the decontamination of the chemical agents.

Each individual will receive an official letter of commendation and an award plaque, to be presented at the 21st Army Science Conference (during an awards luncheon). The guest speaker for the RDA Awards Luncheon will be Professor Richard E. Smalley of Rice University. Congratulations to all the winners!

TACOM-ACALA EAGLE AWARD

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Members of the ***M45 CB Mask Acquisition Team*** were awarded the TACOM-ACALA Eagle Award for Acquisition Reform initiatives used during recent production contract negotiations. The 23 recipients included personnel from CBDCOM, TACOM-ACALA, SBA, DCAA, and Campbell Plastics Engineering and Manufacturing, Inc. A three-year multiyear firm fixed-price 8a set aside contract, with five option years for the end item and five years Indefinite Delivery-Indefinite Quantity for the spares, was awarded for FY97 through FY01. The contract was negotiated using ALPHA contracting techniques; using the ALPHA method saved 180 days of pre-award time by simultaneously performing tasks in lieu of performing tasks sequentially. A minimum of 90 days of ALT/PLT has been saved in placing the spares on contract by using the Indefinite Delivery-Indefinite Quantity provisions.

AMC COST ANALYSIS AWARD

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The AMC Cost Analysis Award was established to recognize those individuals or groups for outstanding achievements by personnel involved in the Cost Analysis Program. Awards are presented in several areas. ***Ms. Sylvia Clark*** of the CBDCOM Cost Analysis Team was chosen as the 1997 recipient of the award for Research, Methodology, and Data for her efforts in the development of improved estimating methodology for Independent Government Estimates (IGEs).

HUMAN INTEREST STORIES

SECRETARIAL TRAINING AND ENHANCEMENT PROGRAM (STEP) – The Spring 1998 semester marks the end of the Secretarial Training and Enhancement Program. This program has been a real success story -- many of our employees have now completed their Associates Degree using credits they received through STEP as their foundation. Many others are now pursuing Bachelors Degrees. These results were the intent from the program's inception. We are now faced with a dwindling number of potential students and realize it is not because the program failed, but rather, because it has been so successful and our administrative employees are now ready to move on to bigger challenges.

HIGH SCHOOL TECHNOLOGY CLASS SUPPORT – The Edgewood RDE Center's Engineering Directorate participated in the C. Milton Wright High School field day at Harford County Airport, Churchville, MD. Twenty-nine engineering and drafting students experienced first hand demonstrations of materials and designs used to establish structural integrity of aircraft. Mr. Ned Surratt, Chief of our Technical Integration Office, presented construction drawings and related parts being fabricated, discussed critical structural integrity of synthetic composites and metallic materials and demonstrated the relationship between technical drawings and factory markings of quality materials. The class instructor, Mr. Gary Rabee, was elated with the direct relationship to current class subjects.

EDGEWOOD PARTICIPATES IN ENGINEER-FOR-A-DAY – Edgewood RDE Center's Engineering Directorate participated in the Susquehanna Chapter of the Maryland Society of Professional Engineer-for-a-Day Program in April. Five students from local high schools spent the morning with an engineer to gain a better understanding of the engineering field. The students were taken to our Experimental Fabrication Shop, the Wind Tunnel, Computer Aided Design and Computer Aided Engineering areas, the Biological Integrated Detection System (BIDS) team, and the Laser Laboratory.

BRING YOUR CHILD TO WORK DAY – In June, the Federal Woman's Program Committee sponsored "Bring Your Child to Work Day." This event is envisioned to instill confidence and excitement in young children about their futures. The program is open to children, ages 9-15, whose parents work within CBDCOM/Edgewood RDE Center.

"Satisfaction of our customers' requirements defines quality for us."

At the Edgewood RDE Center, we are striving to improve customer satisfaction. Recently, Dr. Resnick, Director of Research and Technology, selected a *client advocate* to develop a long-term working relationship with his customers. The *client advocate* would be someone free of the direct workload from the customer and would take a strategic look at partnering opportunities. The pilot client will be the Office of Science and Technology. Dr. Resnick wants to begin immediately and to use Jeff Hinte of the Advanced Systems Concepts Directorate as the *client advocate*.

Remember our email address for customers to send their comments or inquiries is **cu-team@apgea.army.mil**

SIXTH INTERNATIONAL SYMPOSIUM ON PROTECTION AGAINST CHEMICAL AND BIOLOGICAL WARFARE AGENTS

The Sixth International Symposium on Protection Against Chemical and Biological Warfare Agents was held in May in Stockholm, Sweden. The Edgewood RDE Center's Corporate Enhancement Team fielded exhibits for two customers, the Joint Service Materiel Group (JSMG) and the partnered AMC Treaty Laboratory/DoD Technical Support Working Group (TSWG).

To foster partnership among the JSMG and the NBC Industry Group, we provided a 12-foot exhibit on the third floor of the exhibition hall from which JSMG, CBDCOM, and an Industry group compendium of products was distributed. Interest was high and approximately 500 of each package were dispensed. Sincere appreciation goes to Mr. Jim McKivrigan, Director of JSMG, and Mr. Bill Fox, JSMG's Industry Program Manager, who both provided devoted support to the project as well as manual labor during the set-up/break-down sessions.



*Mr. William A. Fox
Industrial Liaison, JSMG*



*Joint AMC Treaty Laboratory
and DoD Technical Support Working Group Exhibit*

On the fourth floor, we fielded a 1000 square foot exhibit to showcase the various products of the CBDCOM AMC Treaty Team and the DoD TSWG. A 20-foot custom exhibit created by the CBDCOM Data Imaging Team highlighted the work of the AMC Treaty Team, the Enhanced Modular Laboratory, and announced the opening of the TSWG's Broad Agency Announcement that, in part, invited proposals for R&D of a Chemical Biological Dosimeter.

Other exhibit areas in the exhibit suite featured the CBDCOM patented Super Toxic Analytical Glove System, Domestic Preparedness, TSWG mission, and some of the TSWG Weapons of Mass Destruction Countermeasures subgroup's recently developed equipment and systems. We are indebted to Dr. Dennis Reutter, Ms. Monica Heyl, and Mr. Charles Henry (all of the AMC Treaty Team) who staffed the exhibit and enhanced the command's international reputation as a center of excellence. In addition, we appreciate the teamed-support of Ms. Tracy Cronin (TSWG's Office of

Technology) and Mr. Ben Garrett and Ms. Gail Dempsey (Battelle Crystal City Operations) who staffed the TSWG portions.

Ms. Regina Ryan, newest member of the Corporate Enhancement Team, produced all of the JSMG and CBDCOM color brochures for the exhibit; however, it was her design of a joint United States/Sweden lapel pin, which was presented



Lapel Pin

to our distinguished international visitors, that received the highest recognition. The pin quickly became quite noticeable, and sought after, among the symposium's delegates from more than 50 nations.

Exhibiting in an international venue to compete with and represent the United States amid our global partners involves some amount of risk; but with this government/industry team representing "U.S. CB Defense," we were assured of the great success that was achieved. This year the U.S. team certainly exemplified the slogan of the Corporate Enhancement Team, "**Excellence – By Design.**"



In the foreground is the prototype of the initial design concept of the Disposable Toxic Agent Protective system (DTAPS), displayed in front of posters from the Technical Support Working Group's (TSWG) Office of Technology. The DTAPS was designed and developed for TSWG by GEOMET Technologies, Inc. of Germantown, MD.

POC: Ms. Brenda C. Eckstein, Corporate Enhancement Team, Commercial (410) 436-2879, DSN 584-2879, or email bceckste@apega.army.mil

COOPERATIVE R&D WITH INDUSTRY AND ACADEMIA

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ecent significant achievements and actions in our continuing commitment to *technology transfer* follow:

In March, Mr. Roy Albert attended the Mid-Atlantic Federal Laboratory Consortium Meeting at the Pittsburgh Research Laboratory. He briefed on the Edgewood Center's capabilities and unique facilities, which are available for cooperative efforts with private industry. He also saw a demonstration of a head contact microphone and speakers being developed by the Navy Coastal Systems Station for use in fire fighters' helmets. This technology may have application for use by personnel in CB protective gear.

In May, our Office of Technology Applications hosted a visit of personnel from the Maryland State Department of Business and Economic Development. This visit was arranged through the Aberdeen Proving Ground Science and Technology Board to familiarize the state with different technologies available at APG. The briefing outlined CBDCOM and its capabilities, the technology transfer opportunities within the Edgewood RDE Center and highlighted agreements with Maryland companies, and included a tour of the Process Engineering Facilities.

In June, Ms. Stella Lee participated in the **BIO '98 International Biotechnology Meeting & Exhibition** in New York. There were over 4000 industry leaders and government officials from more than 40 countries from every avenue of the biotechnology industry. Ms. Lee was there to introduce and market our bio-process engineering capability and facility to the commercial world. It was an excellent opportunity to exchange ideas and information, network, and build critical business relationships.

In June, Ms. Lee also attended the **1998 Joint Service Chemical and Biological Decontamination Conference** in Florida. This

conference was held to discuss decontamination issues and problems and to promote solutions. The U.S. Government, Industry, Academia, Foreign Industry and Government personnel were invited to participate with the intention of eliciting novel approaches to the area of decontamination. Ms. Lee gave a presentation on the Technology Transfer Program at the Edgewood RDE Center.

Several of our Team Leaders attended a meeting at the Cecil County School of Technology for an orientation on the Summer Externship for Teachers Program. Seventy-eight teachers volunteered to spend one week at area businesses to gain first-hand knowledge on various careers that they could take back to the classroom and relate to the students to help them be better prepared for a career. A teacher was at Edgewood the week of July 13th. This program was sponsored by Maryland Career Connections.

Cooperative R&D Agreement (CRDA)

Two CRDAs with GEO-CENTERS, INC., were signed in April. One for the Design Evaluation Laboratory and the other for the Chemical Evaluation Laboratory. Under these CRDAs, GEO-CENTERS, INC., will assist with the transition of military technologies (especially chemical and biological agents testing) to commercial applications.

A CRDA was finalized between the Edgewood RDE Center and New Horizon Diagnostics (NHD), Inc., Columbia, MD. Under this CRDA, we will work together to develop luminescence techniques for applications to various missions, such as domestic preparedness, food safety monitoring, and water monitoring. These techniques include the development of luminescence techniques as both a generic and specific detection/identification platform. NHD shall have access to certain Edgewood RDE Center expertise, rapid prototyping facilities, and machine shops, and Edgewood shall serve as a beta test site for new equipment and techniques

that NHD is developing. NHD shall commercialize and market the detection kit and shall pay a percentage of the sales to the Center.

In May, a CRDA was signed between the Edgewood RDE Center and Direct Dimension, Inc., Baltimore, MD. The Center has developed and maintains unique capabilities to perform computer-aided engineering and manufacturing products development in support its military mission. Direct Dimensions, Inc., is a high technology firm that provides dimensional measurement services to industry. The company has advanced expertise in dimensional analysis including both hardware and software capabilities. Under this CRDA, both parties will pool resources to make research and development of rapid prototyping, virtual prototyping and dimensional measurement service available to the commercial sectors.

A CRDA was sent out to the Department of Biological Resources Engineering at the University of Maryland at College Park for their signature. The nature of this CRDA is to design and conduct a mask wear research investigation and to characterize mask wear responses of individuals of various physical and psychological traits.

In June, our Computer-Aided Engineering Team met with Dr. Albert Owens, Distinguished Service Professor and Center Director Emeritus of the Johns Hopkins Oncology Center. Dr. Owens' company, Axxia Pharmaceuticals, has developed a Hydromorphone Implant and needs to produce an injection molded quantity of 500 for further testing to obtain FDA approval. Dr. Owens was briefed on our CAE capabilities saw a demonstration of our injection molding capabilities. The possibility of a CRDA is being pursued. This meeting was arranged through the APG S&T Board and Mr. Warren Hartenstine of the HEAT Center.

Memorandum of Agreement (MOA)

Through a Memorandum of Understanding with the University of Maryland, Ed Farmer (General Manager of PharmaTech, Salisbury, MD) and several of their engineers visited our Center to

discuss rapid prototyping, computer-aided manufacturing, and molding of rubber closures (which are mostly used in the pharmaceutical industry). We discussed with them how to bring their product to market in reduced time using rapid prototyping. When Mr. Farmer was leaving, he said, "You people have saved me about \$100,000 today." This is a perfect example of how the Stevenson-Wydler Technology Transfer Act is to work. We are to transfer technology to U.S. industry to make them more competitive in the world markets and PharmaTech has a large foreign competition.

We signed an MOA with the University of Maryland College Park-Technology Extension Service and Emerging Materials Concepts Consultants to scan for images of the cyanobacteria on substrate materials using an electron microscope.

We also signed an MOA with the FBI Laboratory to provide technical support.

Patent License Agreement (PLA)

The PLA with ZUMRO, Inc., for the CB Explosive Containment System, which was co-invented by James Genovese and Bill Drumgoole. consists of a royalty payment of 8% on gross sales, a minimum payment of \$3,000.00 for the second year, and \$5,000.00 per year for the remaining years. The Edgewood RDE Center and the co-inventors will share in the royalties generated from this PLA (*featured in Edgewood Quarterly, Issue No. 14*).

In May, another exclusive PLA was signed by Mr. Zarzycki, the Center's new Technical Director, and Mr. Garrison, the CEO of the EnVirion, S. Salem, NY. This PLA allows marketing of the Integrated Virus Detection System (IVDS) to the commercial and public sectors. The IVDS is a breakthrough of virus detection technology, and the system is the first instrument of its kind and exhibits not only crucial defense of biological warfare application but also has many public health applications, such as water monitoring, food processing, pharmaceutical

pursuing antiviral drugs, veterinary application and many more. This technology was developed by two inventors, Dr. Charles Wick from the Edgewood RDE Center and Dr. David Anderson from EnVirion. Dr. Anderson has been continuously involved in the improvement of the IVDS, and EnVirion has a strong and proactive marketing program. Meanwhile, Dr. Wick and the Edgewood Center will receive royalties from the future sales of IVDS. It is a truly a Win-Win situation for all. CBDCOM's patent program continues to grow impressively with 12 U.S. Patents issued since the



Rebecca Haydock, President COO, Robert Garrison, CEO, Joseph Zarzycki, ERDEC Technical Director, and Charles Wick, ERDEC Inventor

beginning of the fiscal year (Oct 97). This represents a record-setting pace for CBDCOM. One new exclusive and royalty-bearing patent license agreement was executed in March 1998, and another was finalized in April. These agreements will result in new commercial products and services spinning-off from CBDCOM technology. This will bring to eight the total number of CBDCOM patent license agreements. With the signing of four new CRDAs this year, it brings CBDCOM's total to 13 since its first CRDA was established in 1995.

Battelle sent a royalty payment of \$5,000 and Global Environmental Solutions sent a royalty payment of \$1,000 to DFAS-Rock Island under their existing PLAs with the Edgewood RDE Center. This money will be distributed among the inventors and the Center.

Testing Service Agreement (TSA)

Government laboratories are authorized, for an appropriate fee, to test materials, equipment, models, computer software, and other items for any person or entity, according to the Interim Draft Department of defense (DO) guidance implementing 10 U.S.C. 2539b, "Authority to Sell," April 17, 1997. To make this process effective and efficient here at the Edgewood RDE Center, we prepared procedures, and we are having great success.

In April, a TSA was signed between Environmental Technologies Group, Inc., and the Edgewood RDE Center to collect signature data for ICAM-APD detectors with surety materials using our patented testing system. Data collected will be used to confirm the detection algorithm of the detector.

Also signed in April, was a TSA with Intellitec Division of TPG, Inc., to collect M43A1-SAW detector signatures using surety materials.

In July, we signed a TSA with Environics Oy represented by Sensor Applications, Inc., to verify the detection rate and false alarm rate of the M90-D1-B detector, by collecting data open-air interferent environment.

Miscellaneous

In April, we hosted the monthly meeting of the Harford County Tech Prep Committee. This committee works with Harford County Schools, Harford Community College, and area industry and government to improve school curriculum and encourage students to take technology-related courses. We provided a tour of our Computer-Aided Design/Computer-Aided Engineering Rapid Prototype Facility.

***AMC Field Assistance
in Science and Technology
(AMC-FAST)***

In April, Mr. Albert attended the annual meeting of Quick Reaction Coordinators. During development of the agenda for the Science Advisors' Annual Training, Mr. Albert was tasked to present an overview in May at AMC of the Edgewood RDE Center's capabilities as well as up-to-date information on the new Command (SSCOM/CBDCOM), which is to be stood up October 1st, 1998.

POCs: Mr. Roy C. Albert, Technology and Science Information Team, DSN 584-4438, commercial (410) 436-4438, email address is rcalbert@apega.army.mil, or Ms. Stella Lee, Office of Research and Technology Applications, DSN 584-5386, commercial (410) 436-5386, email address is sychung@apega.army.mil.

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TECHNICAL INDUSTRIAL LIAISON

Small Business Innovation Research (SBIR)

Eight new Phase I SBIR contracts were awarded from a total of 61 proposals that were received as a result of DOD SBIR Solicitation 98.1. These contracts address the following six topics:

- Label-Less Methods of Biodetection
- Microfabrication-Based Biodetectors
- Large Scale Production of Antibodies in Transgenic Animals (2 contracts)
- Intermolecular Force Measurements for Molecular Identification
- Fast, Low Power Consumption Gas Chromatograph
- Hand-Held Gas Chromatography-Mass Spectrometry (2 contracts)

The ten Phase I contracts awarded last fall as a result of the previous SBIR solicitation (97.2) are nearing completion. We have recently received eight new Phase II proposals. Two of the proposals were selected for award. Both address the

development of obscurants by biological means. Up to three additional proposals may be accepted at a later date if additional SBIR funding becomes available. Five Edgewood Center topics were approved for Solicitation 98.2, which officially opened July 1st, 1998. A pre-solicitation (which lists all of the 98.2 topics) is currently available for viewing through the Internet. Prospective contractors can submit questions regarding these topics through the SBIR coordinators.

Broad Agency Announcement (BAA):

BAA 98-1 closed on June 30th. There were 24 proposals received the last week of June, making a total of 48 proposals for the life of the BAA. All of the proposals received have been forwarded to Research and Technology Directorate for evaluation, and preparations are now underway for BAA-99-1.

POC: Mr. Ronald P. Hinkle, Technical Industrial Liaison, DSN 584-2031, commercial (410) 436-2031, or email rphinkle@apega.army.mil.

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1998 Army Summer Faculty Programs

This is an ARO-sponsored program, and they process all the contractual paper work. It is an excellent way to get help for our projects. Management strongly encourages participation in the program to use the talents of the faculties both from the high school and the universities/colleges to enhance our research and development programs. CBDCOM had eight candidates for the summer faculty program, including seven for the High School Science and Math Faculty Program and one for the summer Faculty Research and Engineering Program. The number of participants has increased by two over last year in the High School Science and Math Faculty Program. This year's participants along with their affiliations and sponsors are:

<i>Summer Faculty Research and Engineering Program</i>		
<i>Participant</i>	<i>Faculty Affiliation</i>	<i>Sponsor</i>
Dr. Daniel Chen	Lamar University Beaumont, TX	MAJ Eric Deitz Mr. Kenneth Fidley
<i>High School Science and Math Faculty Program</i>		
Ms. Susan E. Besch	Middle River Middle School Baltimore, MD	Mr. Robert Doherty
Ms. Roberta J. Bruggeman	Kenwood High School Baltimore, MD	Mr. Steven Kaminsky
Mr. Charles W. Cross	Elkton High School Elkton, MD	Mr. Michael T. Goode
Ms. Roma S. Dogra	Southwestern High School Baltimore, MD	Dr. Thaiya Krishnamurthy
Mr. Gregory Lauck	Aberdeen High School Aberdeen, MD	Mr. William G. Argiropoulos
Mr. George M. Stewart	Rosedale Center for Alternative Studies Baltimore, MD	Mr. Joseph A. Domanico
Mr. Aaron M. Thompson	Havre de Grace High School Havre de Grace, MD	Mr. Ralph F. Falcone

COOPERATIVE R&D

Engineer Scientist Exchange Program

Mr. Kibong Choi, of the Republic of South Korean MOD, was selected to work at Edgewood RDE Center under the U.S./Republic of Korea 1998 *Engineer Scientist Exchange Program*. He will begin his assignment in the fall of 1998. Mr. Choi will be assigned to the Aerosol Research Team in our Research and Technology Directorate. Mr. Choi will be working with aerosol generators, samplers, and analysis methods.

Foreign Visitors

In April, Group Captain Ian McPhee, Commandant of the Defence NBC Centre, UK, visited the Command. This was Group Captain McPhee's first visit here since taking over as

Commandant of Winterbourne Gunner, the UK NBC Centre, in September of 1997. He was here to discuss current cooperation between the United Kingdom and the United States in materiel development. Group Captain McPhee commented that the degree of overlap in technology development (in CB) between the United States and the United Kingdom is substantial, and he is very interested in continuing the cooperation under appropriate international agreements.

In June, Dr. Brenton Paul, Head, Combatant Protection and Nutrition Branch, Aeronautical and Maritime Research Laboratory, Australia, and Mr. Douglas Comery, Staff Officer, Embassy of Australia, visited the Command. This was the first visit from Dr. Paul since assuming his new position. Dr. Savage, the U.S. National Representative for The Technical Cooperation Program Group on Chemical and Biological

Defense hosted the visit, which was primarily an information exchange. As a result of this visit, several areas were identified for possible future collaboration, and further discussions will be held in the near future.

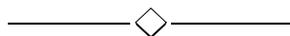
TTCP CBD Group

In June, the Chemical and Biological Defense Group meeting of The Technical Cooperation Program met at the Defence Establishment Suffield (DRES). The group discussed current activities underway in medical countermeasures, biological detection, modeling and hazard assessment, individual protective equipment, and analytical methodologies applicable to the Chemical Warfare Convention. In addition, the group was briefed on the efforts to identify key topic areas in defense against radiological hazards.

Dr. George Famini, Edgewood Center's International Programs Office, Sal Bosco of

OSD(AT/CB&CP), and CWO Robert Hicks of the Defense Attache', Budapest, visited several sites within the Hungarian Military relevant to chemical and biological defense and held discussions on how to increase interaction between the Hungarian Defense Forces (HDF) and the U.S. Army on issues of CB Defense. Sites visited included the Land Forces Headquarters, The NBC Supply Center, and the Military Institute of Technology. In addition, a visit was made to Respirator Ltd, the primary supplier of CB Defense Materiel to the HDF. The HDF is currently undergoing the major task of re-outfitting the entire military with equipment that is compliant with NATO standards.

POCs: Dr. George R. Famini or Ms. Juanita M. Keesee, International Programs Office, Commercial (410) 436-2552/5376, DSN 584 - 2552 / 5376, e m a i l g r f a m i n i @ a p g e a . a r m y . m i l o r j m k e e s e e @ a p g e a . a r m y . m i l.



MUSEUM DEDICATION IN POLAND

Mr. Peter J. Stopa, U.S. Army Edgewood Research, Development and Engineering Center, visited Poland, where he participated in the dedication of a room to "Western Cooperation" in the Museum of the Veterinary Research Center, Military Institute of Hygiene and Epidemiology, Pulawy, Poland. The ribbon-cutting ceremony was initiated by COL Michael Bartoszcze, Commander of the Center. Mr. Stopa assisted COL(P) Andrzej Trybusz, the new Commander of Medical Services of the Polish Army, in the cutting of the ribbon. Other participants included COL Skoczek, Chief of the Veterinary Corps of the Polish Army, and CPT Christian Otterbein of the Medical Academy of the German Armed Forces. The U.S. Army Edgewood RDE Center figured prominently in this room. We were the first of the Western military research centers to establish contact with Poland, and we have had the closest ties with them. Our efforts culminated in the signing of an Information Exchange Annex with Poland in December 1996, the first by any U.S. Army laboratory. A similar agreement was concurrently signed between the U.S. Air Force and the Polish Institute of Aerospace Medicine. In addition, a NATO Advanced Research Workshop was co-sponsored last year by the Edgewood RDE Center and Military Institute of Hygiene and Epidemiology. A collage of photographs and memorabilia commemorates both these events. The ceremony concluded with a champagne toast in which the Poles expressed their desire to develop even closer relationships with their new colleagues in the West.





Edgewood Enterprise employees participate in many workshops, symposiums, and conferences; and many are recognized by outside organizations for their exemplary performance. It is our pleasure to share this information.

In March–

Ms. Janice Nordin, Deputy Systems Manager, Office of PM Smoke/Obscurants, briefed at the ***Modernization Through Spares (MTS) Seminar*** in Detroit, MI. The Team's Modernization Through Spares initiatives were considered among the best examples demonstrating the benefits of Modernization Through Spares in the U.S. Army. By invitation, Ms. Nordin delivered the presentation at ***Road Show VII*** in May 98.

Ms. Trudy Shackelford attended the ***Basis of Issue Plan Feeder Data Training Workshop***, which was hosted by the U.S. Army Force Management Support Agency-West, Fort Leavenworth, KS. The workshop was held to facilitate the Materiel/BOIPFD Developer and Combat/Basis of Issue Plan (BOIP) Developer interchanges on BOIPFD policy, procedures, and support systems that will sustain a reasonable BOIPFD capability during downsizing of AMC and USAFMSA.

A presentation, entitled "Chemically Resistant Materials and Test Methodologies for Vehicle Surfaces to Meet NBCCS Requirements," was contributed to the ***9th Annual TARDEC Ground Vehicle Survivability Symposium*** at the Naval Postgraduate School. Several fluoropolymers had been proposed as candidates for composite vehicle surfaces to provide chemical resistance.

Experimental results on chemical agent interaction with fluoropolymers was reported and evaluated. The study also highlighted overall Edgewood RDE Center capabilities in material selection and evaluation for chemical resistance to meet DoD program requirements for NBC Contamination Survivability. Material screening methods were described that ranged from polymer phase diagram predictions to ASTM solubility and sorption/desorption tests. The use of standardized test methods and reference materials to control measurement quality was also emphasized.

In April–

Our Research and Technology Directorate hosted the ***Smoke/Obscurants Symposium XX***. The theme for this year's symposium was "Smoke in Transition." A total of 35 platform papers and 12 poster papers were presented. The symposium was attended by over 120 representatives from 19 government agencies, 17 contractors, and four foreign countries. This year brought 47 new attendees to the symposium. Mr. James O'Bryon (Deputy Director, Operational Test and Evaluation, Live Fire Test and Evaluation, Office of the Secretary of Defense) and MG George Friel (Commander, CBDCOM) delivered keynote addresses. Symposium topics included Smoke Materials, Data Analysis, Smoke Systems, Health and Environment, Countermeasures, and Smoke Modeling.

Our Armored Systems Modernization Team participated in the ***Smoke Symposium*** and provided four papers: "Reduction and Presentation of Millimeter Wave Attenuation Data for Obscurant Cloud Characterization," "Technology Demonstration Program for a Multispectral Obscuration Reinforcing System (ORS) for the M1A1 Main Battle Tank," "Development of a Cartridge for Aerosol Dissemination," and "The Vehicle Smoke Protection Model and Cloud Density Visualization Utility (VSPM-CDVU)."

Technical support was provided to the fog oil pollution reduction program and its paper, "Literature Survey on Materials to Improve Low Temperature Fluidity of Fog Oil." Two posters were presented, which covered the aerosol dissemination technology effort using propellant as the energy source and a 40mm cartridge as the technology demonstration vehicle, and the computer demonstration of the VSPM-CDVU which received a *best poster* award. The ASM Team also provided a two hour Smoke Generation System Analysis Workshop that was attended by representatives from three nations.

The **Association of American Universities (AAU)** sponsored its *4th Annual Capitol Hill Demonstration* entitled "Basic Research in the National Defense" in Washington, DC. One of the participants, the Massachusetts Institute of Technology, included in its exhibit our Tier II sensor, which is part of the Biological Aerosol Warning System (BAWS). The Tier II sensor is a Micro-UV laser-based aerosol fluorescence sensor being developed by the Massachusetts Institute of Technology's Lincoln Laboratory under an Advanced Technology Demonstration program.

A display demonstrating the BAWS was featured at the **ENFORCE XXI-98 Conference**, which is hosted annually by the U.S. Army Engineer Center and Ft. Leonard-Wood.

Mr. Troy Johnson, Team member of the M56 Coyote, Office of PM Smoke/Obscurants, presented a paper on the "Fog Oil Pollution Prevention Program" at the *24th Environmental Symposium and Exhibition* (sponsored by the National Defense Industrial Association) in Tampa, FL. The paper was presented under the category of Military Training and Operations and described the effort to define, test, and evaluate a new all-temperature visual obscurant material capable of producing effective optical screening from -25 °F to 120 °F in large area smoke generators. The candidate material(s) will minimize environmental and human health impacts to negate the need to dilute mineral oil (current fog oil) with diesel fuel during cold weather operations.

Ms. Ann Butrow, Analytical Chemistry Team, attended the *semi-annual meeting of American Society for Testing and Materials (ASTM) Committee E-37 on Thermal Measurements* at ASTM Headquarters in West Conshohocken, PA. The focus of Committee E37 is development of standard test methods to be used for the measurement of thermophysical properties. As a member of a task group that has generated a test method for measuring vapor pressure using thermal analysis, Ms. Butrow presented the results of recent efforts using differential scanning calorimetry (DSC) to optimize experimental parameters and extend the pressure range over which the method can be used. In addition to serving on the vapor pressure task group, Ms. Butrow is also chairing a task group on method consistency, the subcommittee on nomenclature and definitions, and is currently second Vice-Chairman of E-37.

The *JSLIST International Conference on NBC Protective Clothing and Individual Equipment* was choreographed by Battelle and hosted by the U.S. Marine Corps Systems Command. This three-day seminar featured speakers from Natick as well as all the services. The conference was a comprehensive look at all aspects of the JSLIST program from inception until now.

Dr. Thaiya Krishnamurthy, of our Research and Technology Directorate, delivered an invited lecture entitled, "Bacterial Identification by Mass Spectrometry" at the recent *Conference on Application of Mass Spectrometric Techniques for Identification of Biological Warfare Agents* held in France. Scientists from the international mass spectrometry community and defense organizations participated in discussions on the available mass spectrometry technology and its application potential for characterization and identification of biological agents. Dr. Krishnamurthy also chaired a session on the application of matrix assisted laser desorption ionization for the

identification of biological warfare agents. She participated in discussions involving required instrumentation and technology for the field identification of biological warfare agents. She also had the opportunity to learn about the progress made in other defense laboratories in the identification of biological warfare.

Dr. Lynn Hoffland attended the *NATO SIBCA* meeting in Brussels where they discussed field trials over the summer to test procedures they have developed over the past year for sampling and analysis on the battlefield. Many nations will participate in these trials, which they expect will include open-air tests with chemical agents.

Mr. Howard M. Smalley of the Technical Integration Office (TIO) presented a paper entitled Environmentally Friendly Electronics Cleaning for Military Readiness at the 24th Environmental Symposium & Exhibition. The *24th Environmental Symposium & Exhibition* was held at the Tampa Convention Center. The Symposium was sponsored by the National Defense Industrial Association. The paper discussed the importance of environmentally friendly precision cleaning to military readiness and described an environmentally friendly electronics cleaning system being developed by the TIO. The authors of the paper were Dr. John R. Kennedy, Leonard J. Beeson, Harold Klapper, and W. E. Kinne of the TIO; Lawrence G. Vettrano of the Science & Engineering Laboratory, McClellan Air Force Base, Sacramento, CA; and Richard W. Fuchs, Independent Special Processes.

In May—

The AMC CASHPAC was held in conjunction with the *1998 Army Safety Conference* at San Antonio. CASHPAC members had a unique opportunity to participate in both AMC and Army level discussions on the future of the Army Safety Program. There was several professional development courses offered in conjunction with presentations by Army Safety leaders.

Mr. Richard Decker and Ms. Janice Nordin, Office of the Product Manager for Smoke/Obscurants,

facilitated a seminar, entitled “Technical Data Package Conversion for Modernization through Spares,” as part of *Acquisition Reform Days III*. The class focused on implementation of Modernization Through Spares initiatives using examples of successes experienced on the M157A2 program.

Our Arms Control and Treaty Assistance Directorate staff participated in a Defense Treaty Inspection Readiness Program (DTIRP) *Arms Control Conference* in DC.

Dr. C. Hsu attended the *1998 Congressional Seminar and National Leadership Training Conference* sponsored by the Federal Asian Pacific American Council (FAPAC) in Washington. The theme of the conference was “Asian Pacific Americans: Pursuing Progress.” Over 300 conferees took home a strong message: APAs pursue the progress in diversity in One America, One Nation, and One Voice.

Mr. Roy C. Albert attended a two-day meeting of the Army’s *Quick Response Office* to determine what technologies are available now or in the next 6-12 months to address five contingency events, including NBC terrorism, peace making/keeping, noncombatant evacuations, humanitarian relief, and sniper threats to deployed forces. The meeting was attended by all of AMC’s Major Subordinate Commands, HQ AMC, TRADOC, Corps of Engineers, Surgeon General, USAF Force Protection Battle Lab, and several Program Managers. As a follow on, we prepared a CD of fact sheets on CB Defense and Smoke equipment for the AMC Quick Response Office’s Working Group Meeting. These fact sheets will be used to identify technologies that can be used in one of the contingency situations.

The *second Biological Warfare Improved Response Program workshop*, which was recently held, included emergency responders from seven states and representatives of

Federal Bureau of Investigation, Federal Emergency Management Agency, Department of Health and Human Services, Environmental Protection Agency, Department of Energy National Laboratories, U.S. Department of Agriculture, Centers for Disease Control, Naval Medical Research Institute, U.S. Army Dugway Proving Ground, Atlantic Command, U.S. Marine Corps, and Special Operations/Low Intensity Conflict, National Guard, and the military reserves. The team developed baseline responses to a terrorist attack on a large crowd using a dual-agent cocktail of non-contagious BW agents. Needs and approaches to improve these baseline responses were identified.

Dr. A. Birenzvice was invited to give a presentation on “long-range RDA planning” during the *monthly meeting to the Chesapeake Chapter of the National Association of Government Contract Management*. The invitation followed a publication of an article on subject matter in the March - April issue of the ARMY RD&A magazine. The meeting was attended by about 20 persons and the presentation was very well received.

In June—

The *66th annual meeting of the Military Operations Research Society (MORS)* was held between 23-26 June 1998 at the Naval Postgraduate School, Monterey CA. Over 1100 individuals attended representing government, industry and academia. Topics addressed at the meeting covered all aspects of military operations. A total of 15 papers were presented during the “NBC Defense Working Group Session.” Of these, the following papers were based on work sponsored or performed by the Modeling and Simulation Team: “Assessing Chemical Detector Effectiveness Using Distributed Simulation” by Rich McMahon, ARL; Larry Nagl, ITT Systems and Sciences and Miles Miller, Edgewood RDE Center. “Algorithm for Simulation of Background Aerosols” by Mike Kierzewski, OptiMetrics, Inc. “BACKTRACK - A Hybrid System for Predicting the Source of a Biological Cloud from Sensor Data” by Mike Smith, Edgewood RDE Center and Mike Esposito, ITT Systems and Sciences.

Edgewood RDE Center scientists participated in the recent *American Chemical Society Meeting* in Dallas:

- Mr. David Rossman and Dr. Fu Lian Hsu presented posters in the Organic Division on “Thiirane Cleavage with Trifluoromethylthiocopper” and “Ether Cleavage of di-[2-(2-chloroethylthio)ethylether and its Analogs by Chlorotrimethylsilane and Sodium Iodide.”

- Dr. Lynn Hoffland presented a paper “CE and LC/MS/MS for the Analysis of Chemical Warfare Degradation Products” in the Divisions of Analytical Chemistry and Industrial and Engineering Chemistry.

- Dr. J.B. Wright presented a paper “Reaction Pathways for Organophosphorus Compounds: an ab initio Study” at the symposium on Computational Chemistry of Phosphorus Compounds.

This three-session symposium, with speakers from eastern and western Europe as well as from the United States was organized by Dr. William E. White. The symposium covered structural aspects of phosphorus compounds, reaction mechanisms, and new developments in methodology.

- Dr. George Famini presented a paper “Solvents Effects on C=O Stretching Frequencies of 1-substituted 2-pyrrolidinones and Related Compounds.”

- George was program chairman of the Computers in Chemistry Division and will become chairman in January.

At the program committee meeting of the *Division of Computers in Chemistry*, Dr. William E. White agreed to organize a pedagogical session on computational chemistry for the ACS meeting scheduled for August 1999 in New Orleans. This symposium will probably consist of four talks

by eminent computational chemists and will be designed to teach scientists about the methods and pitfalls related to computational chemistry.

Ms. Nancy J. Waltman represented the Edgewood RDE Center at the *ASTM D10 Packaging Committee* meeting. She participated in the ASTM/DOD Federal Liaison Group meeting and chaired the Chemical Packaging Task Group meeting.

Members of the M157/JP Team, Office of the Product Manager for Smoke Obscurants, attended the *Armor Conference* in Fort Knox and answered inquiries stimulated by the static display. The Program Manager for NBC Defense Systems had an M93A1 Fox on display at the Conference. An estimate 250 soldiers and civilians stopped by to ask questions about the Fox – its mission, availability, and future improvements.

The Product Manager for Smoke/Obscurants also exhibited at the *Infantry Conference* at Fort Benning.

The *Worldwide Chemical Conference XVI* was hosted at Fort McClellan by the Chemical School. This year's theme was "NBC Force Protection - Full Spectrum Support." Topics covered an assessment of the impact of CB weapons on joint operation, and joint NBC defense programs and issues associated with each branch of service. Also included were updates on the Gulf War Illness and the Chemical Weapons Convention Treaty, methods developed to prevent and treat NBC casualties, the Anthrax vaccination program, domestic preparedness programs to protect the home front against NBC threat, and the status and direction of the chemical demilitarization programs. The presentations provided a comprehensive overview of the U.S. NBC defense effort. CBDCOM and Soldiers Systems Command shared a 10' x 60' exhibit, which highlighted our upcoming merger. This year marks the Chemical Corps' 80th anniversary and, probably, the last Worldwide Chemical Conference that will be held at this location because the School is slated to move to Fort Leonard Wood, MO, next fiscal year.

Dr. Richard R. Smardzewski represented us at the *Association of the U.S. Army (AUSA)* in Pasadena. Our Biological Aerosol Warning System was selected as an item in the "Situational Awareness" portion of the AMC Corporate Exhibit. The theme of this exhibit is "Technology: The Highway to the Army After Next."

Dr. George Famini, International Programs Office, presented an invited symposium on "The Application of Molecular Orbital Methods to Linear Free Energy Relationships" at the *College of Pharmacy, University of Minnesota*. Dr. David Grant of the Department of Medicinal Chemistry was the host, and detailed discussions were held as to how to increase the application of theoretical methods into pharmacological research. Also, as Dr. Grant is the editor of the *Journal of Pharmaceutical Sciences* (and Dr. Famini is a member of the Editorial Board), discussions were held on how to increase the focus of *J. Pharm. Sci.* in this area.

The Program Director for Biological Defense Systems and the Biological Standoff Team Leader recently attended a seminar hosted by the European Command on the *Joint Biological Remote Early Warning System (JBREWS)*. Our Short-Range Biological Standoff Detection System is a component of the JBREWS and was briefed at the seminar. U.S. Air Force representatives expressed great interest in the Short-Range system for potential air base application. Army and Marine Corps representatives were also interested.

Mr Rosso attended the Defense Special Weapons Agency's *7th Annual International Conference on Controlling Arms*.

The Joint Service Materiel Group in conjunction with the Office of Naval Research, sponsored a *Decontamination Conference* at the St. Petersburg Hilton

Hotel, Florida. The purpose of the conference was to bring decontamination issues to the forefront. The conference was designed to bring academia, industry, and government personnel together to provide a focus for the issues and solutions facing today's soldiers in decontamination.

We hosted the annual *MASINT Chemical Defense Science & Technology Symposium*. The primary objective of the symposium was to investigate methods for providing technical and tactical intelligence to prevent chemical warfare related death and injury.

Ms. J. Razulis presented an invited paper at the *66th Military Operations Research Society (MORS)*. Her presentation, entitled "International Chemical Assistance Program," during the Arms Control Working Group session.

Mr. William A. Fox, Process Manager for Industrial Base, attended the *4th Eurosatory Exhibition* at Le Bourget, near Paris, France. Eurosatory, held every 2 years, is the only international exhibition exclusively dedicated to land defense activities. Approximately 750 exhibitors from over 50 countries participated in the exhibition. While in France, Mr. Fox met with the Defense Attaché and U.S. Embassy personnel to discuss NBC industrial base issues and domestic capabilities identified in an NBC Product Book, which was distributed at the Stockholm Symposium two weeks earlier.

Mr. English taught a one hour block of instruction on NBC Contamination Survivability, at the Joint Military Intelligence Training Center at the *Chemical and Biological Warfare Intelligence Course* at Bolling Air Force Base, Washington, D.C.

Dr. Paul Sneeringer of the our Chemical Evaluation Laboratory delivered a presentation entitled "Mission and Capabilities of the Chemical Evaluation Laboratory" at the *Technologies Modernization Conference* held by the Defense Support Center-Philadelphia, Defense Logistics Agency.

Ms. Elizabeth Hirsh (Edgewood RDE Center) and LTC Christopher Parker (PM Smoke), presented a paper, entitled "Smoke/Obscurants and EPA," at the *Joint Avionics Weapons and Systems (JAWS) Conference*. The paper was selected as Best Paper in its category.

Dr. John R. Kennedy of the Technical Integration Office (TIO) presented a paper, entitled "Advances in Environmentally Friendly Aerospace Electronic Cleaning Technologies" at the *3rd Conference on Aerospace Environmental Technology*. The conference was sponsored by the National Aeronautics Space Administration and the University of Alabama at Huntsville. Dr. Dennis E. Griffin of the Marshall Space Flight Center was the Technical Program Chairman. The conference was held at the Von Braun Center; Huntsville, AL. Since the banning of chlorofluorocarbons (CFCs), finding effective, efficient and environmentally safe techniques of cleaning electronic items and sensitive equipment has been a major priority of the aerospace community. A very large portion of the conference concerned environmentally friendly cleaning technologies. The paper which Dr. Kennedy presented discussed recent TIO advances in electronic equipment cleaning technology. The paper seemed to be well received and generated numerous requests for reprints. In addition to Dr. Kennedy, the authors of the paper were Leonard J. Beeson, Harold Klapper, and W. E. Kinne of the TIO; Lawrence G. Vettrano of the Science & Engineering Laboratory, McClellan Air Force Base, Sacramento, CA; and Richard W. Fuchs, Independent Special Processes. The complete paper will be published in the Proceedings of the 3rd Conference on Aerospace Technology at a future date.

In July--

The Joint Service Technical Panel for Chemical-Biological Defense held an

intensive program review at the Edgewood RDE Center. The meeting assessed ongoing and proposed new start technical base efforts to formulate the FY99 non-medical Chemical-Biological Defense Technology Base program. Representatives from the four services, OSD, DARPA, the Joint Service Integration Group, the Joint Service Material Group, and Dugway Proving Ground attended.

Upcoming:

Two M58 Wolf vehicles and an M56 Coyote vehicle participated in the SAIC video being made for display at this year's AUSA convention. The video, highlighting the Army Acquisition Corps, involved action shots of the Wolf, the FOX, and masked soldiers emerging from and operating in smoke.

Ms. Monica Heyl was notified by the Scientific Affairs Committee of the North Atlantic Treaty Organization that she and Dr. Raymond McGuire, Lawrence Livermore National Laboratory, have been funded to co-direct a ***NATO Advanced Research Workshop***. Their cooperative partner co-director is Dr. B.F. Myasoedov, Russian Academy of Science, Russia. The workshop, "Environmental Aspects of Converting CW Facilities to Peaceful Purposes and Derivative Technologies in Modeling, Medicine and Monitoring," is being jointly funded by NATO and the Institute of Science and Technology and will be held in Moscow in October 1998. This workshop will be developed and attended by the members of its organizing committee, which include Dr. Dennis Reutter, AMCTL, Dr. Bernhard Brunner, Swiss NC Laboratory, and Dr. Paul Norman, Porton Down, UK.

The ***Fourth Workshop on Standoff Detection for Chemical and Biological Defense*** is being organized by the Joint Science and Technology Panel on Chemical and Biological Defense in cooperation with the U.S. Army, U.S. Navy, U.S. Air Force, and U.S. Marine Corps. The workshop will be held at the Hospitality House, Williamsburg, VA, in October 1998. The workshop will address issues related to development of passive and active standoff detectors based on state-of-the-art methodologies for reconnaissance, detection, identification, quantification, and mapping of both Chemical and Biological agents. Such systems will continue to have a profound impact on chemical/biological defenses, environmental and food monitoring, the health industry, wind and weather prediction and various research and industrial endeavors. Particular attention will be given in this workshop to the subsystems which make up a standoff detector. Also, the workshop will focus on system test, new technologies, and future needs.

The Administrative Department, Engineering Directorate at the Edgewood RDE Center is sponsoring the ***Second Administrative Appreciation Day***. This development training, *a day just for the administrative, clerical, secretarial employees* of CBDCOM, will be held in July from 9:00-4:00 P.M. at a local Restaurant (Continental Breakfast and Buffet Lunch will be included).



Books, Journals, and Magazine Articles

Dr. Harry Salem, Edgewood RDE Center, and Frederick Sidell (retired), U.S. Army Medical Research Institute for Chemical Defense, have jointly contributed seven sections to the **Encyclopedia of Toxicology**, edited by Philip Wexley of the National Institute of Health and published in three volumes by Academic Press (1998).

Our AMC Treaty Laboratory (Flyaway-Lab) was the featured laboratory in the April issue of *Analytical Chemistry*, which is the premiere American Chemistry Society publication for analytical chemists. The article covered the unique role of the AMC Treaty Laboratory in the U.S. Department of Defense for implementation of the Chemical Weapons Convention and discussed the linkages between the home-base Edgewood laboratory and our unique, deployable flyaway lab (which was highlighted in an earlier edition of the same publication), and disclosed the AMC Treaty Laboratory's highly successful participation in the Organization for the Prohibition of Chemical Weapons international proficiency tests.

A chapter, entitled "Eukaryotic Cell Biosensor: The Cytosensor Microphysiometer," by A.T. Eldefrawi, C.J. Cao, V.I. Cortes, R.J. Mioduszewski, D.E. Menking, and J.J. Valdes was published in *Methods in Biotechnology – 7, Affinity Biosensors: Techniques and Protocols*, Human Press, USA, Eds. K. Rogers and A. Mulchandani (April 1998). This was a collaborative effort between members of our Toxicology and Molecular Recognition Team and the UMAB Department of Pharmacology and Experimental Therapeutics faculty.

"Temporal and Spacial Distribution of Environmental Bacteria" by A. Birenzvice, D. L. Carlile, and C. H. Wick was published in *Aerosol*, the Journal of the Russian Aerosol Society, **Vol No. 3**, pp 5-11 (1998).

"Multispectral and Hyperspectral Image Analysis with Convex Cones," by A. Ifarraguerri of our Research and Technology Directorate and C.-I. Chang of the University of Maryland - Baltimore County has been accepted for publication in the *IEEE Transactions of Geoscience and Remote Sensing*. Convex cone analysis is a data analysis technique originally developed under our auspices to study time-resolved Pyrolysis-MS of Gas Chromatography-Mass Spectrometry data. Here, its applicability has been extended to remote sensing imaging spectrometry. This technique shows great promise in the automated standoff detection and identification of chemical and possible biological agents.



TECHNICAL REPORTS

Published technical reports, when available, should be requested from the Administrator, Defense Technical Information Center, ATTN: DTIC-FDRB, 8725 John J. Kingman Road, Ste 0944, FT Belvoir, VA 22060-6218.

<i>Report No.</i>	<i>Title</i>	<i>Author(s)</i>
ERDEC-CR-247	Operation and Maintenance Manual Infrared/Millimeter Obscuration Reinforcing System for the M1A1 Abrams Main Battle Tank, February 1998, UNCLASSIFIED - limited.	M.J. Orr R. Malecki
ERDEC-CR-258	User's Manual for Millimeter Wave Radar Obscurant Characterization System (MROCS) Attenuation Data Reduction Program (MADRP), Version 1.1, May 1998, UNCLASSIFIED - limited.	M.R. Perry B.K. Boughton W. Rouse
ERDEC-CR-260	Evaluation of Adsorbents for Pressure Swing Adsorption, April 1998, UNCLASSIFIED - limited.	J.M. Campbell D. Reed D.T. Croft D.K. Friday
ERDEC-CR-262	Novel Multispectral Obscuration Ideas (Water-Based) Bubbles, May 1998, UNCLASSIFIED - limited.	S.S. Gross J.W. Mausteller J. Hale
ERDEC-CR-263	Continued Study of Electromagnetic Absorption, Scattering, and Extinction by Conductive Fibers, May 1998, UNCLASSIFIED - limited.	P.C. Waterman J.C. Pedersen J. Hale
ERDEC-CR-264	Multiple Obscurant Dissemination System (MODS), May 1998, UNCLASSIFIED - limited.	A. Rutstein W.A. Adams.
ERDEC-SP-061	International Task Force 25: Hazard from Industrial Chemicals, Final Report, April 1998, UNCLASSIFIED - limited.	A.K. Stuempfle D.J. Howells S.J. Armour C.A. Boulet
ERDEC-SP-062	Chemical Agents, Weapons and Defense Materiel Type Classified, Adopted, or Obsolete May 1998, UNCLASSIFIED - limited.	G.D. Taylor

ERDEC-TR-455	FY97 Joint Service CB Defense Technology Base Plan (TBP) Development, January 1998, UNCLASSIFIED - limited.	J. Walther D. Affleck D. Kravec F. Marvin L. Hutchinson
ERDEC-TR-462	Application of Data Fusion Technique with Simple Aerosol Monitors for an Early Warning Against Biological Attack: A Feasibility Study (U), April 1998, UNCLASSIFIED - limited.	A. Birenzvice
ERDEC-TR-466	Fluorescence Spectroscopy of Biological Agents, I. Bacillus anthracis, April 1998, UNCLASSIFIED - limited.	S.D. Christesen K.K. Ong
ERDEC-TR-475	Review of Selected Army-Funded Research on Fog Oil Smoke Characteristics as Related to Clean Air Act Issues, March 1998, UNCLASSIFIED - public release.	N.A. Chester
ERDEC-TR-482	Application of a High Pressure Soxhlet Extractor Using Liquid CO2 for the Extraction of Organic Phosphonates from Solid Adsorbents, March 1998, UNCLASSIFIED - public release.	S.G. Pleva M.W. Ellzy
ERDEC-TR-487	Air Leakage Measurements on the U.S. Marine Corps Amphibious Assault Vehicle, April 1998, UNCLASSIFIED - limited.	B.D. Cannon D.W. Reeves W.P. Ahearn
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The **Edgewood Enterprise** is located at the Edgewood Area of Aberdeen Proving Ground, Maryland; a small detachment of about 30 people is located at Rock Island Arsenal, Illinois.



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