



# Scientific Advances in Alternative Demilitarization Technologies

Edited by

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# Scientific Advances In Alternative Demilitarization Technologies

**Carl Bruch, Carroll Muffett, Sandra  
Nichols**



## **Scientific Advances In Alternative Demilitarization Technologies:**

**Scientific Advances in Alternative Demilitarization Technologies** F.W. Holm, 2012-12-06 FRANCIS W HOLM Science Applications International Corporation 7102 Meadow Lane Chevy Chase MD 20815 The North Atlantic Treaty Organization NATO sponsored an Advanced Research Workshop ARW in Warsaw Poland on April 24 25 1995 to collect and study information on alternative and supplemental demilitarization technologies The conference included experienced scientists and engineers who delivered presentations and provided written reports of their findings Countries describing their technologies included Poland pre processing thermal oxidation and instrumentation Russia molten salt oxidation plasma catalytic oxidation supertoxicants molten metal fluid bed reactions and hydrogenation Germany supercritical water oxidation and detoxification the United Kingdom electrochemical oxidation the United States wet air oxidation detoxification and biodegradation and the Czech Republic biodegradation The technologies identified for assessment at the workshop are alternatives to incineration technology for chemical warfare agent destruction Treatment of metal parts and explosive or energetic material were considered as a secondary issue The treatment of dunnage and problems associated with decontamination while recognized as an element of demilitarization received only limited discussion The alternative technologies are grouped into three categories based on process bulk operating temperature low 0 200 C medium 200 600 C and high 600 3 500 C Reaction types considered include hydrolysis oxidation electrochemical hydrogenation and pyrolysis These categories represent a broad spectrum of processes some of which have been studied only in the laboratory and some of which are in commercial use for destruction of hazardous and toxic wastes Some technologies have been developed and used for specific commercial applications

**Scientific Advances in Alternative Demilitarization Technologies** F. W. Holm, 2014-01-15 **Advanced Physicochemical Treatment Technologies** Lawrence K. Wang, Yung-Tse Hung, Nazih K. Shammash, 2007-11-10 In Advanced Physicochemical Treatment Technologies leading pollution control educators and practicing professionals describe how various combinations of different cutting edge process systems can be arranged to solve air noise and thermal pollution problems Each chapter discusses in detail the three basic forms in which pollutants and waste are manifested gas solid and liquid There is an extensive collection of design examples and case histories

**Aberdeen Proving Ground, Transportable Treatment Systems for Non-stockpile Chemical Warfare Materiel**, 2001 **Strategies to Protect the Health of Deployed U.S. Forces** National Research Council, Division on Engineering and Physical Sciences, Department of Military Science and Technology, Commission on Engineering and Technical Systems, 2000-01-11 Since Operation Desert Shield Desert Storm Gulf War veterans have expressed concerns that their postdeployment medical symptoms could have been caused by hazardous exposures or other deployment related factors Potential exposure to a broad range of CB and other harmful agents was not unique to Gulf operations Hazardous exposures have been a component of all military operations in this century Nevertheless the Gulf War deployment focused national

attention on the potential but uncertain relationship between the presence of CB agents in theater and symptoms reported by military personnel Particular attention has been given to the potential long term health effects of low level exposures to CB agents In the spring of 1996 Deputy Secretary of Defense John White met with the leadership of the National Academies to discuss the DoD s continuing efforts to improve protection of military personnel from adverse health effects during deployments in hostile environments Although many lessons learned from previous assessments of Operation Desert Shield Desert Storm have been reported prospective analyses are still needed Strategies to Protect the Health of Deployed U S Forces Force Protection and Decontamination which addresses the issues of physical protection and decontamination is one of four initial reports that will be submitted in response to that request Specifically this report includes a review and evaluation of the following areas the adequacy of current protective equipment and protective measures as well as equipment in development the efficacy of current and proposed methods for decontaminating personnel and equipment after exposures to CB agents current policies doctrine and training to protect and decontaminate personnel and equipment in future deployments i e major regional conflicts MRCs lesser regional conflicts LRCs and operations other than war OOTWs the impact of equipment and procedures on unit effectiveness and other human performance factors current and projected military capabilities to provide emergency response

**War, Science and Terrorism** Dr J Richardson, 2012-12-06

Describes the application of research to the evolution of weapons It shows how natural engineering information and environmental sciences are exploited how even social science is applied to recruitment battlefield and logistical management and careful preparation of terroristic acts

**Index of Conference Proceedings** British Library. Document Supply Centre, 1998

**Arsenic and Old Mustard: Chemical Problems in the Destruction of Old Arsenical and `Mustard' Munitions** J.F. Bunnett, Marian Mikolajczyk, 2013-11-11 More than ten million poison gas shells mortar bombs etc lie hidden in Europe many of them relics from World War I Some were fired and failed to detonate others were abandoned in old ammunition dumps Most retain their load of chemical warfare CW agents They are turned up daily in the course of farming and construction Many European nations have permanent departments concerned with their collection and destruction Old munitions when discovered are usually heavily corroded and difficult to identify Is it a CW munition Or an explosive If CW what agent does it contain Once identified one has to select a destruction method Some of the methods that have been proposed are less than perfect and are often complicated by the presence of extraneous chemicals either mixed with the CW agents during manufacture or formed over decades in the ground Of particular interest are the insiders reports on the German CW programmes of both World Wars and the current status of Russian chemical armaments

*Handbook on Advanced Nonphotochemical Oxidation Processes* , 2001

**Governance, Natural Resources and Post-Conflict**

**Peacebuilding** Carl Bruch, Carroll Muffett, Sandra Nichols, 2016-04-07 When the guns are silenced those who have survived armed conflict need food water shelter the means to earn a living and the promise of safety and a return to civil order

Meeting these needs while sustaining peace requires more than simply having governmental structures in place it requires good governance Natural resources are essential to sustaining people and peace in post conflict countries but governance failures often jeopardize such efforts This book examines the theory practice and often surprising realities of post conflict governance natural resource management and peacebuilding in fifty conflict affected countries and territories It includes thirty nine chapters written by more than seventy researchers diplomats military personnel and practitioners from governmental intergovernmental and nongovernmental organizations The book highlights the mutually reinforcing relationship between natural resource management and good governance Natural resource management is crucial to rebuilding governance and the rule of law combating corruption improving transparency and accountability engaging disenfranchised populations and building confidence after conflict At the same time good governance is essential for ensuring that natural resource management can meet immediate needs for post conflict stability and development while simultaneously laying the foundation for a sustainable peace Drawing on analyses of the close relationship between governance and natural resource management the book explores lessons from past conflicts and ongoing reconstruction efforts illustrates how those lessons may be applied to the formulation and implementation of more effective governance initiatives and presents an emerging theoretical and practical framework for policy makers researchers practitioners and students Governance Natural Resources and Post Conflict Peacebuilding is part of a global initiative to identify and analyze lessons in post conflict peacebuilding and natural resource management The project has generated six books of case studies and analyses with contributions from practitioners policy makers and researchers Other books in this series address high value resources land water livelihoods and assessing and restoring natural resources *Disposal of Neutralized Wastes* National Research Council, Division on Engineering and Physical Sciences, Board on Army Science and Technology, Committee on Review and Evaluation of the Army Non-Stockpile Chemical Materiel Disposal Program, 2001-04-29 Chemical warfare materiel CWM is a collection of diverse items that were used during 60 years of efforts by the United States to develop a capability for conducting chemical warfare Nonstockpile CWM which is not included in the current U S inventory of chemical munitions includes buried materiel recovered materiel binary chemical weapons former production facilities and miscellaneous materiel CWM that was buried in pits on former military sites is now being dug up as the land is being developed for other purposes Other CWM is on or near the surface at former test and firing ranges According to the Chemical Weapons Convention CWC which was ratified by the United States in April 1997 nonstockpile CWM items in storage at the time of ratification must be destroyed by 2007 The U S Army is the designated executive agent for destroying CWM Nonstockpile CWM is being handled by the Non Stockpile Chemical Materiel Program NSCMP stockpile CWM is the responsibility of the Chemical Stockpile Disposal Program Because nonstockpile CWM is stored or buried in many locations the Army is developing transportable disposal systems that can be moved from site to site as needed The Army has plans to

test prototypes of three transportable systems the rapid response system RRS the munitions management device MMD and the explosive destruction system EDS for accessing and destroying a range of nonstockpile chemical agents and militarized industrial chemicals The RRS is designed to treat recovered chemical agent identification sets CAIS which contain small amounts of chemical agents and a variety of highly toxic industrial chemicals The MMD is designed to treat nonexplosively configured chemical munitions The EDS is designed to treat munitions containing chemical agents with energetics equivalent to three pounds of TNT or less These munitions are considered too unstable to be transported or stored A prototype EDS system has recently been tested in England by non stockpile program personnel Although originally proposed for evaluation in this report no test data were available to the committee on the composition of wastes from the EDS Therefore alternative technologies for the destruction of EDS wastes will be discussed in a supplemental report in fall 2001 Treatment of solid wastes such as metal munition bodies packing materials and carbon air filters were excluded from this report Review and Evaluation of the Army Non Stockpile Chemical Materiel Disposal Program Disposal of Neutralent Wastes evaluates the near term 1999 2005 application of advanced nonincineration technologies such as from the Army s Assembled Chemical Weapons Assessment Program and the Alternative Technologies and Approaches Project in a semi fixed skid mounted mode to process Rapid Response System Munitions Management Device and Explosive Destruction System liquid neutralization wastes

**Molten Salts 15** Robert A. Mantz, 2007 This symposium was dedicated to the significant and ground breaking accomplishments of Robert A Osteryoung in the area of molten salts and ionic liquids This symposium provided an international and interdisciplinary forum centered on innovative basic and applied research performed in molten salts and ionic liquids Contributed papers were solicited in all areas of biology chemistry electrochemistry electrochemical engineering and physics related to molten salt research

### **Alternatives for the Demilitarization of Conventional Munitions**

National Academies of Sciences, Engineering, and Medicine, Division on Engineering and Physical Sciences, Board on Army Science and Technology, Committee on Alternatives for the Demilitarization of Conventional Munitions, 2019-01-11 The U S military has a stockpile of approximately 400 000 tons of excess obsolete or unserviceable munitions About 60 000 tons are added to the stockpile each year Munitions include projectiles bombs rockets landmines and missiles Open burning open detonation OB OD of these munitions has been a common disposal practice for decades although it has decreased significantly since 2011 OB OD is relatively quick procedurally straightforward and inexpensive However the downside of OB and OD is that they release contaminants from the operation directly into the environment Over time a number of technology alternatives to OB OD have become available and more are in research and development Alternative technologies generally involve some type of contained destruction of the energetic materials including contained burning or contained detonation as well as contained methods that forego combustion or detonation Alternatives for the Demilitarization of Conventional Munitions reviews the current conventional munitions demilitarization stockpile and analyzes existing and emerging disposal

treatment and reuse technologies This report identifies and evaluates any barriers to full scale deployment of alternatives to OB OD or non closed loop incineration combustion and provides recommendations to overcome such barriers

**Disposal of chemical weapons : alternative technologies.** , *Monthly Bibliography* United Nations Library (Geneva, Switzerland),1997 Pine Bluff Arsenal, Disposal of Chemical Agents and Munitions ,1996 New Scientist and Science Journal ,1995 **Aberdeen Proving Ground, Pilot Testing of Neutralization/Biotreatment of Mustard Agent (HD), Design, Construction and Operation** ,1998 *Dismantlement and Destruction of Chemical, Nuclear and Conventional Weapons* N. Schulte,2013-04-17 The end of the Cold War opened unprecedented opportunities for reductions in weapons of mass destruction With these opportunities came new challenges both scientific and political Traditionally approached by different groups the scientific technical and political challenges are inextricably intertwined Agreements to dismantle and destroy chemical nuclear and conventional weapons after having been negotiated via diplomatic channels require the expertise of scientists associated with their development to determine the safest and most environmentally sound methods of destruction It is in this context that representatives from sixteen countries and five international organizations were convened jointly by NATO the Ministry of Foreign Affairs of the Federal Republic of Germany and the State Government of North Rhine Westphalia 19 21 May 1996 in a meeting near Bonn to take stock of worldwide efforts to destroy and dismantle chemical nuclear and conventional weapons remaining after the end of the Cold War NATO support was provided under the auspices of the NATO Science Committee s Panel on Disarmament Technologies The conference brought together the major actors involved in the dismantlement and destruction of chemical nuclear and conventional weapons highlighted the substantial accomplishments achieved in this area and pinpointed the remaining technical obstacles still to be overcome It also underlined the critical importance of transparency data exchange and verification as indispensable preconditions for disarmament and cooperative security

Using Supercritical Water Oxidation to Treat Hydrolysate from VX Neutralization National Research Council,Division on Engineering and Physical Sciences,Commission on Engineering and Technical Systems,Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program,1998-05-08 The U S Army has asked the National Research Council NRC to evaluate whether supercritical water oxidation SCWO is an effective and appropriate means of eliminating hazardous or toxic organic constituents in VX hydrolysate for ultimate disposition The NRC was not asked to conduct an in depth analysis of the entire integrated VX bulk agent destruction and disposal process for the Newport Chemical Agent Disposal Facility As the facility design is being finalized March 1999 April 2000 the NRC will probably be asked to assess all aspects of the facility design including monitoring containment process control and redundancy as well as the quantitative risk assessment QRA This report outlines the elements of the proposed neutralization SCWO technology evaluates the results of ongoing SCWO tests and makes recommendations concerning aspects of the technology that require further development The scope of this evaluation did not include evaluations of other potential

technologies or management options for the treatment of VX hydrolysate



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