# 1nc

## 1nc – osmrs

### t – must be civilian

#### Interpretation - Non-military means they can’t be associated with the armed forces in any way

**Oxford Dictionaries, 14** (http://www.oxforddictionaries.com/definition/english/non-military)

non-military

Line breaks: non-military

Pronunciation: /nɒnˈmɪlɪt(ə)ri /

ADJECTIVE

Not belonging to, characteristic of, or involving the armed forces; civilian:

the widespread destruction of non-military targets

#### B. Violation – Using the military in a non-combat role isn’t non-military because it still operates within military structure

**Brown, 12 -** PhD Thesis. SOAS, University of London (Sylvia, Youths in non-military roles in an armed opposition group on the Burmese-Thai border. <http://eprints.soas.ac.uk/15634>)

a) Definition of key terms The term ‘youth’ is understood in this study to be a socially constructed emic term which, like all social constructions, is not static, but continually re-defined by society based on the social context of the time. The term ‘non-military’ is used here to refer to roles which are not located within army or militia structures. Since roles within military structures involve both combat and non-combat roles (army cooks, porters, signallers and engineers, for example), the term ‘non-combat’ can be used to refer to ancillary roles within a military, which are not the focus of this study. This study is concerned with participants outside the armed wing of an armed opposition group entirely, for instance, within its administrative apparatus or mass organisations.

#### C. Voting issue –

#### limits – allowing the military explodes the literature base and our research burdens – there are dozens of noncombat roles like anti-piracy, counterterrorism or counternarcotics that could all facilitate development – it could be its own topic

#### Precision – Using the military for peaceful purposes is non-aggressive, NOT nonmilitary

Charles, 8/5/12 - Board of Editors for National University of Advanced Legal Studies

[Ammu, “Demilitarization of Outer Space: Between 'Non-Military and Non-Aggressive'” Social Science Research Network, http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2124338]//SG

In October 1957, Soviet Union launched of Sputnik I, which proceeded to orbit the Earth and triggered the development of principles of space law. The space activities of US also immediately followed. “The U.S.S.R. initially stated that "peaceful" in international law always meant nonmilitary, since the International Treaty of Antarctica in 1959 and the Treaty on Non- proliferation of Nuclear Weapons, as well as United Nations Charter, define "peaceful" methods of solving international disputes as those not connected with the use of armed forces. The Soviets then changed their approach from what appeared to be an interpretation of complete demilitarization. The Soviets stated that paragraph two of Article IV had already demilitarized the moon and celestial bodies and that paragraph one was an important step toward banning the use of all outer space for military purposes. The U.S.S.R. distinguished between activity where the military is employed and activity with a military character, since paragraph two of Article IV specifically allowed the use of military personnel for peaceful purposes. By comparison, United States' position was based on the interpretation of "peaceful use" as nonaggressive, rather than nonmilitary, activity. The United States had maintained this position consistently ever since the beginning of the space era. This has been seen as play to gain international recognition of the legality of reconnaissance satellites, while simultaneously discouraging military space activities that threatened those assets. According to this definition "peaceful use" as used in the Space Treaty denoted nonaggressive activity in the traditional international legal sense, where "aggressive" consisted of an attack on or undermining another State's territorial sovereignty.” “As per the Treaty on the Limitation of AntiBallistic Missile Systems 1972 the United States and the Soviet Union have agreed in not to develop, test, or deploy anti-ballistic missile systems or components which are space based. The United Nations Conferences on Disarmament, the United Nations General Assembly, the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and the international scientific community has proclaimed and repeatedly affirmed that outer space shall be used for peaceful purposes, not for military advantage.”5

#### predictability – their interpretation makes the word ‘non-military’ meaningless – if military only means formal combat roles, ‘exploration’ and ‘development’ are incoherent in that context.

### iaea da

#### SMRs collapse IAEA efficacy—impact is accidents

Edwin Lyman, Ph.D., Senior Scientist, Global Security Program Union of Concerned Scientists, 7/14/11, “An Examination of the Safety and Economics of Light Water Small Modular Reactors”, http://www.ucsusa.org/assets/documents/nuclear\_power/lyman-appropriations-subcom-7-14-11.pdf

Fukushima also demonstrated how rapidly a nuclear reactor accident can progress to a core meltdown if multiple safety systems are disabled. A well-planned and executed terrorist attack could cause damage comparable to or worse than the earthquake and tsunami that initiated the Fukushima crisis, potentially in even less time. And although Osama bin Laden is gone, the terrorist threat to domestic infrastructure may actually increase over time if al Qaeda seeks to retaliate. This is the wrong time to consider reducing security requirements for nuclear power plants, regardless of their size. However, SMR vendors have emphasized that reducing security staffing is critical for the economic viability of their projects. Christofer Mowry of B&W told the NRC in March that “whether SMRs get deployed in large numbers or not is going to come down to O&M [operations and maintenance]. And the biggest variable that we can attack directly ... is the security issue.” A Nuclear Energy Institute representative said in a presentation in June that “optimal security staffing levels [for SMRs] may appreciably differ from current levels.”¶ UCS is also concerned that reducing safety and security requirements for SMRs could facilitate their sale to utilities or other entities in the United States and abroad that do not have prior experience with nuclear power. Some SMR vendors argue that their technology is so safe that it can be deployed to remote areas, military bases, and countries in the developing world that have relatively low electric demand and no nuclear experience or emergency planning infrastructure. However, SMRs deployed in this manner could raise additional safety and security concerns compared to their deployment by established and experienced nuclear utilities.¶ The distributed deployment of small reactors would also put great strains on existing licensing and inspection resources. Nuclear reactors are qualitatively different from other types of generating facilities, not least because they require a much more extensive safety and security inspection regime. Similarly, deployment of individual small reactors at widely distributed and remote sites around the world would strain the resources of the International Atomic Energy Agency (IAEA) and its ability to adequately safeguard reactors to guard against proliferation, since IAEA inspectors would need to visit many more locations per installed megawatt around the world. Maintaining robust oversight over vast networks of SMRs around the world would be difficult, if feasible at all.¶ UCS believes that SMRs are only suitable for deployment where there is an established infrastructure to cope with emergencies, and if sufficient numbers of trained operator and security staff can be provided. It is unrealistic to assume the near-term availability of SMRs that are so safe they can be shipped around the world without the need to ensure the highest levels of competence and integrity of local regulatory authorities, plant operators, emergency planning organizations and security forces. Fukushima has demonstrated the importance of timely off-site response in the event of a severe accident, so the accessibility of reactors in remote locations also must be a prime consideration. Even within the U.S., small utilities with little or no experience in operating nuclear plants need to fully appreciate the unique challenges and responsibilities associated with nuclear power and should not expect that small modular reactors will provide any relief in this regard.

#### Extinction

Stephen Lendman, The Peoples Voice, 3/12/11, Nuclear Meltdown in Japan, www.thepeoplesvoice.org/TPV3/Voices.php/2011/03/13/nuclear-meltdown-in-japan

Reuters said the 1995 Kobe quake caused $100 billion in damage, up to then the most costly ever natural disaster. This time, from quake and tsunami damage alone, that figure will be dwarfed. Moreover, under a worst case core meltdown, all bets are off as the entire region and beyond will be threatened with permanent contamination, making the most affected areas unsafe to live in. On March 12, Stratfor Global Intelligence issued a "Red Alert: Nuclear Meltdown at Quake-Damaged Japanese Plant," saying: Fukushima Daiichi "nuclear power plant in Okuma, Japan, appears to have caused a reactor meltdown." Stratfor downplayed its seriousness, adding that such an event "does not necessarily mean a nuclear disaster," that already may have happened - the ultimate nightmare short of nuclear winter. According to Stratfor, "(A)s long as the reactor core, which is specifically designed to contain high levels of heat, pressure and radiation, remains intact, the melted fuel can be dealt with. If the (core's) breached but the containment facility built around (it) remains intact, the melted fuel can be....entombed within specialized concrete" as at Chernobyl in 1986. In fact, that disaster killed nearly one million people worldwide from nuclear radiation exposure. In their book titled, "Chernobyl: Consequences of the Catastrophe for People and the Environment," Alexey Yablokov, Vassily Nesterenko and Alexey Nesterenko said: "For the past 23 years, it has been clear that there is a danger greater than nuclear weapons concealed within nuclear power. Emissions from this one reactor exceeded a hundred-fold the radioactive contamination of the bombs dropped on Hiroshima and Nagasaki." "No citizen of any country can be assured that he or she can be protected from radioactive contamination. One nuclear reactor can pollute half the globe. Chernobyl fallout covers the entire Northern Hemisphere." Stratfor explained that if Fukushima's floor cracked, "it is highly likely that the melting fuel will burn through (its) containment system and enter the ground. This has never happened before," at least not reported. If now occurring, "containment goes from being merely dangerous, time consuming and expensive to nearly impossible," making the quake, aftershocks, and tsunamis seem mild by comparison. Potentially, millions of lives will be jeopardized. Japanese officials said Fukushima's reactor container wasn't breached. Stratfor and others said it was, making the potential calamity far worse than reported. Japan's Nuclear and Industrial Safety Agency (NISA) said the explosion at Fukushima's Saiichi No. 1 facility could only have been caused by a core meltdown. In fact, 3 or more reactors are affected or at risk. Events are fluid and developing, but remain very serious. The possibility of an extreme catastrophe can't be discounted. Moreover, independent nuclear safety analyst John Large told Al Jazeera that by venting radioactive steam from the inner reactor to the outer dome, a reaction may have occurred, causing the explosion. "When I look at the size of the explosion," he said, "it is my opinion that there could be a very large leak (because) fuel continues to generate heat." Already, Fukushima way exceeds Three Mile Island that experienced a partial core meltdown in Unit 2. Finally it was brought under control, but coverup and denial concealed full details until much later. According to anti-nuclear activist Harvey Wasserman, Japan's quake fallout may cause nuclear disaster, saying: "This is a very serious situation. If the cooling system fails (apparently it has at two or more plants), the super-heated radioactive fuel rods will melt, and (if so) you could conceivably have an explosion," that, in fact, occurred. As a result, massive radiation releases may follow, impacting the entire region. "It could be, literally, an apocalyptic event. The reactor could blow." If so, Russia, China, Korea and most parts of Western Asia will be affected. Many thousands will die, potentially millions under a worse case scenario, including far outside East Asia. Moreover, at least five reactors are at risk. Already, a 20-mile wide radius was evacuated. What happened in Japan can occur anywhere. Yet Obama's proposed budget includes $36 billion for new reactors, a shocking disregard for global safety. Calling Fukushima an "apocalyptic event," Wasserman said "(t)hese nuclear plants have to be shut," let alone budget billions for new ones. It's unthinkable, he said. If a similar disaster struck California, nuclear fallout would affect all America, Canada, Mexico, Central America, and parts of South America. Nuclear Power: A Technology from Hell Nuclear expert Helen Caldicott agrees, telling this writer by phone that a potential regional catastrophe is unfolding. Over 30 years ago, she warned of its inevitability. Her 2006 book titled, "Nuclear Power is Not the Answer" explained that contrary to government and industry propaganda, even during normal operations, nuclear power generation causes significant discharges of greenhouse gas emissions, as well as hundreds of thousands of curies of deadly radioactive gases and other radioactive elements into the environment every year. Moreover, nuclear plants are atom bomb factories. A 1000 megawatt reactor produces 500 pounds of plutonium annually. Only 10 are needed for a bomb able to devastate a large city, besides causing permanent radiation contamination. Nuclear Power not Cleaner and Greener Just the opposite, in fact. Although a nuclear power plant releases no carbon dioxide (CO2), the primary greenhouse gas, a vast infrastructure is required. Called the nuclear fuel cycle, it uses large amounts of fossil fuels. Each cycle stage exacerbates the problem, starting with the enormous cost of mining and milling uranium, needing fossil fuel to do it. How then to dispose of mill tailings, produced in the extraction process. It requires great amounts of greenhouse emitting fuels to remediate. Moreover, other nuclear cycle steps also use fossil fuels, including converting uranium to hexafluoride gas prior to enrichment, the enrichment process itself, and conversion of enriched uranium hexafluoride gas to fuel pellets. In addition, nuclear power plant construction, dismantling and cleanup at the end of their useful life require large amounts of energy. There's more, including contaminated cooling water, nuclear waste, its handling, transportation and disposal/storage, problems so far unresolved. Moreover, nuclear power costs and risks are so enormous that the industry couldn't exist without billions of government subsidized funding annually. The Unaddressed Human Toll from Normal Operations Affected are uranium miners, industry workers, and potentially everyone living close to nuclear reactors that routinely emit harmful radioactive releases daily, harming human health over time, causing illness and early death. The link between radiation exposure and disease is irrefutable, depending only on the amount of cumulative exposure over time, Caldicott saying: "If a regulatory gene is biochemically altered by radiation exposure, the cell will begin to incubate cancer, during a 'latent period of carcinogenesis,' lasting from two to sixty years." In fact, a single gene mutation can prove fatal. No amount of radiation exposure is safe. Moreover, when combined with about 80,000 commonly used toxic chemicals and contaminated GMO foods and ingredients, it causes 80% of known cancers, putting everyone at risk everywhere. Further, the combined effects of allowable radiation exposure, uranium mining, milling operations, enrichment, and fuel fabrication can be devastating to those exposed. Besides the insoluble waste storage/disposal problem, nuclear accidents happen and catastrophic ones are inevitable. Inevitable Meltdowns Caldicott and other experts agree they're certain in one or more of the hundreds of reactors operating globally, many years after their scheduled shutdown dates unsafely. Combined with human error, imprudently minimizing operating costs, internal sabotage, or the effects of a high-magnitude quake and/or tsunami, an eventual catastrophe is certain. Aging plants alone, like Japan's Fukushima facility, pose unacceptable risks based on their record of near-misses and meltdowns, resulting from human error, old equipment, shoddy maintenance, and poor regulatory oversight. However, under optimum operating conditions, all nuclear plants are unsafe. Like any machine or facility, they're vulnerable to breakdowns, that if serious enough can cause enormous, possibly catastrophic, harm. Add nuclear war to the mix, also potentially inevitable according to some experts, by accident or intent, including Steven Starr saying: "Only a single failure of nuclear deterrence is required to start a nuclear war," the consequences of which "would be profound, potentially killing "tens of millions of people, and caus(ing) long-term, catastrophic disruptions of the global climate and massive destruction of Earth's protective ozone layer. The result would be a global nuclear famine that could kill up to one billion people." Worse still is nuclear winter, the ultimate nightmare, able to end all life if it happens. It's nuclear proliferation's unacceptable risk, a clear and present danger as long as nuclear weapons and commercial dependency exist.

### mox da

#### The plan spotlights light water SMRs, because they are slightly more developed than advanced reactors

**Department of Commerce 2011** (February, U.S. Department of Commerce International Trade Administration, Manufacturing and Services Competitiveness Report, “The Commercial Outlook for U.S. Small Modular Nuclear Reactors”, http://www.trade.gov/publications/pdfs/the-commercial-outlook-for-us-small-modular-nuclear-reactors.pdf, WEA)

Although SMRs have significant potential and ¶ the market for their deployment is growing, their ¶ designs must still go through the technical and ¶ regulatory processes necessary to ensure that ¶ they can be safely and securely deployed. Lightwater technology–based SMRs may not be ready ¶ for deployment in the United States for at least ¶ a decade, and advanced designs might be even ¶ further off. Light-water SMRs and SMRs that have ¶ undergone significant testing are the most likely ¶ candidates for near-term deployment, because ¶ they are most similar to existing reactors that ¶ have certified designs and significant operating ¶ histories. NuScale is on track to submit its reactor ¶ design to the NRC by 2012, as is Babcock & Wilcox ¶ for its mPower design. In addition, GE-Hitachi, ¶ which already completed an NRC preapplication ¶ review for its PRISM reactor in 1994, plans to submit its PRISM design for certification in 2012. ¶ With fierce competition for commercial deployment of U.S. SMRs anticipated, the U.S. government is accelerating its efforts to support the ¶ licensing of new reactor designs. The fiscal year ¶ 2011 budget request for the Department of Energy ¶ includes $39 million for a program to support ¶ design certification of SMRs for commercial deployment, as well as a research and development ¶ portfolio that will address the technology development needs of both near- and longer-term SMRs. ¶ The Department of Energy is also in discussions ¶ with several U.S. companies to facilitate the lightwater SMR design certification by the NRC within ¶ a reasonable timeframe. The department also ¶ continues to support research and development ¶ efforts toward advanced reactor designs through ¶ the Advanced Reactor Concepts program, which ¶ focuses on metal-cooled reactor technologies.

#### SMR models are zero-sum—light water SMRs enable mixed oxide usage, which crushes prolif cred

**Clements 2012** – Nonproliferation Policy Director at ANA (6/8, Tom, Alliance for Nuclear Accountability, “Documents Reveal Time-line and Plans for “Small Modular Reactors” (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding”, http://www.ananuclear.org/PressRoom/ANAPressReleases/tabid/115/articleType/ArticleView/articleId/558/Default.aspx, WEA)

The MOAs indicate that sale of electricity to SRS via “Purchase Power Agreements” (PPAs) is being viewed as a way to fund the reactors. “Sales of electricity produced by SMRs at high rates to SRS is nothing but a back-door subsidy by big government and will not be defensible to the public or Congress,” said Clements. “It’s time for big government to stop choosing winners and losers among SMR concepts and let the free market decide if SMRs will be pursued.”¶ The MOA with SMR, LLC for the “Safe Modular Underground Reactor” indicates pursuit of controversial nuclear weapons-related programs. The MOA states that “the Parties agree to invite the NNSA [National Nuclear Security Administration] to discuss the feasibility of additional Agreements to irradiate Tritium Producing Burnable Absorption Rods (TPBARs) and Mixed Oxide Fuel (MOX).” These plans refer to the production of radioactive tritium gas used to boost the explosive power of all U.S. nuclear weapons and the use of experimental plutonium fuel (mixed oxide, MOX) made from weapons-grade plutonium surplus to the nuclear weapons program. ¶ The costly and problem-plagued concept to use MOX in conventional light-water reactors is under pressure and has just faced an additional budget cut by the US House of Representatives. A proposal to use MOX in an SMR is an indication that DOE itself is concerned if it can carry out the MOX program as now conceived, according to ANA.¶ Tritium for nuclear weapons is currently produced by the Watts Bar unit 1 reactor owned by the Tennessee Valley Authority. According to ANA, this shows that the U.S. has quietly crossed the imaginary line between the military and civilian nuclear processes and is engaged in a project which undermines sound nuclear non-proliferation policies. “For non-proliferation, safety and cost reason, production of tritium and use of MOX fuel should be ruled out for any SMRs,” said Clements.¶ SRS is engaged in an intensive promotional campaign to secure SMRs at the site in spite of the fact that they only exist on paper, no design is licensed by the Nuclear Regulatory Commission and sources of funding for development and construction of the reactors have not been identified. This effort by SRS to present itself as a leading SMR candidate site is in parallel with the overly enthusiastic media campaign by SMR vendors to promote their specific models, according to ANA.

#### Nonprolif leadership solves prolif – turns nuclear leadership

Wallace & Williams, 4-17-12

[Michael, Senior Adviser, U.S. Nuclear Energy Project – CSIS, Sarah, CSIS, “Nuclear Energy in America: Preventing It’s Early Demise,” <http://csis.org/files/publication/120417_gf_wallace_williams.pdf>]

America’s nuclear energy industry is in decline. Low natural gas prices, financing hurdles, new safety and security requirements, failure to resolve the waste issue and other factors are hastening the day when existing reactors become uneconomic, making it virtually impossible to build new ones. Two generations after the United States took this wholly new and highly sophisticated technology from laboratory experiment to successful commercialization, our nation is in danger of losing an industry of unique strategic importance, unique potential for misuse, and unique promise for addressing the environmental and energy security demands of the future. The pace of this decline, moreover, could be more rapid than most policymakers and stakeholders anticipate. With 104 operating reactors and the world’s largest base of installed nuclear capacity, it has been widely assumed that the United States—even without building many new plants— would continue to have a large presence in this industry for some decades to come, especially if existing units receive further license extensions. Instead, current market conditions are such that growing numbers of these units are operating on small or even negative profit margins and could be retired early. Meanwhile, China, India, Russia, and other countries are looking to significantly expand their nuclear energy commitments. By 2016, China could have 50 nuclear power plants in operation, compared with only 14 in 2011. India could add 8 new plants and Russia 10 in the same time frame. These trends are expected to accelerate out to 2030, by which time China, India, and Russia could account for nearly 40 percent of global nuclear generating capacity. Meanwhile, several smaller nations, mostly in Asia and the Middle East, are planning to get into the nuclear energy business for the first time. In all, as many as 15 new nations could have this technology within the next two decades. Meanwhile, America’s share of global nuclear generation is expected to shrink, from about 25 percent today to about 14 percent in 2030, and—if current trends continue—to less than 10 percent by mid-century. With the center of gravity for global nuclear investment shifting to a new set of players, the United States and the international community face a difficult set of challenges: stemming the spread of nuclear weapons-usable materials and know-how; preventing further catastrophic nuclear accidents; providing for safe, long-term nuclear waste management; and protecting U.S. energy security and economic competitiveness. In this context, federal action to reverse the American nuclear industry’s impending decline is a national security imperative. The United States cannot afford to become irrelevant in a new nuclear age. Our nation’s commercial nuclear industry, its military nuclear capabilities, and its strong regulatory institutions can be seen as three legs of a stool. All three legs are needed to support America’s future prosperity and security and to shape an international environment that is conducive to our long-term interests. Three specific aspects of U.S. leadership are particularly important. First, managing the national and global security risks associated with the spread of nuclear technology to countries that don’t necessarily share the same perspective on issues of nonproliferation and nuclear security or may lack the resources to implement safeguards in this area. An approach that relies on influence and involvement through a viable domestic industry is likely to be more effective and less expensive than trying to contain these risks militarily. Second, setting global norms and standards for safety, security, operations, and emergency response. As the world learned with past nuclear accidents and more recently with Fukushima, a major accident anywhere can have lasting repercussions everywhere. As with nonproliferation and security, America’s ability to exert leadership and influence in this area is directly linked to the strength of our domestic industry and our active involvement in the global nuclear enterprise. A strong domestic civilian industry and regulatory structure have immediate national security significance in that they help support the nuclear capabilities of the U.S. Navy, national laboratories, weapons complex, and research institutions. Third, in the past, the U.S. government could exert influence by striking export agreements with countries whose regulatory and legal frameworks reflected and were consistent with our own nonproliferation standards and commitments. At the same time, our nation set the global standard for effective, independent safety regulation (in the form of the Nuclear Regulatory Commission), led international efforts to reduce proliferation risks (through the 1970 NPT Treaty and other initiatives), and provided a model for industry self-regulation. The results were not perfect, but America’s institutional support for global nonproliferation goals and the regulatory behaviors it modeled clearly helped shape the way nuclear technology was adopted and used elsewhere around the world. This influence seems certain to wane if the United States is no longer a major supplier or user of nuclear technology. With existing nonproliferation and safety and security regimes looking increasingly inadequate in this rapidly changing global nuclear landscape, American leadership and leverage is more important and more central to our national security interests than ever. To maintain its leadership role in the development, design, and operation of a growing global nuclear energy infrastructure, the next administration, whether Democrat or Republican, must recognize the invaluable role played by the commercial U.S. nuclear industry and take action to prevent its early demise.

### dod cp

#### The United States Department of Defense should increase its proprietary investment in offshore small modular reactors, designate the technology for military bases in the United States, and integrate them along the coast and grant them electricity integration.

#### Military procurement solves commercial and islanding- avoid regulation

Andres and Loudermilk 10

(Richard B. Andres, Professor of ¶ national Security Strategy at the ¶ national War College and a Senior fellow and energy and environmental ¶ Security and Policy Chair in the Center ¶ for Strategic research, institute for national Strategic Studies, at the national Defense University, Micah J, Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University, “Small Reactors and the Military’s Role in Securing America’s Nuclear IndustryPosted” <http://robertmayer.wordpress.com/2010/08/28/small-reactors-and-the-militarys-role-in-securing-americas-nuclear-industryposted/>, SEH)

Unlike private industry, the military does not face the same regulatory and congressional hurdles to constructing reactors and would have an easier time in adopting them for use. By integrating small nuclear reactors as power sources for domestic U.S. military bases, three potential energy dilemmas are solved at the same time. First, by incorporating small reactors at its bases, the military addresses its own energy security quandary. The military has recently sought to “island” its bases in the U.S. -protecting them from grid outages, be they accidental or intentional. The Department of Defense has promoted this endeavor through lowering energy consumption on bases and searching for renewable power alternatives, but these measures alone will prove insufficient. Small reactors provide sufficient energy output to power military installations and in some cases surrounding civilian population centers.¶ Secondly, as the reactors become integrated on military facilities, the stigma on the nuclear power industry will ease and inroads will be created for the adoption of small-scale reactors as a viable source of energy. Private industry and the public will see that nuclear reactors can indeed be utilized safely and effectively, resulting in a renewed push toward the expansion of nuclear power. Although many of the same hurdles will still be in place, a shift in public opinion and a stronger effort by utilities, coupled with the demonstrated success of small reactors on military bases, could prove the catalysts necessary for the federal government and the NRC to take more aggressive action.¶ Finally, while new reactors are not likely in the near future, the military’s actions will preserve, for a while longer, the badly ailing domestic nuclear energy industry. Nuclear power is here to stay around the globe, and the United States has an opportunity to take a leading role in supplying the world’s nuclear energy and reactor technology. With the U.S. nuclear industry dormant for three decades, much of the attention, technology, and talent have concentrated overseas in countries with a strong interest in nuclear technology. Without the United States as a player in the nuclear energy market, it has little say over safety regulations of reactors or the potential risks of proliferation from the expansion of nuclear energy. If the current trend continues, the U.S. will reach a point where it is forced to import nuclear technology and reactors from other countries. Action by the military to install reactors on domestic bases will both guarantee the survival of the American nuclear industry in the short term, and work to solidify support for it in the long run.¶ Ultimately, between small-scale nuclear reactors and the U.S. military, the capability exists to revitalize America’s sleeping nuclear industry and promoting energy security and clean energy production. The reactors offer the ability to power domestic military bases, small towns, and other remote locations detached from the energy grid. Furthermore, reactor sites can house multiple units, allowing for greater energy production – rivaling even large reactors. Small reactors offer numerous benefits to the United States and a path initiated by the military presents a realistic route by which their adoption can be achieved.

#### DoD key

Glen Butler, Lt. Col., 2011, Not Green Enough, [www.mca-marines.org/gazette/not-green-enough](http://www.mca-marines.org/gazette/not-green-enough)

SMRs have relatively low plant cost, can replace aging fossil plants, and do not emit greenhouse gasses. Some are as small as a “hot tub” and can be stored underground, dramatically increasing safety and security from terrorist threats.25 Encouragingly, in fiscal year 2010 (FY10) the DoE allocated $0 to the U.S. SMR Program; in FY11, they’ve requested $38.9 million. This funding is to support two main activities—public/private partnerships to advance SMR designs and research and development and demonstrations. According to the DoE’s website, one of the planned program accomplishments for FY11 is to “collaborate with the Department of Defense (DoD) . . . to assess the feasibility of SMR designs for energy resources at DoD installations.”26 The Marine Corps should vigorously seek the opportunity to be a DoD entity providing one platform for this feasibility assessment.27 Fourth, SMR technology offers the Marine Corps another unique means to lead from the front—not just of the other Services but also of the Nation, and even the world.28 This potential Pete Ellis moment should be seized. There are simple steps we could take, and others stand ready to lead if we are not.30 But the temptation to “wait and see” and “let the others do it; then we’ll adopt it” mentality is not always best. Energy security demands boldness, not timidity. To be fair, nuclear technology comes with challenges, of course, and with questions that have been kicked around for decades. An April 1990 Popular Science article asked, “Next Generation Nuclear Reactors—Dare we build them?” and included some of the same verbiage heard in similar discussions today.31 Compliance with National Environment Policy Act requirements necessitates lengthy and detailed preaction analyses, critical community support must be earned, and disposal challenges remain. Still, none of these hurdles are insurmountable. Yet despite the advances in safety, security, and efficiency in recent years, nuclear in the energy equation remains the new “n-word” for most military circles. And despite the fact that the FY10 National Defense Authorization Act called on the DoD to “conduct a study [of] the feasibility of nuclear plants on military installations,” the Office of the Secretary of Defense has yet to fund the study. Fifth, the cumbersome, bureaucratic certification process of the Nuclear Regulatory Commission (NRC), often enough to scare away potential entrepreneurs and investors, is not necessarily a roadblock to success. The NRC is “responsible for licensing and regulating the operation of commercial nuclear power plants in the United States.” Military installations offer unique platforms that could likely bypass an extended certification process. With established expertise

and a long safety record in nuclear reactor certification, operations, training, and maintenance, the Naval Nuclear Propulsion Program comprises the civilian and military personnel who: . . . design, build, operate, maintain, and manage the nuclear-powered ships and the many facilities that support the U.S. nuclear-powered naval fleet.”34 Bypassing the NRC and initiating SMR experimentation under ADM Hyman Rickover’s legacy umbrella of naval reactors could shorten the process to a reasonable level for Marine and naval installations.35

#### Internal net benefit - islanding da

#### Small nuclear reactors key to prevent bases from being vulnerable to inevitable grid outages- the impact is nuclear war

Andres and Breetz 11

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Grid Vulnerability. DOD is unable to provide its ¶ bases with electricity when the civilian electrical grid is ¶ offline for an extended period of time. Currently, domestic military installations receive 99 percent of their ¶ electricity from the civilian power grid. As explained in a ¶ recent study from the Defense Science Board:¶ DOD’s key problem with electricity is that critical ¶ missions, such as national strategic awareness and ¶ national command authorities, are almost entirely ¶ dependent on the national transmission grid . . . ¶ [which] is fragile, vulnerable, near its capacity ¶ limit, and outside of DOD control. In most cases, ¶ neither the grid nor on-base backup power provides¶ sufficient reliability to ensure continuity of critical ¶ national priority functions and oversight of ¶ strategic missions in the face of a long term (several ¶ months) outage.¶ 7¶ The grid’s fragility was demonstrated during the 2003 ¶ Northeast blackout in which 50 million people in the ¶ United States and Canada lost power, some for up to a ¶ week, when one Ohio utility failed to properly trim trees. ¶ The blackout created cascading disruptions in sewage ¶ systems, gas station pumping, cellular communications, ¶ border check systems, and so forth, and demonstrated the ¶ interdependence of modern infrastructural systems.¶ 8¶ More recently, awareness has been growing that ¶ the grid is also vulnerable to purposive attacks. A report sponsored by the Department of Homeland Security suggests that a coordinated cyberattack on the grid ¶ could result in a third of the country losing power for ¶ a period of weeks or months.¶ 9¶ Cyberattacks on critical ¶ infrastructure are not well understood. It is not clear, for ¶ instance, whether existing terrorist groups might be able ¶ to develop the capability to conduct this type of attack. It ¶ is likely, however, that some nation-states either have or ¶ are working on developing the ability to take down the ¶ U.S. grid. In the event of a war with one of these states, ¶ it is possible, if not likely, that parts of the civilian grid ¶ would cease to function, taking with them military bases ¶ located in affected regions.¶ Government and private organizations are currently ¶ working to secure the grid against attacks; however, it is ¶ not clear that they will be successful. Most military bases ¶ currently have backup power that allows them to function for a period of hours or, at most, a few days on their ¶ own. If power were not restored after this amount of time, ¶ the results could be disastrous. First, military assets taken ¶ offline by the crisis would not be available to help with disaster relief. Second, during an extended blackout, global ¶ military operations could be seriously compromised; this ¶ disruption would be particularly serious if the blackout ¶ was induced during major combat operations. During the ¶ Cold War, this type of event was far less likely because the United States and Soviet Union shared the common understanding that blinding an opponent with a grid blackout could escalate to nuclear war. America’s current opponents, however, may not share this fear or be deterred ¶ by this possibility.¶

In 2008, the Defense Science Board stressed that ¶ DOD should mitigate the electrical grid’s vulnerabilities by turning military installations into “islands” of ¶ energy self-sufficiency.¶ 10¶ The department has made efforts to do so by promoting efficiency programs that ¶ lower power consumption on bases and by constructing ¶ renewable power generation facilities on selected bases. ¶ Unfortunately, these programs will not come close to ¶ reaching the goal of islanding the vast majority of bases. ¶ Even with massive investment in efficiency and renewables, most bases would not be able to function for more ¶ than a few days after the civilian grid went offline. Unlike other alternative sources of energy, small reactors have the potential to solve DOD’s vulnerability to ¶ grid outages. Most bases have relatively light power demands when compared to civilian towns or cities. Small ¶ reactors could easily support bases’ power demands separate from the civilian grid during crises. In some cases, ¶ the reactors could be designed to produce enough power ¶ not only to supply the base, but also to provide critical ¶ services in surrounding towns during long-term outages.¶ Strategically, islanding bases with small reactors ¶ has another benefit. One of the main reasons an enemy ¶ might be willing to risk reprisals by taking down the ¶ U.S. grid during a period of military hostilities would ¶ be to affect ongoing military operations. Without the ¶ lifeline of intelligence, communication, and logistics ¶ provided by U.S. domestic bases, American military operations would be compromised in almost any conceivable contingency. Making bases more resilient to ¶ civilian power outages would reduce the incentive for ¶ an opponent to attack the grid. An opponent might ¶ still attempt to take down the grid for the sake of disrupting civilian systems, but the powerful incentive to ¶ do so in order to win an ongoing battle or war would ¶ be greatly reduced.

### solvency

#### SMRs empirically fail at commercialization

Magwood, commissioner – NRC, 7/14/’11

(William, “ECONOMICS AND SAFETY OF MODULAR REACTORS; COMMITTEE: SENATE APPROPRIATIONS; SUBCOMMITTEE: ENERGY AND WATER DEVELOPMENT,” CQ Congressional Testimony)

That is not to say that SMRs are a new idea. The conceptual benefits of small reactors have been the subject of discussion and analysis for decades, and all the potential benefits I've mentioned have been considered in the past. The potential advantages of smaller reactors prompted the government to provide considerable financial support for the development of the mid- size, passive-safety reactors in the 1990s and to encourage the pursuit of the pebble-bed modular reactor in the early years of this century.¶ **Both efforts proved unable to overcome** the **economic realities** of building and operating nuclear power plants realities that tend to penalize small reactors and reward larger designs. Thus, instead of the AP-600 and 500 megawatt Simplified Boiling Water Reactor of the early 1990s, the market pushed vendors to increase the size of their designs; today, vendors offer Generation III+ technologies based on those smaller systems the 1100 megawatt AP- 1000 and the 1600 megawatt Economic Simplified Boiling Water Reactor.2¶ Around the turn of the century, both DOE and industry became interested in the Pebble Bed Modular Reactor, or PBMR. This was a small, high-temperature gas-cooled reactor with a generating capacity of about 165 megawatts. This technology captured considerable media attention after U.S. companies became involved in an effort to build a commercial pilot in South Africa. However, as the high costs of the project became apparent, commercial participants began to peel away and eventually the South African project was abandoned.¶ **All small reactor technologies of the past failed** to find a way to overcome the fact that the infrastructure required to safely operate a nuclear power reactor of any size is considerable. Tons of steel and concrete are needed to construct containment buildings. Control rod drives, steam generators, and other key systems are **hugely expensive** to design and build. A larger plant with greater electric generating capacity simply has an inherently superior opportunity to recover these large up-front costs over a reasonable period.¶ So why is today different from yesterday? The greatest difference is the fact that the technology has evolved significantly over the years. Having learned lessons from the development of Generation III+ technologies and from the failure of previous small reactors, today's SMR vendors clearly believe they have solved the riddle of small reactor economics. They are presenting novel design approaches that could lead to significant improvements in nuclear safety. For example, design concepts that I have seen thus far further advance the use of passive safety systems, applying gravity, natural circulation, and very large inventories of cooling water to reduce reliance on human intervention during an emergency. SMR designs also apply novel technologies such as integral pressure vessels that contain all major system components and use fewer and smaller pipes and pumps, thereby reducing the potential for a serious loss-of- coolant accident.¶ Very importantly, these new SMRs are much smaller than the systems designed in the 1990s; this choice was made to assure that they could be factory-built and shipped largely intact by rail for deployment. The ability to "manufacture" a reactor rather than "constructing" it on-site could prove to be a major advantage in terms of cost, schedule reliability, and even quality control.¶ But will innovations like these allow this new breed of SMRs to be successful? Maybe.¶ Many years of work remain for SMR vendors to refine their designs and allow for the development of realistic and reliable cost estimates. **This is much the same state of affairs that existed in** the **2002** time frame when DOE launched the Nuclear Power 2010 program to spur the development and certification of Generation III+ designs such as the AP-1000. At that time, the level of design completeness was insufficient to enable vendors to provide utilities with reliable cost and schedule estimates.

### Nuclear Leadership

#### Nuclear will remain uncompetitive for decades—our evidence cites industry leaders.

Hiltzik 11

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To all those who may be concerned that the catastrophic events at Japan's Fukushima Daiichi nuclear plant will derail the heralded renaissance of nuclear power in the U.S., you can relax.¶ The reason is simple: There is no renaissance.¶ Not even Exelon Corp., the nation's biggest nuclear generation company, has been holding its breath for a surge in orders or appreciable increase in new generating capacity.¶ The reason has little to do with an unreasoning public's fear of nuclear meltdowns and radiation poisoning, and almost everything to do with pure economics. As John Rowe, Exelon's chairman and chief executive, told an audience at a Washington think tank two weeks ago, you can build a new natural gas plant for 40% less than a new nuclear plant, and the price of its fuel is at rock bottom.¶ "Natural gas is queen," he says. (To be fair, Exelon also makes a lot of money from gas.)¶ In recent years, nuclear energy has been promoted as a "green," or at least greenish, alternative to coal power and other fossil-fueled generation. That's been a potent selling point as concern has mounted over the latter's effect on climate change by the production of greenhouse gases. Nuclear power is burdened by its own environmental issues, including the dangers of radioactive release into the atmosphere, but the production of carbon dioxide isn't among them.¶ Yet the technology's potential as a weapon against global warming has been as oversold, just as its virtues as safe, clean and "too cheap to meter" were during its infancy in the 1950s. To realistically make a dent in climate change, nuclear plant construction would have to take off at such a rate that it would "pose serious concerns" for the availability of construction materials, properly trained builders and operating technicians, and safety and security oversight, as a report by the Council on Foreign Relations observed in 2007.¶ "For at least a couple of decades to come, nuclear will be very uncompetitive," the report's author, Charles D. Ferguson, told me this week. Ferguson is president of the Federation of American Scientists.¶ The ongoing disaster in Japan will exacerbate social concerns about nuclear waste disposal — the on-site storage of spent fuel, which is common at U.S. plants, has complicated the situation at Fukushima — as well as concerns about the safety and security of existing plants. But those concerns have existed for years, so the spectacle of the Japanese grappling with the consequences, graphic as it is, may not in itself affect public attitudes.¶ Talk of nuclear renaissance in the U.S. had been spurred by two developments. One was the dramatic improvement in the operating record of U.S. plants. In recent years the domestic nuclear industry had been operating at close to 90% of capacity, compared with the lousy 65% record it turned in during the 1970s. The change was the product partially of the industry's consolidation into a small number of specialty operators with nuclear expertise, and it tended to reduce the apparent cost

of nuclear power to levels competitive with other sources.¶ But that also means that "people who advocate nuclear power have rose-colored glasses about its economics," says John E. Parsons of the Massachusetts Institute of Technology, the co-author of a 2009 update to a 2003 MIT report on the future of nuclear power.¶ Further encouragement came from the streamlining of U.S. licensing rules. The new procedure consolidates what formerly were separate construction and operating permits into one, removing the uncertainty that a utility might build an entire facility only to be denied permission to run it.¶ But no new plant has yet been approved under the new system, so plenty of uncertainty still exists. "An investor has to ask, 'Am I looking at a technology that works only when all the cards fall my way?'" Parsons says.¶ Despite expressions of support for nuclear power coming from political leaders, including President Obama, who is offering loan guarantees for new reactors, nuclear energy can't develop in a policy vacuum. One of the dismal ironies of the American energy program is that many of the same politicians standing foursquare behind nuclear power are also sworn opponents of policies such as a carbon tax, which would make nukes more competitive by raising the price of fossil-based alternatives.¶ For example, here's Mitt Romney. In "No Apology," the book he published last year presumably as a manifesto for his 2012 presidential campaign, Romney says he doesn't understand why nuclear power is such a "boogeyman," because America's existing plants are "trouble-free." Romney contends that nuclear plants are economically unfeasible in the U.S. only because of our "interminable permitting, regulatory and legal delays."¶ Romney should listen more to fellow businessmen like Exelon's Rowe, who would tell him that the real reason is that gas generation is cheaper, thanks to pricing that ignores such external costs of gas as pollution and climate change. Yet in his book Romney condemns policies such as the carbon tax because it would "fatten government, harm employers and employees, and hurt consumers." You can't have it both ways, Mitt.¶ Romney defends the economics of nuclear power by observing that countries with major nuclear construction programs, such as China, seem to have solved the economic conundrum without much trouble. Yet even pro-nuclear experts here acknowledge that nuclear economics don't easily cross national borders. China, which has 13 operating nuclear plants and 30 under construction, has endowed its state-owned nuclear industry with heavy subsidies.¶ According to a report by the Federation of American Scientists, China's burgeoning demand for electrical power can't effectively be satisfied from its current main source, coal, which will face a depletion crisis around the end of this decade. That makes ramping up nuclear an urgent issue for China. But in the U.S., says Andrew Kadak, the former CEO of Yankee Atomic Power Co., a New England nuclear plant operator, "we don't have that urgency because natural gas is too cheap an alternative."¶ With the construction of plants still hampered by economics, nuclear utilities are devoting more attention to improving efficiencies and increasing the output of their existing plants, a process known as "uprating." But that amounts to treading water until the social and economic difficulties of nuclear power can be addressed. And they'll have to be addressed: "It's going to be very hard to reduce carbon dioxide if nuclear is out of the picture," MIT's Parsons says. But the first step is injecting realism into the discussion. Nuclear power may be necessary to our energy future, but it won't be our savior.

### Warming

#### Enrichment Turn

#### The global nuclear renaissance will spread enrichment capabilities worldwide---but developing and exporting SMRs prevents states from acquiring the full fuel cycle

Anatoly S. Diyakov 10, Professor of Physics and Director of the Center for Arms Control Energy and Environmental Studies at the Moscow Institute of Physics, Winter 2010, “The nuclear “renaissance” & preventing the spread of enrichment & reprocessing technologies: a Russian view”, Dædalus, Vol. 139, No. 1

The anticipated growth of nuclear power around the world may lead to the spread of nuclear fuel cycle technologies as well. The expectations associated with a renewed interest in nuclear power and the rate of nuclear power growth in the world may be exaggerated; at the very least we can expect that the growth would occur not immediately, but over a long period. Nevertheless, there are definite concerns about the implications of nuclear power expansion for the nuclear nonproliferation regime. Driving these concerns is a sense that, beyond interest in nuclear power, developing countries also have an interest in retaining their right under the Nuclear Non-Proliferation Treaty (npt) to possess nuclear fuel cycle technologies. A potential spread of nuclear fuel cycle technologies, especially technologies for uranium enrichment and for reprocessing spent fuel to separate plutonium, poses a serious concern to the nuclear nonproliferation regime because enrichment and reprocessing capabilities give states the capability to produce fissile materials for weapons.

This is not a new problem. Indeed, as early as 1946, the Acheson-Lillenthal report declared that proliferation risks are inherent to the nuclear fuel cycle. If nations engage in fuel cycle activities it increases the risk of:

• Spread of sensitive technologies from declared facilities, resulting in their illegal transfer to other entities;

• Diversion of nuclear materials from declared fuel cycle facilities;

• Running a military program at undeclared fuel cycle facilities; and

• Breakout–that is, withdrawal from the npt and the subsequent use of safeguarded nuclear facilities for military purposes.

The reality of these dangers was recently demonstrated by North Korea and the A.Q. Khan network. International Atomic Energy Agency (iaea) Director General Mohamed ElBaradei has said that the fuel cycle is the “Achilles heel” of the nonproliferation system.8

Some countries have already declared their right to acquire enrichment and reprocessing technologies. This right is in fact secured for countries party to the npt. The npt does not restrict peaceful development and use of nuclear power; Article IV of the Treaty asserts, “Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes.”

However, in ensuring the right to peaceful use of nuclear energy, the npt also imposes specific obligations upon its member states. In accordance with Article II of the npt, “Each non-nuclearweapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly. ” Article III requires that each Treaty participant state “undertakes to accept safeguards . . . for the exclusive purpose of verification of the fulfillment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons.”

The right to develop the nuclear fuel cycle, afforded by the npt, is considered by some to be a loophole in the nonproliferation regime. This loophole, and recent violations of commonly accepted obligations by certain countries, raises questions about the npt’s capacity to protect international security adequately from threats that may occur.

It would be wrong to blame the authors of the npt for this loophole. Over the four decades that have passed since the npt first came into effect, the world has changed dramatically. The npt to a large extent was initially intended to prevent creation of nuclear weapons by industrially advanced countries such as West Germany, Italy, Sweden, Switzerland, South Korea, Taiwan, and others, while simultaneously providing them the bene½t of peaceful nuclear use and security guarantees. When the npt was being negotiated in the 1960s, hardly anyone could have imagined that, with time, the main actors in proliferation and the dangers arising from it would come to be those countries that had recently become liberated from Europe’s colonial dominion (at the time called “developing” or “third-world” countries) and also non-state entities– namely, terrorist organizations.

Considering that objective forces are compelling more and more countries to turn to nuclear energy to satisfy their energy needs, and that they have the right to develop the nuclear fuel cycle,

it is necessary to search for solutions that, on the one hand, would prevent proliferation of sensitive nuclear technologies and, on the other hand, would ensure interested countries guaranteed access to external sources of nuclear fuel cycle services and products.

In light of the expected broad utilization of nuclear power, the strengthening of the nonproliferation regime should be sought in two ways. One way presupposes that states abandon plans to acquire uranium enrichment and spent nuclear fuel reprocessing technologies if they do not possess them already. However, this proposal has practically no chance to be realized, at least not in the near future. Furthermore, attempts to implement it at present would be counterproductive to strengthening the nonproliferation regime, since it would require amending the npt. In other words, the npt would have to be “reopened,” and another discriminatory division among npt member states–countries permitted to have the nuclear fuel cycle and those not– would have to be created in addition to the nuclear- and non-nuclear-weapons countries division that already exists. Considering the unwillingness on the part of most non-nuclear states to undertake additional restrictions, it is dif½- cult to expect that the negotiations process, involving participation from all 140 npt member states, would be successful. Many countries believe that restrictions on development of technologies should be universal for all npt participant states, and should not permit some to develop technologies while prohibiting others. For example, Canada has no enrichment plants at present, although it is considering the possibility of creating an enrichment facility for production of low-enriched uranium for its candu reactors. Brazil, which does have an active enrichment program, would be permitted to have it. Efforts to create and enforce this further division would do more to weaken the npt than it would to strengthen it. As the example of Iran shows, additional division of states into those permitted to have enrichment and reprocessing and those forbidden not only undermines the unity of npt member countries, but also facilitates development of a black market for nuclear technologies.

The second way to strengthen the regime entails switching to innovative nuclear power technologies that could sustain the nonproliferation regime by means of inherent physical and technological properties. This would require development of new types of power reactors and the fuel cycles for them. To this end, work is presently being conducted through a number of international programs, including the International Project on Innovative Nuclear Reactors and Fuel Cycles (inpro), Generation IV, and gnep+anfc. However, progress has been slow in these programs, and the possibilities for the creation and use of such innovative nuclear technologies lie in the distant future. Therefore, the expansion of nuclear power in the world, even if started by 2020 to 2025, will be based on the use of light water reactors and existing fuel cycle technologies. Taking into account the current trend toward increasing the operational lifetime of nuclear power reactors up to 60 or 70 years, it becomes obvious that there is a need to ½nd such solutions that could work during a period of at least a century.

# 2nc

## MOX

### 2nc light water links

#### SMR development now, but near-term subsidies lock in inferior light water models

**Spencer and Loris 2011** – Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies, Research Associate in the Roe Institute, at The Heritage Foundation (2/2, Jack and Nicolas, Heritage, Backgrounder, “A Big Future for Small Nuclear Reactors?”, WEA)

Small modular reactors (SMRs) have garnered significant¶ attention in recent years, with companies of¶ all sizes investing in these smaller, safer, and more¶ cost-efficient nuclear reactors. Utilities are even forming¶ partnerships with reactor designers to prepare for¶ potential future construction. Perhaps most impressive¶ is that most of this development is occurring¶ without government involvement. Private investors¶ and entrepreneurs are dedicating resources to these¶ technologies based on their future prospects, not on¶ government set-asides, mandates, or subsidies, and¶ despite the current regulatory bias in favor of large¶ light water reactors (LWRs).

The result is a young, robust, innovative, and growing¶ SMR industry. Multiple technologies are being¶ proposed that each have their own set of characteristics¶ based on price, fuel, waste characteristics, size,¶ and any number of other variables. To continue this¶ growth, policymakers should reject the temptation to¶ offer the same sort of subsidies and government¶ programs that have proven ineffective for large¶ LWRs. While Department of Energy cost-sharing¶ programs and capital subsidies seem attractive, they¶ have yet to net any new reactor construction.

#### Plan eliminates incentives to improve designs

**Spencer and Loris 2011** – Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies, Research Associate in the Roe Institute, at The Heritage Foundation (2/2, Jack and Nicolas, Heritage, Backgrounder, “A Big Future for Small Nuclear Reactors?”, WEA)

Government Intervention. Too many policymakers¶ believe that Washington is equipped to¶ guide the nuclear industry to success. So, instead¶ of creating a stable regulatory environment where¶ the market value of different nuclear technologies¶ can determine their success and evolution, they¶ choose to create programs to help industry succeed.¶ Two recent Senate bills from the 111th Congress,¶ the Nuclear Energy Research Initiative¶ Improvement Act (S. 2052) and the Nuclear¶ Power 2021 Act (S. 2812), are cases in point.¶ Government intervention distorts the normal¶ market processes that, if allowed to work, would¶ yield the most efficient, cost-effective, and appropriate¶ nuclear technologies. Instead, the federal¶ government picks winners and losers through¶ programs where bureaucrats and well-connected¶ lobbyists decide which technologies are permitted,¶ and provides capital subsidies that allow¶ investors to ignore the systemic problems that¶ drive risk and costs artificially high. This¶ approach is especially detrimental to SMRs¶ because subsidies to LWRs distort the relative¶ benefit of other reactor designs by artificially lowering¶ the cost and risk of a more mature technology¶ that already dominates the marketplace.

#### First customer is key because of design competition—the plan locks in supplier advantage

**Yurman 2012** (2/22, Dan, The Energy Collective, updated coverage from Fuel Cycle Week, V11:N460 published by International Nuclear Associates, “SMR developers are racing to the market”, http://theenergycollective.com/dan-yurman/77332/smr-developers-seek-investors-and-customers, WEA)

Developers of small modular reactors (SMRs) of both the light water and fast neutron flavors are in a race to get to market. The reason is a hypothetical SMR producing 100 MW electrical, costing $4,000/Kw to build, is not a 'bet the company investment', making it attractive for a mid-size utility.¶ Further, the revenue from the first one can pay for the next unit, and so on, which is why they are marketed as "modules." Investors in utilities like the idea of step-wise capital spending at a conservative scale relative to market valuation and ramping up a commitment to nuclear energy in stages rather than 1,000 MW at a time.¶ Key milestones for success by SMR vendors are securing investors to complete their technology, jumping through the NRC's licensing hoops, and booking that all important first customer. SMR developers see themselves primarily as vendors, and not as nuclear reactor utility operators. However, some may wind up in a hybrid role to get their first sale on the books.

#### We would use MOX because there’s a joint mandate with Russia and it’s abundant

**Yurman 9/10**/2012 – (Dan, The Energy Collective, “Calling Out Red Herrings about MOX Fuel for TVA”, http://theenergycollective.com/dan-yurman/111276/calling-out-red-herrings-about-mox-fuel-tva?ref=node\_other\_posts\_by, WEA)

The conversion of the plutonium is part of a joint program with Russia to dismantled nuclear weapons. The agreement was signed in 2000. The $4.8 billion U.S. MOX fuel plant is being built in South Carolina by a consortium of The Shaw Group and Areva. In France Areva has over two decades of experience making MOX fuel. ¶ If TVA decides to use MOX, it could eventually replace up to 40 percent of the fuel assemblies in the cores of its Sequoyah and Browns Ferry reactors. The two Sequoyah reactors are pressurized water reactors with 193 fuel assemblies each. The three Browns Ferry reactors are boiling water reactors with 764 fuel assemblies each.¶ The DOE’s MOX plant is expected to produce the equivalent of 1,700 PWR assemblies to dispose of 34 tonnes of surplus plutonium. At a projected output rate of up to 70 metric tons heavy metal per year, the MOX facility may produce more fuel than TVA’s five reactors could consume. ¶ Two other nuclear utilities – Duke and Energy Northwest, are also considering using MOX fuel. One of the key issues all three utilities have is reliable fuel services. This means that if the utilities decide to use the MOX fuel, it must be ready when the reactors have their scheduled fuel outages. Energy Northwest has reliable fuel services lined up for a number of years. For this reason earlier this year it cancelled a study to be carried out by PNNL to look at the issue.¶ TVA won’t start out at the 40-percent core replacement level. The initial replacement level for the reactors will be about 8 assemblies of MOX fuel. Ramp up time to the 40-percent level depends on the DOE’s production schedule, how well the MOX works, and cost factors, among others. TVA does not expect to load MOX fuel before 2018. ¶ Explaining MOX to the public¶ One of the challenges that TVA faces is that the public perceptions of using plutonium as fuel needs some explaining. TVA starts by describing that MOX is a mix of uranium and plutonium. MOX has about 4-percent plutonium oxide (of which 94 percent is Pu-239) and the rest is depleted uranium oxide. ¶ Commercial nuclear fuel starts as uranium oxide. What many people do not know, is that plutonium is a normal byproduct in nuclear reactors that fission uranium.

### 2nc MOX bad

#### Reinstating MOX fuel wrecks non-prolif agreements and leads to fissile diversion and environmental contamination—military connections and short-term profit motives magnify the risk

**Zeller et al 2005** – Science Director for Blue Ridge Environmental Defense League, \*\*founder of Ecodefense, \*\*\*Institute for International Environmental Safety, \*\*\*\*International Panel on Fissile Materials, \*\*\*\*\*leader of the Movement for Nuclear Safety in Chelyabinsk (5/11, Louis Zeller, Vladimir Slivyak, Konstantin Kozlov, Masa Takubo, Natalia Mironova, Statement to the Review Conference of the Parties to the Nuclear Non-Proliferation Treaty, “Prevent the Reprocessing of Military Plutonium Wastes into Fuel”, http://www.nirs.org/reactorwatch/mox/jstate051105.htm, WEA)

We hereby stand opposed the reprocessing of plutonium for fuel because it presents unsupportable risks to public safety and the environment, and undermines the goal of nuclear non-proliferation. Manufacturing plutonium fuel (MOX, see end note) would create vast amounts of waste. And, plutonium fueled reactors would create an unsolvable international nuclear security dilemma.¶ The authors of this presentation appreciate this opportunity to expand upon these concerns and to propose alternatives to the 2005 Review Conference of the Parties to the Nuclear Non-Proliferation Treaty.¶ Human Health Problems at Two of the Most Polluted Places on Earth¶ The Savannah River Site in South Carolina is an 802 square kilometer complex polluted by five decades of atomic weapons manufacturing. Up to 100 million curies of tritium were released over the decades, contaminating the region’s drinking water. And 490 million curies of liquid high level radioactive waste are stored in underground tanks.[7] Near the Savannah River Site, the death rate is 19.8% above normal, largely from heart disease and cancer;[8] both are associated with ionizing radiation.[9]¶ The industrial complex at Mayak produced plutonium for the first Soviet atomic bomb. For over 40 years the Siberian Chemical Combine pumped more than 1 billion Curies of radioactive poisons into underground aquifers. Today there are about 200 million Curies of radionuclides including plutonium in open basins, pulp repositories, and burial grounds.[10] The Techa River passes through many villages before discharging radioactive waste into the Arctic Ocean. Many residents have been evacuated, but one village remains inhabited: Muslumovo. The people of this town, which is closer to Mayak than many of the evacuated villages, have been left behind; they believe they have been singled out as Muslim “guinea pigs” in a horrible radioactive experiment.[11] At the request of NGOs, on April 11, 2005 the General Prosecutor of Russia started a criminal investigation of liquid waste dumping into the Techa River by plutonium manufacturing enterprises in the Chelyabinsk oblast of Russia.¶ New Threats¶ Now Minatom wants to build a new plutonium fuel factory on the site of the Siberian Chemical Combine. The technology of the French firm COGEMA was adopted for Russian plant[10]. This year, the US Nuclear Regulatory Commission granted a license to construct a similar factory at the Savannah River Site in South Carolina.¶ Plutonium fuel production would create enormous amounts of radioactive waste. Official estimates are that 82,000 liters of high activity radioactive waste containing 84,000 Curies of americium, 174,000 liters of plutonium- and uranium-bearing wastes, and 1.4 million liters of low-level radioactive waste would be produced annually.[12]¶ Security and Safety Problems¶ Plutonium fuel requires transportation of weapons grade plutonium and fresh fuel across thousands of miles of open country. According to the only independent study on nuclear transportation produced in Russia, there is a serious risk of accident on railroads that may lead to plutonium contamination of the environment.[13] In the US, Duke Energy got an exemption from post-9/11 security measures for its plutonium fuel test reactor.[14]¶ Plutonium utilization in aging Russian VVER-1000 reactors is dangerous and may lead to proliferation from civil reactor sites.[15] American plants are no better. Duke Energy reactors depend on unreliable baskets of ice for cooling during an emergency. Plutonium makes a poor fuel because it is difficult to handle, store, and transport.[16]¶ Alternatives¶ There is an alternative to plutonium fuel: immobilization. Mixing the plutonium with liquid glass and radioactive waste, would avoid the risks to human health caused by plutonium reactors. It would save hundreds of millions of dollars. And, it would return us to a more sensible non-proliferation policy.¶ American and Russian environmental groups strongly oppose the plutonium fuel program. In the US, citizens called upon the Governor of South Carolina to stop plutonium fuel shipments.[5] In Russia 83% of the residents of Tomsk are opposed to a plutonium facility.[6]¶ Our united view is:¶ 1. Plutonium must not be used as fuel in civil reactors.¶ 2. Plutonium must be kept at well-protected sites.¶ 3. Plutonium must be immobilized in the future to prevent smuggling and re-use in nuclear weapons.¶ Basis for Action by the Review Committee¶ The Thirteen Steps provides a foundation for opposing plutonium reprocessing. Step 10 calls upon nuclear weapons states to place fissile material no longer required for military purposes under international verification.[2] But the Surplus Plutonium Disposition program now underway in the US and Russia would transfer fissile material from public, governmental management to private, commercial control. We believe that plutonium would no longer be subject to effective international verification if it is turned over to Duke Energy, an investor-owned American utility, and COGEMA, a French reprocessing corporation.¶ Further, we agree with those who advocate expanding the scope of a Fissile Materials Cutoff Treaty to include a ban on civilian plutonium production.[3] Paul Leventhal, President of the Nuclear Control Institute, described the birth of the plutonium reprocessing chimera when he said,¶ There is a long and troubling history that has brought us to this present state of affairs. The original assumptions about the scarcity of uranium and the inevitability of the plutonium-breeder reactor have proven false, but the original dream of plutonium as the key to limitless energy has not faded. It is nurtured by a handful of powerful, government-run companies that seek to impose a plutonium-fuel economy on the world.¶ The nightmare of plutonium energy is not limited to the nuclear weapons states. In this context it is vital that the Rokkasho reprocessing plant in Japan, planned to open in 2007 as the first commercial-scale plant in a non-nuclear-weapon state, should be abandoned.¶ And regarding the dangerous example of how the superpowers are disposing of their warhead plutonium, we pray this body heeds the words of John D. Holum, former Director of the US Arms Control and Disarmament Agency, who warned that other countries “would hear only one message for the next 25 years: that plutonium use for generating commercial power is now being blessed by the United States.”[4]¶ Conclusion¶ The plutonium fuel program undermines international agreements for nuclear non-proliferation. The circulation of plutonium fuel in the commercial sector would increase the risk of diversion. There is no way to ensure that plutonium reprocessing facilities for electric power will not be turned to military use.¶ Natalia I. Mironova, President of the Movement for Nuclear Safety in Chelyabinsk, said that nuclear technology companies are driven by a profit motive which conflicts with the nuclear non-proliferation system. We submit that a global movement for a world without nuclear weapons must also halt the drive for plutonium power.

#### Tanks prolif cred

**NIRS 2011** – no explicit date given but cites articles as recent as April (Nuclear Information and Resource Service, “The Military-Industrial-Utility Complex and the NIX/MOX Campaign”, http://www.nirs.org/reactorwatch/mox/mox.htm, WEA)

The U.S. Department of Energy is preparing to use plutonium-based (or MOX--mixed oxide) fuel in commercial nuclear reactors. In addition, the DOE is producing tritium for nuclear weapons in civilian reactors operated by Tennessee Valley Authority. These far-reaching steps violate every non-proliferation principle advanced by the U.S. government for decades.

NIRS is unalterably opposed to the use of MOX fuel and the production of tritium in commercial reactors. Use of MOX would contribute to the worldwide "plutonium economy," and would undercut our non-proliferation efforts worldwide. In addition, it would produce more plutonium in so-called "low-level" radioactive waste, exacerbate utility decommissioning efforts and increase costs, expose more people to danger from plutonium through frequent shipments across railways and highways, and increase electricity costs.

Similarly, production of tritium in commercial reactors is little more than a scheme to allow uneconomic reactors to operate with increased government subsidies. Further, it would break down any remaining barrier between commercial and military uses of nuclear energy--leaving us with a new, and frighteningly powerful military-industrial-utility complex.

#### The MOX program crushes global nuclear security by making plutonium abundant—the alternative is safe immobilization

**Lyman and Carroll 2011** – \*Union of Concerned Scientists senior scientist, \*\*Nuclear Watch South coordinator (4/1, Nuclear Information and Resource Service, press release, “SERIOUS SECURITY ISSUES AT MOX PLUTONIUM FACTORY RECOGNIZED BY REGULATORS”, http://www.nirs.org/reactorwatch/mox/moxplutoniumpr040111.pdf, WEA)

The MOX plutonium fuel factory at SRS proposes to utilize up to 50 metric tons of surplus weaponsgrade plutonium to produce an experimental reactor fuel called MOX. A nuclear bomb like the one at ¶ Nagasaki, Japan, requires only 15 pounds of plutonium. Plans for nuclear weapons are available on the ¶ internet therefore plutonium security is paramount to national, even global, security. The U.S. MOX ¶ plutonium program is already in disarray as the MOX factory design is still unfinished, MOX factory ¶ construction is more than 10 years behind schedule and is costing taxpayers $500 million per year.¶ A test of weapons-grade MOX plutonium fuel assemblies failed in Duke Power's Catawba reactor in 2008 ¶ and Duke withdrew from the MOX program. DOE still does not have any other reactors lined up to use ¶ the proposed MOX plutonium fuel but is considering MOX use in Tennessee Valley Authority‟s Browns ¶ Ferry‟s GE Mark I reactors in Alabama. Permission to use MOX plutonium fuel would require reactor ¶ licensees to undergo years of testing and licensing by the NRC. The Browns Ferry reactors are of the ¶ same design which failed in the nuclear disaster unfolding at Fukushima, Japan. Unit 3 at Fukushima was ¶ loaded with “reactor-grade” MOX in September 2010.¶ Nuclear Watch South and environmentalists continue to call for plutonium immobilization in the ¶ glassification process for 60-year-old inventories of high-level radioactive waste in underground storage ¶ tanks at SRS as the preferable alternative to MOX plutonium.

## Warming

### Enrichment turn

#### U.S.-exported SMRs replace indigenous enrichment capability---they’re black-boxed

ITA 11 – International Trade Administration, U.S. Department of Commerce, February 2011, “The Commercial Outlook for U.S. Small Modular Nuclear Reactors,” http://trade.gov/mas/ian/build/groups/public/@tg\_ian/@nuclear/documents/webcontent/tg\_ian\_003185.pdf

Another potential long-term strength of SMRs is that some designs could also support nuclear non-proliferation objectives. All U.S. SMRs are designed to be deployed in an underground configuration. Industry observers contend that this would limit the risk for aboveground sabotage (which is a serious consideration for traditional nuclear power plants) or for radioactive release. The fuel cycle (particularly uranium enrichment and reprocessing) is where most non-proliferation concerns lie. The U.S. SMRs likely to be deployed in the near term are similarly fueled as the existing LWRs, but some U.S. vendors argue that the United States could exercise greater influence in the global nuclear fuel trade if U.S. SMR technology were widely deployed.

Some U.S. SMR vendors claim that their designs could be “black boxed” (that is, they could be deployed already fueled), and once the fuel is spent, the entire unit could be shipped back to the factory for waste handling and reprocessing. If the responsibility for the fuel cycle is taken out of the hands of the reactor operator, then risks of proliferation could potentially be reduced. Significant technical issues, however, remain unsolved for this concept, and there are serious outstanding questions involving transportation, waste handling, safety, and security. Although an attractive idea, such designs are unlikely to be deployed in the near or mid term.

#### Global expansion of enrichment capability is the only way nuclear power can offset enough carbon emissions to solve climate change

Sharon Squassoni 9, Director and Senior Fellow of the Proliferation Prevention Program at CSIS, 3/25/9, “Nuclear Power: How Much More?,” http://www.npolicy.org/article.php?aid=176&rid=2

The amount of nuclear capacity required to make a signification contribution to global climate change mitigation is so large that it would inevitably be widely distributed across the globe. Such a distribution would have particular implications for nuclear proliferation. However, projected distributions of nuclear energy out to 2050 are extremely speculative. The industry itself does not engage in such projections, and countries that set nuclear energy production goals have a history of widely missing long-range targets, such as China and India. The discussion below considers a hypothetical distribution of nuclear energy for 2050, based on the 2003 MIT Study. [12]

Scenario III, shown in Figure 7, uses the “High 2050” scenario in Appendix 2 (“Global Electricity Demand and the Nuclear Power Growth Scenario”) of the 2003 MIT study, The Future of Nuclear Power. Although this is not a distribution designed to achieve optimal CO2 reductions, it is expansion at a level significant enough (1500 GWe) to have an effect on CO2 emissions. This would mean a fourfold increase from current reactor capacity.

The MIT study used an underlying assumption that the developed countries would continue with a modest annual increase in per capita electricity use and the developing countries would move to the 4000 kWh per person per year benchmark if at all feasible (the 4000 kWh benchmark being the dividing line between developed and advanced countries). Electricity demand was then pegged to estimated population growth. Finally, it was assumed that nuclear energy would retain or increase its current share of electricity generation. The least-off developing countries were assumed in the MIT study not to have the wherewithal for nuclear energy. It should be noted that MIT’s 2050 projection was “an attempt to understand what the distribution of nuclear power deployment would be if robust growth were realized, perhaps driven by a broad commitment to reducing greenhouse gas emissions and a concurrent resolution of the various challenges confronting nuclear power’s acceptance in various countries.” A few countries that the MIT High 2050 case included but are not included here are countries that currently have laws restricting nuclear energy, such as Austria.

Implications for Uranium Enrichment

A fourfold expansion of nuclear energy would entail significant new production requirements for uranium enrichment as shown in Figure 8 and possibly, reprocessing. The MIT study anticipated that 54 states would have reactor capacities that could possibly justify indigenous uranium enrichment. If a capability of 10 GWe is considered the threshold at which indigenous enrichment becomes cost-effective, more than 15 additional states could find it advantageous to engage in uranium enrichment.

Figure 9 depicts what the geographic distribution of enrichment capacity might look like, based on the development of 10 GWe or more of reactor capacity. Of course, some states – such as Australia or Kazakhstan – might opt to enrich uranium regardless of domestic nuclear energy capacity, choosing to add value to their own uranium exports. In addition, states may choose to take the path of the UAE, which has formally renounced domestic enrichment and reprocessing in its domestic law, despite aspiring to reach 10 GWe of capacity. Ultimately, these decisions lie very much in the political realm, and can be reversed.

#### Most prolif risks are from reprocessing, not enrichment---but reprocessing won’t spread globally because of cheap uranium to enrich

Michael Spies 7, research associate with the Acronym Institute for Disarmament Diplomacy, 2007, “Climate Change and Nuclear Power,” <http://wmdreport.org/ndcs/online/NuclearDisorderPart3Section1.pdf>

The reprocessing of spent reactor fuel, specifically in order to separate and recycle plutonium for re-use in reactors as mixed-oxide fuel (MOX), could lead to greater proliferation challenges than uranium enrichment. All commercial nuclear power reactors produce plutonium as a by-product. Plutonium separated from spent fuel is directly usable in a nuclear weapon. Moreover, it is estimated that a developing state with a relatively primitive weapons program can construct a bomb out of only eight kilograms of plutonium, compared to 25 kg of U-235 enriched above 90%. An estimated 238 tons of separated plutonium existed in civilian nuclear programs worldwide at the end of 2003, enough for nearly 30,000 nuclear weapons.16

Even safeguarded plutonium reprocessing facilities are risky from a non-proliferation perspective. Present difficulties in material accountancy at large-scale plutonium reprocessing plants create unacceptably large margins of errors in calculating the amount of material unaccounted for, complicating efforts to credibly and confidently apply safeguards." For example, a 1990 study by MIT nuclear researcher Marvin Miller examined the effectiveness of material accountancy for the then-planned industrial scale Rokkasho reprocessing plant in Japan. Miller demonstrated that the annual measurement error for input material into the plant, calculated to be about 1%, amounts to the equivalent of 72 kg of plutonium, enough material for at least a dozen nuclear weapons. ,s

Fortunately, due to the high costs of operating reprocessing plants and the availability of inexpensive uranium, the spread of such facilities has been very limited. The only non-nuclear weapon possessing state to operate a commercial-scale reprocessing plant is Japan. This trend is likely to hold. The MIT study concludes that, based on the availability of uranium resources and expected technological advances aiding its recovery, resorting to reprocessing will be unnecessary to meet the fuel service needs of the world's nuclear reactors for the lifetime of the plants they envision in their 1,000 gigawatt growth scenario.1\* These factors point to the undesirability of spent fuel re-processing in the near to midterm and should propel efforts to permanently limit its spread and phase out its use.

The contribution that nuclear power will actually make to reducing carbon emissions over the next few decades depends upon how rapidly it can be scaled up, and recent history is sobering. The existing global fleet of 436 commercial nuclear power reactors, with a total net installed capacity of about 370 GWe, provides about 16 percent of the world’s supply of electricity today. Depending on how the accounting is done, the emissions avoided by the nuclear fleet amount to about 650 million tons of carbon per year, or 9 percent of the current global emissions total. 8 But it has taken about 40 years for the nuclear industry to reach this level, and in the future the rate of expansion will need to be much faster if nuclear is to play a significant role in reducing carbon emissions. In business-as-usual scenarios published by the International Energy Agency and separately by the ipcc, CO2 emissions are expected to reach about 41 gigatons (GT) per year (that is, 45 percent above today’s level) by 2030 and perhaps 45–50 GT (60–80 percent above today’s level) by 2050. 9 If new nuclear power plants were called upon to eliminate, say, 25 percent of the increase in CO2 emissions that would otherwise occur in these business-as-usual scenarios, roughly 700–900 GWe of new nuclear capacity would have to be added by 2050. 10 In other words, in order to achieve the goal of displacing one quarter of the projected increase in carbon emissions, at least twice as much nuclear capacity would have to be built in the next 40 years as was built in the last 40. In fact, since many existing nuclear plants will reach the end of their useful life during this period and will have to be replaced, the actual requirement would be closer to three times the earlier result

### 2NC UQ

#### Enrichment will spread globally now---60 countries are increasing nuclear capacity---will provide large global enrichment capacity

Olli Heinonen 12, Senior Fellow, Belfer Center for Science and International Affairs, 3/22/12, “"The Nuclear Non-Proliferation Regime Challenged",” http://belfercenter.ksg.harvard.edu/publication/21850/nuclear\_nonproliferation\_regime\_challenged.html

Let me start by assessing the impact of a nuclear renaissance on non-proliferation efforts. There are currently about 435 nuclear power reactors in the world. According to IAEA estimates[1], 60 countries are considering using nuclear power by 2030 25 of them are countries which do not currently have any nuclear plants. The conservative estimate on the total number of power reactors expected to come online by 2030 is 90[2]. The higher projections is as high as 350 power reactors by 2030. This will have a significant impact to the IAEA program as a whole covering nuclear safety, security, and safeguards.

While the Fukushima nuclear crisis reversed the course of nuclear energy in some countries such as Japan, Germany, and Italy, many other countries, including our host, the Republic of Korea, continue to rely on nuclear energy to power their economies and industry. Nuclear energy continues to remain part of their energy security mix, and expanded nuclear energy growth can be expected to continue, accompanied by more stringent scrutiny given to the “3-Ss”.

So what needs to be done to ensure that nuclear energy is used in a safe, secure and proper manner. There are various ways to mitigate proliferation risks associated with the expansion of nuclear energy, particularly with regard to enrichment and spent-fuel handling, such as providing assurances on fuel supply and developing fuel take back options[3]. The experiences at Fukushima do support the case for a permanent solution to centralized, long-term storage or disposal of spent fuel.

The idea of multinational enrichment centres is an important step, but one that needs to overcome certain hurdles. As things currently stand, there is no shortage of uranium enrichment services. The establishment of multinational enrichment centres (MNC) to politically unstable regions will not be an attraction to technology holders and investors. Technology holders may worry about risks associated with “hijacking” their technologies. We should also keep in our minds that A Q Khan got access to knowhow while serving in a multinational enterprise, URENCO. In other words, while MNCs and new enrichment technologies such as SILEX[4] should be pursued, emphasis should be made in parallel to ensure that there are adequate commercially attractive enrichment services available to minimize the need to build unnecessary enrichment plants. That said, despite whatever incentives offered, a (hopefully) small number of states could still choose to build their own domestic enrichment capabilities. Individual and targeted approaches will be needed to address these cases.

#### Enrichment will spread globally with new nuclear programs---tech development will make it economically viable---but no risk of prolif because new nuclear states will accept safeguard agreements---and, the U.S. will try to prevent enrichment spread, but fail now

Justin Alger 10, researcher at the Canadian Centre for Treaty Compliance (CCTC) at Carleton University in Ottawa, Canada, and Trevor Findlay, the William and Jeanie Barton Chair in International Affairs and director of the CCTC at Carleton’s Norman Paterson School of International Affairs, Fall 2010, “Strengthening Global Nuclear Governance,” Issues in Science & Technology, Vol. 27, No. 1, http://www.issues.org/27.1/alger.html

Because all of the aspiring developing states, along with all other nonnuclear weapon states, are party to the NPT and have comprehensive safeguards agreements, they will be required to apply nuclear safeguards to all of their power reactors and associated facilities. In addition, there will probably be strong pressure on such states to conclude an Additional Protocol to their comprehensive safeguards agreement, making illicit diversion or a hidden clandestine nuclear weapons program more difficult than in the past. Most have, in fact, either signed one or already have one in force. However, key aspiring states—Egypt, Oman, Qatar, Saudi Arabia, Syria, and Venezuela—have not yet signed one, which is of some concern.

The most worrying development would be if the new entrants seek the full nuclear fuel cycle, including uranium enrichment and plutonium reprocessing, which can be used to make reactor fuel or nuclear weapons. Jordan is reportedly resisting the UAE model of foregoing such options, because it may wish to enrich its own domestic uranium resources at some stage rather than relying on others for enrichment services. Turkey has also raised this possibility. One developing country with nuclear power already, Brazil, has its own enrichment plant and is an NPT party but refuses to sign an Additional Protocol. Joint enrichment plans by Argentina and Brazil are being aired. South Korea is pressing the United States to support its plans to reprocess plutonium using an allegedly more proliferation-resistant technology called pyroprocessing.

The quest for energy security is helping legitimize demands for the full fuel cycle. New enrichment technologies such as laser separation may attenuate the current technological and cost barriers. The resistance of key developing states to IAEA and Russian attempts to establish nuclear fuel banks that would provide assurances of supply of nuclear reactor fuel has added to concerns that the future of nuclear energy faces a major political impasse. This is partly driven by anti-Western political gamesmanship by Cuba, Iran, Pakistan, and Syria, but also by genuine developing-country fears that they are being deprived of valuable technological options.

Although the NPT guarantees its parties the “inalienable right to the peaceful uses of nuclear energy,” this is conditional on the acceptance of nuclear safeguards and does not oblige any state to share any particular technology with any other. The United States and other countries, including key members of the G8 and the Nuclear Suppliers Group, are seeking to prevent additional states from acquiring enrichment or reprocessing capabilities, sometimes to the chagrin of even their allies such as Canada. One proposal for resolving this issue over the long term is for the existing possessors of such technology to give up their national capabilities through multilateralization or internationalization of these “sensitive” aspects of the nuclear fuel cycle. Numerous proposals are on the table for pursuing this vision, but its realization would involve enormous compromises on all sides. The issue ultimately reflects the bitter division between the nuclear haves and have-nots that is embedded in the NPT, a resolution of which can come only with the achievement of nuclear disarmament.

### 2NC

#### SMRs cause a global hub and spoke nuclear trade where only a few countries enrich uranium---that collapses both global enrichment capacity and the technical expertise that supports it---means even if countries wanted to restart enrichment later they couldn’t

Ioannis N. Kessides 12, Lead Economist in the World Bank's Development Research Group, and Vladimir Kuznetsov, Consultant, the World Bank, 2012, “Small Modular Reactors for Enhancing Energy Security in Developing Countries,” Sustainability, Vol. 4, No. 8, p. 1806-1832

The extent to which nuclear power will prove an acceptable and enduring option for meeting the future energy requirements worldwide will depend in part upon the ability of the international community to minimize the associated proliferation risks. A major nuclear expansion program, unless is accompanied by adequate technical and institutional safeguards, could increase the risk that weapons-usable fissile materials, facilities, technology, or expertise might be diverted or stolen. The common fear is that such an expansion will make it easier for countries to acquire technology as a precursor to developing nuclear weapons capability or for terrorist groups to obtain nuclear materials. This risk could be further compounded by the likelihood that plutonium-fueled breeder reactors will be widely used to stretch uranium resources under expanded nuclear power deployment. Enhanced capacity and institutional arrangements to prevent proliferation and diversion of nuclear technology to non-peaceful purposes are challenges that will need to be overcome if nuclear energy is to be expanded in developing countries

One potential way of mitigating the proliferation risks of expanded nuclear deployment in developing countries might be through the adoption of hub-and-spoke configurations that restrict all sensitive activities (such as isotope separation of uranium or reprocessing of spent fuel) to large, international/regional energy parks that would export fuel, hydrogen, and even small (40–50 megawatts) sealed reactors to client states [30,31]. These reactors would be assembled and fueled at the central nuclear park, sealed (so that individual fuel assemblies could not be removed) and delivered as a unit to the power plant cites of client countries. At the end of their core life (say 15–20 years) the reactors would be returned to the central park unopened. Thus, during the 15–20 years of operation there would be no refueling and consequently the client countries would need no fuel fabrication facilities and management capabilities. To the extent that such modular reactors would operate almost autonomously, the hub-and-spoke architecture could reduce substantially the rationale and opportunities for countries to develop nuclear research laboratories and train technical specialists and scientists whose know-how could later be diverted to weapons activities [32]. It should be noted that providing attractive alternatives to the buildup of indigenous facilities is a good idea. However, trying to restrict knowledge diffusion is arguable futile and non-sustainable.

### No Reprocessing Spread

#### Most prolif risks are from reprocessing, not enrichment---but reprocessing won’t spread globally because of cheap uranium to enrich

Michael Spies 7, research associate with the Acronym Institute for Disarmament Diplomacy, 2007, “Climate Change and Nuclear Power,” <http://wmdreport.org/ndcs/online/NuclearDisorderPart3Section1.pdf>

The reprocessing of spent reactor fuel, specifically in order to separate and recycle plutonium for re-use in reactors as mixed-oxide fuel (MOX), could lead to greater proliferation challenges than uranium enrichment. All commercial nuclear power reactors produce plutonium as a by-product. Plutonium separated from spent fuel is directly usable in a nuclear weapon. Moreover, it is estimated that a developing state with a relatively primitive weapons program can construct a bomb out of only eight kilograms of plutonium, compared to 25 kg of U-235 enriched above 90%. An estimated 238 tons of separated plutonium existed in civilian nuclear programs worldwide at the end of 2003, enough for nearly 30,000 nuclear weapons.16

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Fortunately, due to the high costs of operating reprocessing plants and the availability of inexpensive uranium, the spread of such facilities has been very limited. The only non-nuclear weapon possessing state to operate a commercial-scale reprocessing plant is Japan. This trend is likely to hold. The MIT study concludes that, based on the availability of uranium resources and expected technological advances aiding its recovery, resorting to reprocessing will be unnecessary to meet the fuel service needs of the world's nuclear reactors for the lifetime of the plants they envision in their 1,000 gigawatt growth scenario.1\* These factors point to the undesirability of spent fuel re-processing in the near to midterm and should propel efforts to permanently limit its spread and phase out its use.

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## Leadership

### Backlash

#### The status quo solves prolif, but pushing a single reactor design causes backlash that jacks U.S. cred

Nader Elhefnawy 8, Professor of English at the University of Miami, writer on IR published in journals including International Security, Astropolitics, and Survival, Autumn 2008, “The Next Wave of Nuclear Proliferation,” Parameters: The US Army War College Quarterly

It would be a mistake to focus excessively on any one track for ameliorating the risk of proliferation. When all is said and done, the current monitoring mechanisms will remain, and so will the maintenance of a stable security environment. Individual cases will require tailored solutions. Nonetheless, the spread of nuclear energy production means a significantly enlarged number of countries will have access to the full nuclear fuel cycle. There are then two primary ways to ameliorate the associated threats. One is to seek methods of nuclear energy production that are inherently proliferation-proof, as may be the case with “Generation IV” nuclear reactors. The other is to reduce the need for nuclear energy production, by making overall energy consumption more efficient, and by increasing production from alternative, nonfossil fuel sources. New Reactor Designs Some experts argue that the next-generation (Generation IV) reactor designs will reduce the proliferation risks associated with nuclear energy production. Advocates of next-generation fast-neutron reactors argue that they could provide more efficient energy production. This would enable them to recover up to 99 percent of the energy from their fuel, allowing them to use smaller quantities and a greater variety of fuel types, including natural uranium and possibly even depleted uranium. 31 They would also generate less waste (perhaps only one percent), containing only trace amounts of the transuranics needed for weapons manufacture, than other reactors of similar capacity. 32 This would permit “pyroprocessing,” a different, possibly cheaper, approach to reprocessing fuel that is less suitable for weapons manufacture. 33 Finally, these different procedures will permit onsite fuel fabrication, fuel recycling, and waste processing, something current reactor fuel cycles do not allow, reducing the transportation and security problems. While appearing to be a panacea for many of nuclear power’s problems, these designs will not be commercially viable until at least 2030. Additionally, despite their obvious advantages, pressuring states to adopt reactors of any given type raises many of the same political issues as the schemes associated with restricting a potential proliferator’s access to nuclear fuel— especially given the fact that established nuclear powers, based on their intention of retaining their current nuclear arsenals, are almost certain to continue operating their existing reactors.

### Inspections

#### Lack of effective inspections turns the whole case---makes SMRs worse for prolif, safety and security than large reactors

Dr. Edwin Lyman 11, Senior Scientist, Global Security Program, Union of Concerned Scientists, July 14, 2011, Testimony Before the Energy and Water Development Subcommittee, Committee on Appropriations, U.S. Senate, “An Examination of the Safety and Economics of Light Water Small Modular Reactors,” http://www.ucsusa.org/assets/documents/nuclear\_power/lyman-appropriations-subcom-7-14-11.pdf

Proponents of small modular reactors (SMRs) claim that their designs have inherent safety features compared to large reactors, and some even argue that their reactors would have been able to withstand an event as severe as Fukushima. We find these claims to be unpersuasive. For any plant, large or small, the key factor is the most severe event that the plant is designed to withstand—the so-called maximum “design-basis” event. Unless nuclear safety requirements for new reactors are significantly strengthened, one cannot expect that either small or large reactors will be able to survive a beyond-design-basis event like Fukushima. Although some light-water SMR concepts may have desirable safety characteristics, unless they are carefully designed, licensed, deployed and inspected, SMRs could pose comparable or even greater safety, security and proliferation risks than large reactors.

### AT Prolif Resistant

#### SMRs aren’t prolif resistant and slow deployment

ITA 11 – International Trade Administration, U.S. Department of Commerce, February 2011, “The Commercial Outlook for U.S. Small Modular Nuclear Reactors,” http://trade.gov/mas/ian/build/groups/public/@tg\_ian/@nuclear/documents/webcontent/tg\_ian\_003185.pdf

Some U.S. SMR vendors claim that their designs could be “black boxed” (that is, they could be deployed already fueled), and once the fuel is spent, the entire unit could be shipped back to the factory for waste handling and reprocessing. If the responsibility for the fuel cycle is taken out of the hands of the reactor operator, then risks of proliferation could potentially be reduced. Significant technical issues, however, remain unsolved for this concept, and there are serious outstanding questions involving transportation, waste handling, safety, and security. Although an attractive idea, such designs are unlikely to be deployed in the near or mid term.

### 2NC Easy to Weaponize

#### 1NC Bourget says the Thorium in SMR’s would easily be convereted to weapons grade, functionally gives countries what’s necessary to proliferate.

#### More Reasons they cause proliferation:

#### Overstretches the IAEA

Lyman 11

(Edwin, senior scientist at Global Security Program Union of Concerned Scientists, “An Examination of the Safety and Economics of Light Water Small Modular Reactors” Senate Hearing, <http://www.ucsusa.org/assets/documents/nuclear_power/lyman-appropriations-subcom-7-14-11.pdf>, SEH)

The distributed deployment of small reactors would also put great strains on existing licensing ¶ and inspection resources. Nuclear reactors are qualitatively different from other types of ¶ generating facilities, not least because they require a much more extensive safety and security ¶ inspection regime. Similarly, deployment of individual small reactors at widely distributed and ¶ remote sites around the world would strain the resources of the International Atomic Energy ¶ Agency (IAEA) and its ability to adequately safeguard reactors to guard against proliferation, ¶ since IAEA inspectors would need to visit many more locations per installed megawatt around ¶ the world. Maintaining robust oversight over vast networks of SMRs around the world would be ¶ difficult, if feasible at all.

#### Causes other countries to sell them

PACE 11

(People’s Alliance for Clean Energy, “Smaller Size, Big Price Tag: Small modular reactors are risky” <http://pacevirginia.org/2011/01/12/smaller-size-big-price-tag-small-modular-reactors-are-risky/>, SEH)

Claim: SMR’s would be safer, posing fewer security risks.¶ Reality: “Mini-nukes” would threaten national security. The United States is not the only country looking to construct SMR’s. In fact, it has been heavily marketed to developing countries whose transmission systems cannot handle large-scale reactors. If pursued in the U.S., Henry Sokolski, executive director of the Nonproliferation Policy Education Center believe that such a program “would open up the door for France and Russia to also start selling these small reactors to nations around the world.” Many of the countries where these “mini-nukes” are being marketed for do not have stable political systems, can be fraught with corruption and security forces are not properly trained to protect the technology and materials which can be used to create nuclear bombs. Additionally, if the U.S. hailed nuclear energy and small modular reactors as the future of energy, it would be impractical if not impossible to simultaneously deny the technology to the rest of the world.

#### Hard to keep track of

Makhijani and Boyd 11

(Arjun Makhijani an electrical and nuclear engineer who is President of the Institute for Energy and Environmental Research and Michele Boyd former director of the Safe Energy Program at Physicians for Social Responsibility. Previously, “Small Modular ¶ Reactors¶ No Solution for the Cost, Safety, and Waste Problems ¶ of Nuclear Power” Physicians for Social Responsibility, <http://www.psr.org/assets/pdfs/small-modular-reactors.pdf>, SEH)

In addition, the use of plutonium fuel ¶ or uranium enriched to levels as high as ¶ 20 percent—four to five times the typical ¶ enrichment level for present commercial ¶ light water reactors—presents serious ¶ proliferation risks, especially as some SMRs ¶ are proposed to be exported to developing ¶ countries with small grids and/or installed ¶ in remote locations. Security and safety ¶ will be more difficult to maintain in countries with no or underdeveloped nuclear ¶ regulatory infrastructure and in isolated ¶ areas. Burying the reactor underground, ¶ as proposed for some designs, would not ¶ sufficiently address security because some ¶ access from above will still be needed and it ¶ could increase the environmental impact to ¶ groundwater, for example, in the event of an ¶ accident.

## Solvency

### 2NC Cost

#### SMR’s are too expensive. 1NC Magwood says the products needed to build and shitty power generation means they never scale up.

#### SMR cheaper’ logic is wrong—economies of scale and clusters of SMRs obviate any benefits

Makhijani, PhD nuclear fusion – UC Berkeley, president – Institute for Energy and Environmental Research, and Boyd, former director – Safe Energy Program @ Physicians for Social Responsibility, ‘10

(Arjun and Michele, “Small Modular Reactors,” <http://ieer.org/wp/wp-content/uploads/2010/09/small-modular-reactors2010.pdf>)

SMR proponents claim that small size will enable mass manufacture in a factory, enabling considerable savings relative to field construction and assembly that is typical of large reactors. In other words, modular reactors will be cheaper because they will be more like assembly line cars than hand-made Lamborghinis. In the case of reactors, however, **several offsetting factors** will tend to neutralize this advantage and make the costs per kilowatt of small reactors higher than large reactors. First, in contrast to cars or smart phones or similar widgets, the materials cost per kilowatt of a reactor **goes up as the size goes down.** This is because the surface area per kilowatt of capacity, **which dominates materials cost,** goes up as reactor size is decreased. Similarly, the cost per kilowatt of secondary containment, as well as independent systems for control, instrumentation, and emergency management, increases as size decreases. Cost per kilowatt also increases if each reactor has dedicated and independent systems for control, instrumentation, and emergency management. For these reasons, the nuclear industry has been building larger and larger reactors in an effort to try to achieve economies of scale and make nuclear power economically competitive. Proponents argue that because these nuclear projects would consist of several smaller reactor modules instead of one large reactor, the construction time will be shorter and therefore costs will be reduced. However, this argument fails to take into account the implications of installing many reactor modules in a phased manner at one site, which is the proposed approach at least for the United States. In this case, a large containment structure with a single control room would be built at the beginning of the project that could accommodate all the planned capacity at the site. The result would be that **the first few units would be saddled with very high costs**, while the later units would be less expensive. The realization of economies of scale would depend on the construction period of the entire project, possibly over an even longer time span than present large reactor projects. If the later-planned units are not built, for instance due to slower growth than anticipated, the **earlier units would** likely **be more expensive** than present reactors, just from the diseconomies of the containment, site preparation, instrumentation and control system expenditures. Alternatively, a containment structure and instrumentation and control could be built for each reactor. **This would greatly increase unit costs** and per kilowatt capital costs. Some designs (such as the PBMR) propose no secondary containment, but this would increase safety risks. These cost increases are unlikely to be offset **even if** the entire reactor is manufactured at a central facility and some economies are achieved by mass manufacturing compared to large reactors assembled on site. Furthermore, estimates of low prices must be **regarded with skepticism due to the history of past cost escalations** for nuclear reactors and the potential for cost increases due to requirements arising in the process of NRC certification. Some SMR designers are proposing that no prototype be built and that the necessary licensing tests be simulated. Whatever the process, it will have to be rigorous to ensure safety, especially given the history of some of proposed designs.

#### SMRs have greater economic barriers than conventional reactors.

Lyman 1

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Some SMR vendors emphasize that their designs are “passively safe.” However, no credible reactor design is completely passive and can shut itself down and cool itself in every circumstance without need for intervention. Some reactor designs, large or small, have certain passive safety features that allow the reactor to depend less on operator action for a limited period of time following design-basis accidents. Small reactors may have an advantage because the lower the power of a reactor, the easier it is to cool through passive means such as natural convection cooling with water or even with air. However, accidents affecting multiple small units may cause complications that could outweigh the advantages of having lower heat removal requirements per unit. Moreover, passively safe reactors generally require some equipment, such as valves, that are designed to operate automatically but are not one hundred percent reliable.

Operators will always be needed to monitor systems to ensure they are functioning as designed, and to intervene if they fail to do so. Both passive systems and operator actions would require functioning instrumentation and control systems, which were unreliable during the severe accidents at Three Mile Island and Fukushima. Passive systems may not work as intended in the event of beyond-design-basis accidents, and as result passive designs should also be equipped with highly reliable active backup systems and associated instrumentation and control systems.¶ But more backup systems generally mean higher costs. This poses a particular problem for SMRs, which begin with a large economic disadvantage compared to large reactors.¶ According to the standard formula for economies of scale, the overnight capital cost per kilowatt of a 125 megawatt reactor would be roughly 2.5 times greater than that of a 1250 megawatt unit, all other factors being equal. Advocates argue that SMRs offer advantages that can offset this economic penalty, such as a better match of supply and demand, reduced up-front financing costs, reduced construction times, and an accelerated benefit from learning from the construction of multiple units. However, a 2007 paper by Westinghouse scientists and their collaborators that quantified the cost savings associated with some of these factors found that they could not overcome the size penalty: the paper found that at best, the capital cost of four 335 megawatt reactors was slightly greater than that of one 1340 megawatt reactor.1

# 1nr

#### **They say that it fails now but its doubling the budget and increasing effectiveness**

Dyer 10/8

Tampa Bay Times¶ October 8, 2012¶ Politifact.com Edition¶ “OBAMA'S SUPPORT OF NUCLEAR SECURITY AGENCY FELL SHORT OF CAMPAIGN PROMISE”¶ BYLINE: KELLY DYER¶ LexisNexis

Strengthen the International Atomic Energy Agency (IAEA) and double its budget in the next four years¶ "The IAEA is understaffed and underresourced at a time when demand for its expertise are growing. Barack Obama and Joe Biden will seek to ensure that the Agency gets the authority, information, people, and technology it needs to do its job. They will work to double the IAEA budget in the next four years (increasing the U.S. annual share to about $225 million). They will press countries to adopt the "Additional Protocol," -- which grants the IAEA the right to conduct more intrusive inspections, including at undeclared facilities - and seek agreement among members of the Nuclear Suppliers Group not to transfer nuclear technology to NPT countries that have not adopted the Additional Protocol. They will work to gain agreement on effective global standards for nuclear safety and security. And they will call for establishing IAEA verification procedures that go beyond the Additional Protocol to strengthen the agency's ability to detect clandestine facilities and activities."

### Turns prolif

#### Lack of effective inspections turns the whole case—makes SMRs worse for prolif, safety and security than large reactors

Dr. Edwin **Lyman 11**, Senior Scientist, Global Security Program, Union of Concerned Scientists, July 14, 2011, Testimony Before the Energy and Water Development Subcommittee, Committee on Appropriations, U.S. Senate, "An Examination of the Safety and Economics of Light Water Small Modular Reactors"

**Proponents of** small modular reactors (**SMRs) claim that their designs have inherent safety** features compared to large reactors, and some even argue that their reactors would have been able to withstand an event as severe as Fukushima. **We find these claims to be unpersuasive**. For any plant--large or small--the key factor is the most severe event that the plant is designed to withstand--the so-called maximum ``design-basis'' event. **Unless nuclear safety requirements for new reactors are significantly strengthened, one cannot expect that either small or large reactors will be able to survive a beyond-design- basis event like Fukushima**. Although some light-water SMR concepts may have desirable safety characteristics, **unless they are carefully designed, licensed, deployed and inspected, SMRs could pose comparable or even greater safety, security and proliferation risks than large reactors.**

#### Preserving sufficient IAEA resources solves their internal link—means inspections prevent inevitable global nuclear energy expansion from causing prolif

Adam M. **Scheinman 8**, Assistant deputy administrator, Nonproliferation and international security, DOE/NNSA, March 31, 2008, "A TIME FOR ACTION: THE U.S. NEXT GENERATION SAFEGUARDS INITIATIVE"

And so we know **the international community is capable of responding to proliferation challenges**. A question for international safeguards is whether we not only can respond, but, in the words of the IAEA, whether we can “stay ahead of the game.” That is, **can we take steps today, even with major nonproliferation problems in Iran and North Korea unresolved, to ensure that expanded nuclear energy use does not contribute to the further proliferation of nuclear weapons.**¶ **I believe the answer to that question is ‘yes.**’ But more than agreement to the principle, **we need the commitment to act on it**. **This means** political acceptance, but **also readiness to commit the necessary resources and attention that will** – in the words of President Bush – **“ensure that the IAEA has all the tools it needs to fulfill its essential mandate.” And that mandate, of course, is verification that nuclear material is not diverted from peaceful uses.**¶As everyone here knows, nuclear power is poised for a major take-off. Some 34 new power reactors are under construction in 11 countries, with up to 60 additional reactors to be built in the next 15 years according to IAEA estimates. Some projections envision the global share of electricity from nuclear power plants increasing between 25 to 95 percent by 2030. And if nuclear power is to play a major role in sustainable development, growth will have to accelerate after that.¶ **Some may ask whether we’re opening Pandora’s box by promoting nuclear uses worldwide**. There is, for example, already a perception that, in certain regions of the world, **nations seek to acquire nuclear power more for strategic and political reasons than for economic or environmental ones. Others point to increasing risks of nuclear terrorism,** **to the damage done by the Khan network and what it may mean for future nuclear black marketeering, and to growing accumulations of plutonium-bearing spent fuel as additional concerns.**¶ **These are serious concerns that must be met with equally serious and comprehensive responses. Primary among them is an international safeguards system that is effective and strictly applied; that employs technologies and enjoys access sufficient to deter nuclear cheating; and that above all provides assurances that nations respect their international obligations.**

#### Declining confidence in IAEA inspections causes breakout prolif

Adam M. **Scheinman 8**, Assistant deputy administrator, Nonproliferation and international security, DOE/NNSA, March 31, 2008, "A TIME FOR ACTION: THE U.S. NEXT GENERATION SAFEGUARDS INITIATIVE"

**If states lacked confidence in the IAEA to verify peaceful activities, then they may seek to create options to break-out of the nonproliferation regime and pursue weapons themselves**. In this sense, **international safeguards help maintain a healthy distance between nuclear order and anarchy, and it is for this reason that the United States and the world community have such a major stake in the success of international safeguards.**

### SMRS SAFE

**The chances of a meltdown is 200 times higher than NRC predictions**

**Lelieveld 12**   
(J., May 23, 2012, Probability of nuclear reactor core meltdown higher than expected  , Homeland Security News Wire, <http://www.homelandsecuritynewswire.com/dr20120523-probability-of-nuclear-reactor-core-meltdown-higher-than-expected0>)

To determine the likelihood of a nuclear meltdown, the researchers applied a simple calculation. They divided the operating hours of all civilian nuclear reactors in the world, from the commissioning of the first up to the present, by the number of reactor meltdowns that have actually occurred. The total number of operating hours is 14,500 years, the number of reactor meltdowns comes to four — one in Chernobyl and three in Fukushima. This translates into one major accident, being defined according to the [International Nuclear Event](http://www-ns.iaea.org/tech-areas/emergency/ines.asp)Scale (INES), every 3,625 years. Even if this result is conservatively rounded to one major accident every 5,000 reactor years, the risk is 200 times higher than the estimate for catastrophic, non-contained core meltdowns made by the U.S. Nuclear Regulatory Commission (NRC) in 1990. The Mainz researchers did not distinguish ages and types of reactors, or other potential contributing factors to accidents such as whether reactors are located in regions of enhanced risks, for example by earthquakes.

#### SMRs aren’t safer or more effective than larger reactors.

Smith, ‘11

[Gar, environmental journalist, editor of Earth Island Institute's weekly "eco-zine" The-Edge, Summer, “Don’t Mini-mize the Dangers of Nuclear Power,” http://www.earthisland.org/journal/index.php/eij/article/dont\_mini-mize\_the\_dangers\_of\_nuclear\_power/]

And that’s just a partial list. The problem with nuclear power is simple: It’s too complex. When things go wrong – as they inevitably do, because humans are fallible – the consequences can be deadly. The Fukushima disaster has severely hobbled the atomic industry’s hopes for a big-ticket nuclear renaissance. So the American Nuclear Society has proposed a mini-renaissance based on “Small Modular Reactors,” or SMRs. Cheaper, quicker to build, and small enough to fit in a garage, SMRs could power homes, factories, and military bases. South Carolina’s Savannah River National Laboratory hopes to start building SMRs at a New Mexico plant and is taking a lead role in a GE-Hitachi demonstration project. Even as Japanese engineers were working to contain the radiation risks at Fukushima, an international SMR conference in South Carolina in April attracted representatives from Westinghouse, AREVA, GE, the International Atomic Energy Agency, China National Nuclear Corp., Iraq Energy Institute, the US Army, and many US utilities. But SMRs still depend on designs that generate intense heat, employ dangerous materials (highly reactive sodium coolant), and generate nuclear waste. SMRs also retain all the risks associated with supplying, maintaining, safeguarding, and dismantling large nuclear reactors – only now those risks would be multiplied and decentralized. The planet can’t afford nuclear energy – be it mega or mini. As Dave Brower observed 30 years ago: “Is the minor convenience of allowing the present generation the luxury of doubling its energy consumption every 10 years worth the major hazard of exposing the next 20,000 generations to this lethal waste?

#### Passive safety designs are hyped and safety risks of SMR outweigh any potential benefits.

Lyman, ‘11

[Dr. Edwin, Senior Scientist -- Union of Concerned Scientists, “AN EXAMINATION OF THE SAFETY AND ECONOMICS OF LIGHT WATER SMALL MODULAR REACTORS: HEARING before a SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS UNITED STATES SENATE ONE HUNDRED TWELFTH CONGRESS FIRST SESSION, SPECIAL HEARING, JULY 14, 2011--WASHINGTON DC,” http://www.gpo.gov/fdsys/pkg/CHRG-112shrg72251/html/CHRG-112shrg72251.htm]

Some SMR vendors emphasize their designs are passively safe, but no credible reactor design is completely passive and can shut itself down in every circumstance without need for intervention. Small reactors may have an advantage because the lower the power of a reactor, the easier it may be to cool through passive means, but accidents involving multiple small units may cause complications that could outweigh the advantages of having lower heat removal requirements for each unit. Moreover, passively safe reactors do require some equipment, such as valves that are designed to operate automatically, but are not 100 percent reliable. All passive systems will have to be equipped or should be equipped with highly reliable active backup systems in order to compensate for these uncertainties, but more backups mean generally higher costs and this poses a particular problem for SMRs, which begin with a large economic disadvantage compared to large reactors.

#### SMRs are highly vulnerable to accidents -- and colocation means they’ll be harder to forestall once they begin.

Feinstein, ‘11

[Dianne, US Senator, “AN EXAMINATION OF THE SAFETY AND ECONOMICS OF LIGHT WATER SMALL MODULAR REACTORS: HEARING before a SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS UNITED STATES SENATE ONE HUNDRED TWELFTH CONGRESS FIRST SESSION, SPECIAL HEARING, JULY 14, 2011--WASHINGTON DC,” http://www.gpo.gov/fdsys/pkg/CHRG-112shrg72251/html/CHRG-112shrg72251.htm]

For me, one of the fundamental issues raised by events in Fukushima is whether multiple reactors should be collocated. The threat of high-level radiation exposure at one plant clearly compromised the ability of workers to adequately respond to events at nearby plants in the Daiichi site. The premise of the SMR program is that utilities could start with a small number of units and then install more as funding allowed and demand necessitated. Now, how does that premise stack up against possible problems? The Fukushima crisis also demonstrated the potential danger of storing spent fuel in pools on site, and yet the proposed SMR designs do not appear to make any improvements in this method of spent-fuel storage. Bluntly, I'm struggling to reconcile the lessons of Fukushima with the principal design premise of SMRs, and so I look forward to witnesses addressing these issues today.

### Impact

#### Terrorists have 100% probability of a successful attack -- internal studies prove -- causes immediate meltdowns that means that you vote affirmative because we have the most probably terminal impact

Caldicott, ‘6

[Helen, Founder, President -- Nuclear Policy Research Institute, “Nuclear Power is not the answer,” p. 92-4]

Let's consider the two large Indian Point reactors located in the town of Buchanan in Westchester County, thirty-five miles from midtown Manhattan. Indian Point 2 is a 971-megawatt reactor and Indian Point 3 is a 984-megawatt reactor; the licensed operator for both plants is Entergy Nuclear. Both reactors are aging and adjacent to a very large population base: More than 305,000 people live within a ten-mile radius of the plants, and 17 million live within fifty miles. They are in close proximity to a reservoir system that waters 9 million people and to the financial capital of the world. Apart from natural disaster, an Indian Point meltdown caused by a small group of people intent on wreaking disaster could read­ily be achieved in one of several ways. Terrorists with suicidal ten­dencies could easily disrupt the external electricity supply of the reactors, or obtain one small speed boat, pack it with Timothy McVeigh fertilizer explosives, and drive it full tilt into the two adja­cent intake pipes that suck almost two million gallons of Hudson River cooling water per minute into the reactors. The plant could be shut down immediately, but this would not help because of the intensity of the heat already in the reactor. Within several hours the meltdowns would be in full swing. (Several years ago, I was in a boat, owned by the antinuclear group River keeper, on the Hudson opposite the huge intake pipes of the two Indian Point reactors. Al­though the Coast Guard was supposed to be protecting them from terrorist intrusion, there was no sign of a Coast Guard boat during ¶ two early afternoon hours we were within view of the pipes.) Alternatively, a terrorist could drive a truck packed with similar explosives into a strategic area of the plant, triggering a critical situation. Concrete barriers have been erected at several nuclear power plants, but not many, and, as stated in the previous chapter, an inadequate number of guards are protecting against terrorist intrusion. A paper written by the Oak Ridge National Laboratory and the Defense Threat Reduction Agency, published in a 2004 technical journal and available on the Internet, indicates that truck bombs of various sizes would have 100% probability of success.¶ Or yet again, after a few basic flying lessons, a novice pilot could commandeer a large passenger plane loaded

with fuel and fly it into the reactor itself, destroying strategic safety systems and/ or emptying the reactor of its cooling water. Or a patient individual bent on destruction could sign up for training as a nu­clear power plant operator, obtain a job at Indian Point, and at a certain strategic moment, press the wrong switches and valves, removing the cooling water and initiating a meltdown from the inside.