

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
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MAY 2010 REPORT

Note to Readers: Pages 1-12 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 13.

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Item 1. The Oil Spill Likely to Initiate International Regulations Discussions and Accelerate Alternative Energy Developments

The British Petroleum (BP) oil spill in the Gulf of Mexico has alerted the world to the need for better regulatory environments, safety systems and response capacity, and the need to accelerate efforts for alternative sources of energy. It could also fuel disputes between oil corporations and local populations such as those in Peru, Ecuador, and Nigeria. Given the international implications of the environmental consequences of dangerous oil offshore exploration and polluting oil sands, as well as the fact that most operating companies are foreign and/or multinational corporations, international regulations (beyond national criminal penalties) are likely to be created.

Military Implications:

Alternative scenarios of international oil spills should be created to explore applications for military logistical capacities. This disaster should be used to further awareness of the Army Strategy for the Environment, accelerate DARPA energy R&D and implementation of proven green energy technologies. Since BP is the single largest supplier of fuel to DOD, DOD should explore its role in future hearings to improve government standards affecting deepwater drilling for its suppliers and contractors.

Sources: (an expanded list in the [Appendix](#))

BP Risks Big Fines and Loss of Major U.S. Contracts

<http://online.wsj.com/article/SB10001424052748703630304575270822261954614.html>

A Proxy War in Peru

http://www.foreignpolicy.com/articles/2010/05/19/a_proxy_war_in_peru

Nigeria: Delta Communities Cry Out Over Oil Spillage

<http://allafrica.com/stories/201006010104.html>

Lawyers lining up for class-action suits over oil spill

<http://www.washingtonpost.com/wp-dyn/content/article/2010/05/16/AR2010051603254.html>

BP Oil Spill Could Happen Anywhere: Norway

<http://planetark.org/wen/57879>

Item 2. Computer-Designed Genome Creates First “Artificial Cell”

Researchers at the J. Craig Venter Institute announced the successful construction of the bacterial cell *Mycoplasma mycoides JCVI-syn1.0*, the first synthetic cell designed in a computer and self-replicating, controlled only by the synthetic genome. Since the applications could vary from great improvements to the human condition to new forms of bioweapons, President Obama assigned the Presidential Commission for the Study of Bioethical Issues to assess the potential opportunities as well as risks (such as environmental and security) triggered by the new achievement. Meanwhile, the FBI Biological Sciences Outreach Program launched an initiative aimed at educating scientists on the potential security threats posed by synthetic biology.

[Related item: *New Technologies Need New Regulations Systems* in March 2009 and other items on this issue in previous environmental security reports.]

Military Implications:

This new achievement raises the specter of designer bioweapons being created and deployed some day in the future by individuals, as well as the nearer-term possibilities of governments and terrorist organizations creating them. If not already created, an ongoing system for forecasting artificial biology with security implications should be established and connected to the potential negotiators of international standards and treaties and to civilian labs such as the J. Craig Venter Institute to anticipate and help put in place standards and military-to-military training.

Sources:

First Self-Replicating Synthetic Bacterial Cell

<http://www.jcvi.org/cms/press/press-releases/full-text/article/first-self-replicating-synthetic-bacterial-cell-constructed-by-j-craig-venter-institute-researcher/>

Artificial life? Synthetic genes 'boot up' cell

<http://www.reuters.com/article/idUSTRE64J5RY20100526>

NBICS and generation of synthetic organisms

<http://politicsofhealth.org/wol/2010-05-30.htm>

You may soon be visited by an FBI agent, or a scientist acting on behalf of one. Here's why

<http://www.the-scientist.com/article/display/57355/>

Item 3. Technological Advances with Environmental Security Implications**3.1 New Detection and Cleanup Techniques****3.1.1 Chemical Vapor Deposition Creates Nano Filters, Catalyst Scaffolds**

According to a story in *Nanowerk News*, an international group of researchers, led by Robert Vajtai at Rice Univ., has developed a technique that uses chemical vapor deposition to form carbon nanotube membranes that "could find wide application as extra-fine air filters", removing "up to 99 percent of particulates with diameters of less than [1000 nm]", and "as scaffolds for catalysts that speed chemical reactions."

Military Implications:

The military should follow this technique for its application in systems for environmental cleanup

Sources:

Scientists build better catalyst with nanotube membranes

<http://www.nanowerk.com/news/newsid=15986.php>

Three-Dimensional Carbon Nanotube Scaffolds as Particulate Filters and Catalyst Support Membranes

<http://pubs.acs.org/doi/abs/10.1021/nm100150x>

3.1.2 New Nature-based Filter Allows Utilization of Gray Water

Prof. Robert D. Berghage of the Pennsylvania State Univ. and associates have developed a filter that converts gray water (from sinks, showers, and other non-pathogenic sources) to a form suitable for irrigation and similar uses. According to an item in *physorg.com*, the filter "consists of two plastic pipes filled with layers of porous rocks, soil, crumbs from discarded tires, composted cow manure and peat moss. Vegetables and other plants are planted in holes along the

sides of the pipes. The pipes stand in a basin with still more plants -- papyrus and horsetail reed -- whose roots support microbes that remove pollutants."

Military Implications:

Although the use of gray water is generally forbidden in the US, the military should consider this technique as a possible source of supplementary water for appropriate purposes in less developed arid operational regions.

Source:

Love that dirty water: Scientists find low-tech way to recycle H₂O

<http://www.physorg.com/news193945696.html>

3.2. Increasing Energy Efficiency Technologies

3.2.1 Inexpensive Metal Catalyst for Hydrogen Generation from Water.

Researchers with DOE's Lawrence Berkeley National Laboratory and the Univ. of California, Berkeley, have discovered an inexpensive metal catalyst that can effectively generate hydrogen from water. The proton reduction catalyst is based on a molybdenum-oxo metal complex that is about 70 times cheaper than platinum, today's most widely used metal catalyst for splitting the water molecule, according to Dr. Hemamala Karunadasa, who also states "In addition, our catalyst does not require organic additives, and can operate in neutral water, even if it is dirty, and can operate in sea water". At present, however, the process requires an excessive expenditure of electrical energy.

Military Implications:

The military should follow this work on a potential hydrogen fuel source as efforts continue to improve the process.

Sources:

Berkeley Scientists Discover Inexpensive Metal Catalyst for Generating Hydrogen from Water

<http://newscenter.lbl.gov/news-releases/2010/04/30/inexpensive-catalyst-for-generating-hydrogen-from-water/>

Catalyst Brings Cheap Hydrogen Fuel Closer to Reality

<http://news.sciencemag.org/sciencenow/2010/04/catalyst-brings-cheap-hydrogen-f.html>

A molecular molybdenum-oxo catalyst for generating hydrogen from water

<http://www.nature.com/nature/journal/v464/n7293/full/nature08969.html>

3.2.2 New Structure Almost Doubles Solar Cell Efficiency

Researchers Kui-Qing Peng of Beijing Normal University, and Shuit-Tong Lee of the City Univ. of Hong Kong have developed a silicon solar cell with a unique and robust geometry of nanoholes having diameters of about 500-600 nm, achieving a power conversion efficiency of 9.5%, almost double the just over 5% efficiency of other current designs.

Military Implications:

The military should follow work on this improved design for its applicability to power supplies for field equipment.

Sources:

Silicon nanohole solar cells aim to make photovoltaics cost-competitive

<http://www.physorg.com/news192447083.html>

High-Performance Silicon Nanohole Solar Cells

<http://pubs.acs.org/doi/abs/10.1021/ja910082y>

Item 4. Updates on Previously Identified Issues

4.1 Climate Change

4.1.1 Scientific Evidence and Natural Disasters

Scientists have found that the upper 700m of the ocean has warmed significantly between 1993 and 2008 – the period covered by the study – and slightly faster than IPCC estimates. NASA scientists observed that 80-90% of the increased warming ends up in the ocean, with a double effect on potential sea level rise: from expansion of water volume, as well as diminishing capacity to absorb CO₂ and therefore further stimulating the effects of global warming. The research was conducted by an international team of scientists from NOAA, NASA, the Met Office Hadley Centre in the United Kingdom, the University of Hamburg in Germany and the Meteorological Research Institute in Japan, and published in the report *Robust Warming of the Global Upper Ocean*. Meantime, oceans are more acidic “than they have ever been for at least 20 million years,” according to a report by the European Science Foundation. It reveals that seas have already become 30% more acidic in the past 200 years as the oceans absorbed about a third of the CO₂ emissions from human activities since the Industrial Revolution and if current trends continue, they could be 150% more acidic by 2100 than they were in pre-industrial times.

4.1.2 Food and Water Security

UNEP warns in the “Green Economy Report: A preview” brochure that 30% of fish stocks have already been collapsed (i.e. less than 10% of their former potential yield) and virtually all commercial fisheries risk running out by 2050. The lives of some 520 million people are financially linked to fisheries today. While the entire value of fish caught is only \$85 billion, \$27 billion are spent on government subsidies, mostly in rich countries, leading to overexploitation. In “the Yearbook 2010” released earlier this year, UNEP warned that overexploitation, pollution, and rising temperatures threaten 63% of the world’s assessed fisheries stocks. It also warns that governance arrangements, population growth, increasing living standards, over-exploitation, declining water quality, and climate change will cause water scarcity to emerge as a challenge to governments by 2030.

An Israeli consortium unveiled the world’s largest reverse osmosis desalination plant in the coastal city of Hadera. The plant will supply 127 million m³ of desalinated water a year, representing about 20% of Israel’s yearly household consumption and is the third in a series of five desalination plants being built over the next few years that will eventually supply Israel with about 750 million m³ annually for addressing the country’s water shortage. While other Middle East countries have bigger desalination plants, those use thermal-based technology that requires more energy and is less environment-friendly.

Several Arab countries are looking into using technologies for increasing their agricultural land. An Abu Dhabi soil survey found that with adequate investment in the right technologies, over 200,000 hectares of land could be reformed for agricultural use, while Qatar and Kuwait are trying to increase domestic agricultural yields through mycorrhizae—the use of selected types of fungus that enhance the growth of plant roots in arid areas. In a matter of 18 months, the institute managed to convert 4,000 m² of “hyper-saline waste-land” in Qatar’s southern Dukhan area into

a productive land for vegetables and crops production. Similar projects are going on in Kuwait, India, Oman, and the UAE.

4.1.3 Health

The International Livestock Research Institute (ILRI), a member of the Consultative Group on International Agricultural Research (CGIAR), has announced the launch of a \$4.4 million research project to build a climate model that can predict outbreaks of infectious disease in Africa. The research is being undertaken in Ghana, Malawi and Senegal, ILRI working with 11 partners and researchers to integrate data from climate modeling and disease forecasting systems in order to develop a capacity to predict the likelihood of epidemics six months in advance of an outbreak.

4.1.4 Melting Glaciers and Sea Ice

A team of scientists led by University of Leeds estimates that net loss of floating sea ice and ice shelves in the last decade is 7,420 km³. While melting of floating sea ice and ice shelves do not add directly to sea level rise, it unblocks the way for more land ice to slide and melt into the sea; as well as decreasing the reflection of sunlight, it is warming the local area, further increasing melting and salinity dilution which expands sea volume a bit. They estimate that if all the polar ice melted, sea levels would rise by about 70 meters.

4.1.5 Computer Modeling and Scenarios

Prof Dirk Helbing of the Swiss Federal Institute of Technology in Zurich has outlined a plan for a “Living Earth Simulator” that would use economic, environmental, and health data to create a model of the entire planet in real time. The project would gather detailed data about the planet and human activities, use it to simulate the behavior of whole political, social, and economic systems, and then make predictions to prevent crises from occurring. He also envisions ‘situation rooms’ from which global leaders could manage crises as they were going on.

4.1.6 Adaptation

The third edition of Global Biodiversity Outlook (GBO-3) highlights that the linked challenges of biodiversity loss and climate change must be addressed with equal priority and in close coordination. It confirms that the world has failed to meet its target to achieve a significant reduction in the rate of biodiversity loss by 2010. While listing climate change as one of the five principal pressures that drive biodiversity loss, the report also points out opportunities to address the biodiversity crisis while contributing to other social objectives, including the fight against climate change. It outlines a possible new strategy for reducing biodiversity loss, including addressing the underlying causes of its indirect drivers, such as patterns of consumption, the impacts of increased trade and demographic change, and ending harmful subsidies. The report was produced by the Secretariat of the Convention on Biological Diversity and the UNEP’s World Conservation Monitoring Centre and is one of the key outputs of the 2010 International Year of Biodiversity.

A UN HABITAT conference on Promoting Green Building Rating in Africa was held May 4-6, 2010, in Nairobi, Kenya, with participants from 20 African countries. It adopted the Nairobi Declaration on Green Building for Africa, which sets a framework for strengthening the ability

of cities to adapt to climate change by making use of local and naturally available energies and materials, and calls for establishing an African Network of Green Building Councils.

4.1.7 Post-Copenhagen Negotiations

The second round of negotiations under the UN Framework Convention on Climate Change began in Bonn, Germany, on May 31 and is scheduled to conclude on June 11. The meeting brings together representatives from 182 countries. A report by the U.S. Energy Information Administration estimates that world energy consumption would rise 49% by 2035, to 739 quadrillion BTU in 2035 from 495 quadrillion BTU in 2007, led by developing nations such as China and India, whose part of total world energy consumption will grow from about 20% to 30% over the projection period, while the U.S. share would fall from 21% to about 16% over the same period.

Military Implications:

[Same as previous on this issue] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change is increasing the development of international policies and strategies to mitigate and adapt to climate change.

Sources: (see a more expanded list in the [Appendix](#))

Ocean Stored Significant Warming Over Last 16 Years

http://www.noaaneews.noaa.gov/stories2010/20100519_ocean.html

Europe's scientists call for more effort in tackling rising ocean acidity

http://www.eurekalert.org/pub_releases/2010-05/esf-esc051810.php

"Double trouble" in acidic, warming oceans – study

<http://in.reuters.com/article/idINIndia-48634120100519>

UNEP Green Economy Report: A Preview

http://www.unep.ch/etb/publications/Green_Economy/UNEP_Rio20PrepCom_GERPreview_06May10_FINAL.pdf

Israel Opens Largest Desalination Plant Of Its Kind

<http://planetark.org/wen/58036>

Gulf Looks To Science To Turn Desert To Farmland

<http://planetark.org/wen/58059>

US\$4.4 million awarded for research to build a climate model able to predict outbreaks of infectious disease in Africa

<http://www.ilri.org/ilrinews/index.php/archives/1838>

Global Floating Ice In "Constant Retreat": Study

<http://planetark.org/wen/58216>

The FuturIcT Knowledge Accelerator

<http://www.futurict.ethz.ch/FuturIcT>

GBO-3 Website

<http://gbo3.cbd.int>

Conference Green Building

<http://www.unhabitat.org/categories.asp?catid=640>

Climate Talks Open in Bonn

<http://www.iisd.ca/climate/sb32/>

Under Current Policies

<http://www.eia.doe.gov/neic/press/press343.html>

4.2 Recommendations for Strengthening the Convention on Biological Diversity

The 14th meeting of the Convention on Biological Diversity's Subsidiary Body on Scientific, Technical and Technological Advice and the 3rd meeting of the CBD Working Group on Review of Implementation of the Convention adopted several recommendations to be considered by the Convention's review conference to be held in October 2010, in Nagoya, Japan. The recommendations include a Strategic Plan for the period 2011-2020 to halt (or reduce the rate of) biodiversity loss (although some argue that 2050 would be a more realistic timeline.) Debates continue on the legal nature and institutional aspects of a possible biodiversity technology initiative, as well as the role of intellectual property rights in technology transfer. It was also agreed that the COP invite the UN General Assembly to consider declaring 2011-2020 the United Nations Decade on Biodiversity. [Related item: *New Measures to Continue the Fight against Biodiversity Loss* in March 2010 environmental security report.]

Military implications:

Personnel with environmental responsibilities, particularly regarding training and land management, should review and update monitoring and inspection protocols in the new CBD recommendations to prevent harm to biodiversity in general and endangered species specifically.

Source:

Summary of the Third Meeting of the Ad Hoc Open-Ended Working Group on Review of Implementation of the Convention on Biological Diversity

<http://www.iisd.ca/biodiv/wgri3/>

4.3 The Competition for Rare Earth Metals Set to Continue

As green technology and energy are taking off, the competition for rare metals that are needed for the energy generation and storage equipment is increasing. Although rare earth metals are relatively abundant in the Earth's crust, their extraction is difficult and environmentally polluting. Presently, over 90% of these minerals are mined in China, who increasingly wants to keep more for its own industry and allegedly expressed intentions to reduce or even stop the export of some of these resources. Meantime, although some of these materials could be retrieved from recycling used electronics, electronic waste is exported for salvage to countries in Asia and Africa. Although mines are planned in California, Australia, Canada, and Greenland, setting them up, meeting environmental standards, and workforce cost might delay exploitation. [Related item: *Monopoly over Rare Earth Elements Raises Security and Environmental Concerns* in January 2010 environmental security report.]

Military Implications:

[Same as previous on this issue] In addition to continued research on substitute materials and processes, defense authorities should encourage political leaders to consider all options, including government subsidies, if necessary, to secure supply of critical REEs. The focus for assuring at least national defense needs should be on national sources and regions that are reliable and practice fair environmental, work, and pricing policies.

Source:

Why China holds 'rare' cards in the race to go green

<http://news.bbc.co.uk/2/hi/8689547.stm>

4.4 Nuclear Nonproliferation Treaty Review Conference Adopted Document for Reducing Nuclear Threat

The Nuclear Nonproliferation Treaty five-yearly review conference unanimously approved a final document setting out a number of measures to reduce nuclear risk, based on the three pillars of the treaty: disarmament, non-proliferation, and promoting peaceful atomic energy. It includes, *inter alia*, a commitment by the five nuclear powers to expedite nuclear disarmament efforts and reduce the role of atomic weapons in their military policies; a conference scheduled for 2012 on establishing a Middle East zone free of nuclear and other weapons of mass destruction; and resuming India and Pakistan peace talks in July. The conference took place May 3-28, 2010 at UN Headquarters in New York, attended by representatives of the accord's 189 member nations. [Related items: *Advancements on Denuclearization* in April 2010 and other items on this issue in previous environmental security reports.] Meantime, Chad became the 100th nation ratifying the Additional Protocol giving IAEA enhanced access to information on its nuclear activity.

Military Implications:

[Same as previous on this issue] The military should continue to explore these and other initiatives as options to advance nuclear disarmament and facilitate NPT negotiations and improve global nuclear safety.

Sources:

2010 NPT Review Conference

<http://www.un.org/en/conf/npt/2010/>

Nuclear Conference Approves Limited Nonproliferation Measures

http://gsn.nti.org/gsn/nw_20100601_1163.php

PM's Office: Israel won't comply with NPT resolution

<http://www.ynetnews.com/articles/0,7340,L-3895780,00.html>

Chad becomes 100th nation to give UN nuclear inspectors greater access

<http://www.un.org/apps/news/story.asp?NewsID=34697&Cr=nuclear&Cr1=>

4.5 New Legal Proceeding over Allegations of Use of Illegal Weapons in Iraq

The UK Ministry of Defence began investigations over allegations that Britain was complicit in the use of chemical weapons in the 2004 attack against Fallujah, Iraq. The increased number of child deformities, miscarriages, and cancers are linked to the use of weapons including white phosphorus and depleted uranium by the coalition forces. Affected Iraqi families initiated legal actions against the UK Government for breaching international law, war crimes, and failing to intervene to prevent a war crime. [Related items: *UN Mission Assessment of Gaza Conflict Included Environmental Impacts* in September 2009, and *Changes to War Crimes Proposed for the International Criminal Court* in November 2009 environmental security reports.]

Military Implications:

Although these types of legal actions against U.S. military are difficult (to impossible) since the U.S. is not Party of the International Criminal Court, they would affect its allied forces, States Party to the ICC.

Source:

Army to be sued for war crimes over its role in Fallujah attacks

<http://www.independent.co.uk/news/world/asia/army-to-be-sued-for-war-crimes-over-its-role-in-fallujah-attacks-1961475.html>

4.6 New EU Regulations for Increasing Energy Efficiency and Reducing Emissions**4.6.1 European Commission to Strengthen Bio-Waste Management**

The European Commission has published a strategy for improve bio-waste management and help meet the targets set by the Landfill Directive 1999/31/EC that requires Member States to reduce the amount of biodegradable waste that they landfill to 35% of 1995 levels by 2016. The Commission's strategy aims to reduce bio-waste environmental impact while also taking advantage of its potential as a renewable source of energy and recycled materials, as well as reducing the production of methane (a GHG 25 times more potent than CO₂). The Commission estimates that bio-waste is accounting for 88 million tons of municipal waste each year in Europe, while about 2% of the EU's overall renewable energy target could be met if all bio-waste was turned into energy. To support Member States, the EU will provide specific guidance, standards, and indicators for bio-waste prevention with possible future binding targets. [Related item: *European Union to Consider Regulations for Curbing Biowaste* in June 2009 environmental security report.]

Military Implications:

[Similar to previous on this issue] The military stationed in the EU region should increase its biowaste management practices and be prepared to comply with eventual new targets.

Sources:

New Commission strategy aims to get even more from bio-waste

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/578&format=HTML&aged=0&language=EN&guiLanguage=en>

New Commission strategy aims to get even more from bio-waste

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/578&format=HTML&aged=0&language=EN&guiLanguage=en>

4.6.2 Only Very Low-Energy Buildings to Be Built in EU after 2020

The new EU energy efficiency legislation for buildings requires all Member States to alter their building codes so that all new buildings meet high energy-saving standards from the end of 2020 if private, and two years earlier if public constructions, while existing buildings will have to be upgraded where possible. The directive is part of the wider 20/20/20 EU energy efficiency legislative package.

Military Implications:

[Similar to previous on this issue] The military stationed in the EU region should increase its biowaste management practices and be prepared to comply with eventual new targets.

Source:

New energy labels for household appliances; low-energy buildings from 2020

http://www.europarl.europa.eu/news/expert/infopress_page/051-74642-137-05-21-909-20100517IPR74641-17-05-2010-2010-false/default_en.htm

4.7 North American Proposal to Phase Down HFC's

The EPA has announced that Canada and Mexico have joined the US in proposing to expand the scope of the Montreal Protocol on Substances that Deplete the Ozone Layer. The proposal would phase down hydrofluorocarbons (HFCs), which are a significant and rapidly growing contributor to climate change, and lists four possible substitute refrigerants. Note: previous proposals were opposed by China, India, and several Arab countries; see relevant item: *New Decisions Adopted for Strengthening the Montreal Protocol* in November 2009 environmental security report.

Military Implications:

The military should find substitutes for HFC's in cooling systems.

Source:

Recent International Developments in Saving the Ozone Layer

<http://www.epa.gov/ozone/intpol/mpagreement.html>

4.8 Russia Suggests Opening New Transportation Corridor via the Arctic

Russia is suggesting the opening of a new transport corridor from Europe to Southeast Asia, via the Arctic region. One of Russia's largest shipping companies, Sovkomflot, intends to send a tanker from Murmansk to Southeast Asia in November to validate the new waterway. In addition to being much shorter, the new pirate-free route is also safer. If the plan proves viable, Russia will set up the administrative infrastructure to manage navigation across the Arctic, such as small maintenance ports. [Related items: *Arctic Debates Continue* in March 2010 and other items on this issue in previous environmental security reports.]

Military Implications:

[Same as previous on this issue] Military-to-military collaboration should increase among all the Arctic countries to support friendly political and economic negotiations and to assure security in the increasingly vulnerable region.

Source:

Arctic shipping route is safer

<http://english.ruvr.ru/2010/05/26/8505969.html>

4.9 Nanotechnology Safety Issues

More detailed descriptions of the following nanotechnology issues are in the [Appendix](#)

- A report on GENNESYS (Grand European Initiative on Nanoscience and Nanotechnology using Neutron- and Synchrotron Radiation Sources) on coordinating future R/D in nano S&T ([more](#))
- ILO Booklet on Emerging risks and new patterns of prevention in a changing world of work ([more](#))
- ObservatoryNANO 2nd Annual Report on Ethical and Societal Aspects of Nanotechnology ([more](#))

- Policy Framework for Addressing Nanomaterial Risks in California ([more](#))
- New reports by OECD ([more](#)):
 - *Report of the Workshop on Risk Assessment of Manufactured Nanomaterials in a Regulatory Context*
 - *Report of the Questionnaire on Regulatory Regimes on Manufactured Nanomaterials*
 - *OECD Programme on the Safety of Manufactured Nanomaterials 2009-2012: Operational Plans of the Projects*

Item 5. Reports and Information Suggested for Review

5.1 Water Management Is the Main Aspect of Water Security Issues

Water Security: Global, regional and local challenges published by the Institute for Public Policy Research is a policy brief examining the management of trans-boundary water resources. Analyzing the global policy framework in place for addressing water insecurity, it evaluates and makes recommendations for various policy alternatives to strengthen the framework. Similarly, the *Water Security: War or Peace?* report argues that a failure of politics rather than scarcity per se is a likely cause of “water war.” Noting that transboundary water is generally managed peacefully, the paper suggests disconnecting water and national security discourses and rather associating water with cooperative attitudes. The paper also highlights that the capacity to adapt to scarcity tends to be underestimated.

Military Implications:

The two reports offer a comprehensive overview of water security and could be considered for the respective suggestions they put forward for using water issues as peace-building rather than conflict issues.

Sources:

Water Security: Global, regional and local challenges, by Patricia Wouters, Institute for Public Policy Research, May 2010,

Wouters, P., *Water Security: Global, regional and local challenges*.

<http://www.ippr.org.uk/publicationsandreports/publication.asp?id=749>

Thomas Lawfield, *Water Security: War or Peace?*, *Peace & Conflict Monitor* (May 03, 2010),

http://www.monitor.upeace.org/innerpg.cfm?id_article=715

5.2 A New Approach to Environmental Crime

Eco-Crime and Justice: Essays on Environmental Crime is a collection of four essays detailing the multidisciplinary application of criminology to environmental harm. The papers examine how environmental crimes, including illegal wildlife trade, timber trafficking, and hazardous waste dumping, represent some of the fastest growing, most profitable, and poorly enforced illegal activities perpetrated by both international corporations and organized crime. Claiming that states and territories’ very existence is threatened by climate change and that environmental harm disproportionately afflicts developing nations, the poor, and minorities, the essays demand a new perspective. The approach proposed, called eco-global criminology, proposes integrating local wisdom with expert solutions to these borderless ailments, using tailored policing based on multilateral treaties and law enforcement.

Military Implications:

Military personnel who might be called upon to work with other countries in countering environmental crimes should review this report. Under this proposed new paradigm, current activities which damage the environment but are not illegal under international law can be made criminal and be dealt with in order to stave off ecological disasters. They also should keep in mind that these actions might be used as tools in military conflicts.

Sources:

Eco-Crime and Justice: Essays on Environmental Crime, edited by Kristiina Kangaspunta and Ineke Haen Marshall, UNICRI

http://www.freedomfromfearmagazine.org/index.php?option=com_content&view=article&id=243:eco-crime-and-justice-essays-on-environmental-crime&catid=46:frontpage-books&Itemid=180

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 1. The Oil Spill Likely to Initiate International Regulations Discussions and Accelerate Alternative Energy Developments

Sources: (a more expanded list)

BP Risks Big Fines and Loss of Major U.S. Contracts

<http://online.wsj.com/article/SB10001424052748703630304575270822261954614.html>

Gulf Oil Spill Crisis Highlights Need For Safer, Cleaner Energy Sources, Says WWF

<http://www.worldwildlife.org/who/media/press/2010/WWFPresitem16126.html>

Gulf of Mexico oil spill worsens

<http://www.greenpeace.org/international/en/news/Blogs/makingwaves/gulf-of-mexico-oil-spill-worsens/blog/11675>

Lawyers lining up for class-action suits over oil spill

<http://www.washingtonpost.com/wp-dyn/content/article/2010/05/16/AR2010051603254.html>

Lawyers Arrive And Suits Follow

<http://online.wsj.com/article/SB10001424052748704342604575222652608207576.html>

Pappas sues BP, others over damage to seafood business

<http://www.setexasrecord.com/news/226928-pappas-sues-bp-others-over-damage-to-seafood-business>

The politics of offshore drilling

<http://www.cbc.ca/politics/insidepolitics/2010/05/the-politics-of-offshore-drilling.html>

BP Prepares to Take New Tack on Leak After ‘Top Kill’ Fails

<http://www.nytimes.com/2010/05/30/us/30spill.html?th&emc=th>

BP Oil Spill Could Happen Anywhere: Norway

<http://planetark.org/wen/57879>

Despite spill, Louisiana is still devoted to oil

http://seattletimes.nwsourc.com/html/nationworld/2011932128_oilstate23.html

A Proxy War in Peru

http://www.foreignpolicy.com/articles/2010/05/19/a_proxy_war_in_peru

Nigeria: Delta Communities Cry Out Over Oil Spillage

<http://allafrica.com/stories/201006010104.html>

Nigeria: Shell - the Struggle for Accountability

<http://allafrica.com/stories/201002190670.html>

Nigeria: Akwa-Ibom - Oil Communities Want Development Commission

<http://allafrica.com/stories/201005250128.html>

Item 4. Updates on Previously Identified Issues

4.1 Climate Change

Sources: (a more expanded list)

4.1.1 Scientific Evidence and Natural Disasters

Ocean Stored Significant Warming Over Last 16 Years

http://www.noaanews.noaa.gov/stories2010/20100519_ocean.html

Man-made climate change blamed for 'significant' rise in ocean temperature

<http://www.independent.co.uk/environment/climate-change/manmade-climate-change-blamed-for-significant-rise-in-ocean-temperature-1977669.html>

Europe's scientists call for more effort in tackling rising ocean acidity

http://www.eurekalert.org/pub_releases/2010-05/esf-esc051810.php

"Double trouble" in acidic, warming oceans – study

<http://in.reuters.com/article/idINIndia-48634120100519>

4.1.2 Food and Water Security

UNEP Green Economy Report: A Preview

[http://www.unep.ch/etb/publications/Green Economy/UNEP_Rio20PrepCom_GERPreview_06May10_FINAL.pdf](http://www.unep.ch/etb/publications/Green_Economy/UNEP_Rio20PrepCom_GERPreview_06May10_FINAL.pdf)

UN official warns on fisheries losses

http://news.bbc.co.uk/2/hi/science_and_environment/10128900.stm

Oceans' fish could disappear in 40 years: UN

<http://www.google.com/hostednews/afp/article/ALeqM5hipbi-mn7by4mFZ6veqVQ00Emu9Q>

Israel Opens Largest Desalination Plant Of Its Kind

<http://planetark.org/wen/58036>

Gulf Looks To Science To Turn Desert To Farmland

<http://planetark.org/wen/58059>

4.1.3 Health

US\$4.4 million awarded for research to build a climate model able to predict outbreaks of infectious disease in Africa

<http://www.ilri.org/ilrinews/index.php/archives/1838>

4.1.4 Melting Glaciers and Sea Ice

Global Floating Ice In "Constant Retreat": Study

<http://planetark.org/wen/58216>

4.1.5 Computer Modeling and Scenarios

Europe's Plan to Simulate the Entire Planet

<http://www.technologyreview.com/blog/arxiv/25126/?a=f>

The FuturICT Knowledge Accelerator

<http://www.futurict.ethz.ch/FuturICT>

4.1.6 Adaptation

GBO-3 Website

<http://gbo3.cbd.int>

New vision required to stave off dramatic biodiversity loss, says UN report

<http://www.cbd.int/doc/press/2010/pr-2010-05-10-gbo3-en.pdf>

African professionals push green building agenda

<http://www.unhabitat.org/content.asp?cid=8310&catid=5&typeid=6&subMenuId=0>

Conference Green Building

<http://www.unhabitat.org/categories.asp?catid=640>

Declaration on Green Building

http://www.unhabitat.org/downloads/docs/8313_12630_GreenBldgRatingAfricaFINAL.pdf

4.1.7 Post-Copenhagen Negotiations

Climate Talks Open in Bonn

<http://www.iisd.ca/climate/sb32/>

Under Current Policies

<http://www.eia.doe.gov/neic/press/press343.html>

Energy use set to jump 50 percent by 2035: report

http://www.energy-daily.com/reports/Energy_use_set_to_jump_50_percent_by_2035_report_999.html

Global CO2 Emissions To Rise 43 Percent By 2035: EIA

<http://planetark.org/enviro-news/item/58178>

Energy use set to jump 50 percent by 2035: report

4.9 Nanotechnology Safety Issues

More detailed descriptions of the nanotechnology issues

4.9.1 Five-Year European Study of the Needs and Opportunities for Nanotech R/D

A report on GENNESYS (Grand European Initiative on Nanoscience and Nanotechnology using Neutron- and Synchrotron Radiation Sources), a five-year European-wide study of the needs and opportunities for coordinating future R/D in nano science and technology, has been published.

The 500-page report is the result of the collaborative work of more than 600 experts, and, according to Meridian *Nanotechnology and Development News*, "assesses the state of nanomaterials science and technology, highlights future challenges and research needs, and pinpoints the areas of research that will most benefit from joint research strategies with synchrotron radiation and neutron sources."

Military Implications:

Although the emphasis of the report is on a particular set of research techniques, it should still provide a useful overview of the current state and future prospects of nanotech R/D.

Sources:

GENNESYS White Paper

<http://www.merid.org/nanodev/more.php?articleID=2589>

4.9.2 ILO Booklet on Workplace Hazards (REPORT)

According to Meridian *Nanotechnology and Development News*, the International Labour Organization has published a new booklet, *Emerging risks and new patterns of prevention in a*

changing world of work, that summarizes key new occupational safety and health issues, including those related to technological innovations such as nanotechnology and biotechnology.

Military Implications:

The ILO booklet could provide valuable information for preventing new technologies-related health hazards and analyzing potential new standards for work environment.

Source:

Focus on new emerging hazards in a changing world of work

[http://www.ilo.org/global/About the ILO/Media and public information/Press releases/lang--en/WCMS_126383/index.htm](http://www.ilo.org/global/About%20the%20ILO/Media%20and%20public%20information/Press%20releases/lang-en/WCMS_126383/index.htm)

4.9.3 ObservatoryNANO 2nd Annual Report on Ethical and Societal Aspects of Nanotechnology

Meridian *Nanotechnology and Development News* reports that the ObservatoryNANO project has published a report on nanobioethics that includes discussions of the ethical, legal and societal aspects of nanotech for health, medicine, nanobiotechnology, nanotech for agrifood, and on nanotechnology and animal testing.

Military Implications:

Although the foci of the report are somewhat distant from military concerns, it should provide useful ideas on general nanotech ethics and regulatory policy

Sources:

ObservatoryNano 2nd Annual Report on Ethical and Societal Aspects of Nanotechnology

<http://www.merid.org/nanodev/more.php?articleID=2584>

Nanobioethics. ObservatoryNano 2nd Annual Report on Ethical and Societal Aspects of Nanotechnology

<http://www.observatorynano.eu/project/catalogue/4NB/>

4.9.4 Policy Framework for Addressing Nanomaterial Risks in California

The Program on Reproductive Health and the Environment at the Univ. of California, San Francisco, has developed a draft set of policy recommendations to address the potential health risk for the state of California from nanomaterials and nanotechnology: "A Nanotechnology Policy Framework: Policy Recommendations for Addressing Potential Health Risks from Nanomaterials in California". The report presents "an overview of nanotechnology materials and their potential exposures and human health risks, and proposes a selection of policy options for addressing potential hazards and risks from nanotechnology."

Military Implications:

The draft's set of recommendations might provide useful information for addressing nanotech-related risks and potential new future standards that could expand beyond the State of California.

Sources:

Nanotechnology policy framework for addressing nanomaterial risks in California

http://www.nanowerk.com/news/newsid=16113.php?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29

"A Nanotechnology Policy Framework: Policy Recommendations for Addressing Potential Health Risks from Nanomaterials in California"

<http://www.prhe.ucsf.edu/prhe/nanoreportDRAFT.pdf>

4.9.5 OECD Publishes Three Reports on Nanotech Safety and Regulation

Report of the Workshop on Risk Assessment of Manufactured Nanomaterials in a Regulatory Context presents critical issues specific for risk assessment of nanomaterials in a regulatory context and identifies approaches for risk assessment based on the current state of knowledge. Presentations included Risk Assessment Case Studies on nano-TiO₂, nano-Ag and Carbon Nanotubes.

Report of the Questionnaire on Regulatory Regimes on Manufactured Nanomaterials summarizes objectives and activities covered by each piece of legislation; features for consideration when amending or drafting legislation for regulatory oversight

OECD Programme on the Safety of Manufactured Nanomaterials 2009-2012: Operational Plans of the Projects aims to ensure that the approach to hazard, exposure and risk assessment is of a high, science-based, and internationally harmonized standard

Military Implications:

The OECD reports could provide valuable information for preventing new technologies-related risks as well as potential new standards.

Source:

Report of the Workshop on Risk Assessment of Manufactured Nanomaterials in a Regulatory Context

Report of the Questionnaire on Regulatory Regimes on Manufactured Nanomaterials

OECD Programme on the Safety of Manufactured Nanomaterials 2009-2012: Operational Plans of the Projects

http://www.oecd.org/department/0,3355,en_2649_34365_1_1_1_1_1,00.html