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Anna McDermott

ABSTRACT

Of all the nuclear arsenals in the world, Pakistan's faces the most risk. With over forty terrorist organizations active within the country, frequent power fluxes between the military, government and intelligence agencies, and a history of security breaches plaguing its nuclear program, Pakistan makes North Korea seem secure and stable. With all the challenges that face the safety of Pakistan's nuclear arsenal, it still lacks one basic security technology, Permissive Action Links (PALs), which are use control devices that make it virtually impossible for any unauthorized person to detonate a nuclear weapon. Over the years, there have been barriers that have prevented Pakistan from integrating PALs into their arsenal, regardless of how much they will improve safety. Most of these reasons have revolved around the legality of a technology transfer; however, these legal obstructions are simply caused by inefficient rules left over from the Cold War. An investigation shows that these barriers are not insurmountable, and that PAL technology could in fact promote a much-needed modernization of international nonproliferation law.

During the presidential campaign of 2008, Barack Obama unapologetically called for an end to the war in Iraq. Some conservative critics voiced their concern that he would be too timid to make tough choices as Commander-in-Chief. However, President Obama has proven just the opposite in his first months in office, particularly in regards to his approach towards Pakistan, where he is creating a new strategy connecting the country more closely with the war in Afghanistan.ⁱ It is no wonder that the President considers this country a top priority: Pakistan houses not only the sworn enemy of the U.S.—Osama bin Laden, but also a nuclear arsenal of anywhere between 50 to 120 nuclear weapons.ⁱⁱ

Keeping nuclear material and technology safe has been an ongoing struggle for decades, and has only worsened with time. The International Atomic Energy Agency's (IAEA) Illicit Trafficking Database lists a total of 1,080 confirmed incidents of illegally trafficked nuclear materials documented between 1993 and 2006.ⁱⁱⁱ Several hundred others remain documented but unconfirmed. Though the large majority of trafficked materials are in small amounts, it is possible that the seized materials may have only been samples of larger quantities made available for later larger purchases. In 67% of reported cases, lost or stolen materials are not recovered.^{iv}

Three years following this study, few effective things have been done to increase the safety of American lives from a nuclear attack. With so much money going toward rebuilding Iraq and, now, towards failing economy, many fear that the security of the United States could be compromised easily. Pulitzer Prize-winning columnist Nicholas D. Kristoff commented that during the Bush administration, efforts went towards stopping the most peripheral elements of the WMD threat, namely Iraq, while ignoring the more central threat of global proliferation. Today, the U.S. finds itself more vulnerable to a nuclear attack than even during the Cold War.^v According to a recent survey by Senator Richard Lugar, the risk of a terrorist attack on a major

city is actually increasing over time.^{vi} But where would these terrorist attacks likely come from?

Chair Joint Chief of Staff Michael Mullen claims the next terrorist attack on America is currently being planned in the “under-governed regions” of Pakistan, where Al Qaeda has made its world headquarters.^{vii} This risk is mainly due to the unstable balance of power within the country and the continuing presence of Al Qaeda and other extremists. Though some argue that Pakistan’s nuclear facilities are secure, there is reason for skepticism.

Matthew Bunn of the John F. Kennedy School of Government at Harvard points out that nuclear facilities such as those in Pakistan “would not be able to provide a reliable defense against attacks as large as terrorists have already proved that they can mount, such as the four coordinated, independent teams of four to five suicidal terrorists that struck on September 11, 2001.”^{viii} It is not currently known how extensive Al Qaeda’s efforts have gone to procure nuclear weapons. There have been instances of top-level nuclear program officials being sympathetic to Al Qaeda. Pakistani nuclear scientists Sultan Mahmoud and Abdul Majeed established a charity to support the Taliban, and later held a now infamous meeting with Osama bin Laden and Ayman al-Zawahiri, during which they discussed nuclear, biological, and chemical weapons.^{ix} There is a lack of evidence to prove the extent of success Al Qaeda has met in its attempts. Similarly, no evidence exists to prove that there have not been other similar meetings. Nevertheless, it is sobering to remember that a nuclear plot could conceivably be planned on the same small scale as the plot for the September 11th attacks, and on the same level of secrecy.^x

Bearing these facts in mind, it is desirable for Pakistan to make every possible effort to ensure the safety of its nuclear arsenal; however, Pakistani nuclear weapons still lack certain important safety technologies—specifically, one of the oldest and most widely accepted tools for

nuclear security: Permissive Action Links (PALs). Most American, British, French, and Russian nuclear weapons are equipped with PALs.^{xi} These use control devices greatly decrease the possibility of any unauthorized persons, such as terrorists, being able to set off nuclear weapons. The Obama administration must make it a priority to work with Congress in urging the Pakistani government to equip its nuclear arsenal with PALs.

To explore these issues in their full depth, several different elements must be explored. First to be investigated will be background of the dangerous conditions within Pakistan in order to analyze and better understand the necessity of PAL technology. This will include an assessment of the threats within the country, as well as the threats caused by instability within Pakistan's power structures. Next to look into will be the particulars of PAL technology and assess its potential to provide real safety to a nuclear arsenal such as Pakistan's. Following these sections, will be a comprehensive review of the arguments for and against Pakistan's adoption of PAL technology, beginning with the U.S. perspectives, followed by the Pakistan perspectives. To conclude, a brief policy recommendation will be proposed.

Risk Assessment: 'The Most Dangerous Place on Earth'

The centers of power within Pakistan are not the only areas that need to be understood; the whole country faces substantial challenges as well. As Capitol Hill newspaper *Roll Call's* executive editor Mort Kondracke described the situation: "U.S. intelligence officials say Pakistan is the likeliest source of terrorist attacks on the United States. It's the most dangerous place on earth: nuclear-armed, menaced by terrorists, economically in crisis and mired in political turmoil."^{xii} The terrorist organizations within Pakistan, difficult even now to count and categorize, and are evolving as a new generation emerges. The area which holds these groups is in the northern region of Pakistan, specifically the North-West Frontier Province (NWFP) and

the Federally Administered Tribal Areas (FATA). This rugged terrain is home to many ancient tribes and, now, scores of terrorist groups including over one million men who have grown up wielding firearms as part of a way of life. The new generation, with its leadership based on *jihad*, is emerging to make its presence known to the world. In reaction to Western culture, groups have even declared *jihad* on such things as television and music.^{xiii}

Although it is impossible to quantify the various groups within these regions, Ashley J. Tellis of the Carnegie Endowment for International Peace has managed to sort them into five categories: Sectarian, Anti-India, Afghan Taliban, Al Qaeda and associates, and the Pakistani “Taliban.”^{xiv} Others, such as the South Asia Intelligence Review, categorize the groups in three ways: domestic organization, trans-national organizations, and extremist groups for a total of forty seven distinct groups.^{xv}

Steve Coll, the President of the New America Foundation, described Pakistan’s extremist groups as “hard-core breakaway children militias of the sort you encounter in failed states in Africa and elsewhere.”^{xvi} Though hidden away in the steep mountains of Pakistan, they gain global fame with their all-too successful attacks. Al Qaeda is certainly the main target of U.S. forces, but other groups are also gaining world renown: Lashka-e-Taiba, an anti-Indian terrorist organization, has been linked to the 2008 Mumbai attacks where over 170 people were killed.^{xvii} The groups Jaish-e-Mohammed and Lashkar-e-Jhangvi have been suspected of being responsible for the attacks on the Sri Lankan cricketers in Lahore in 2009.^{xviii}

To combat the area’s unique challenges, the Pakistani military created the Frontier Corps. This paramilitary group has what would seem to be the valuable advantage of knowing the local dialects as well as having a familiarity with the rough terrain. Unfortunately, the military has struggled to secure the loyalty of the Frontier Corps. Members of this group have frequently

refused to follow orders and fight. They are inadequately trained and equipped for counter-insurgency attacks.^{xix} The greatest problem does not lie simply in lack of training; another concern is that in the 1990s, the Corps was involved in training the Taliban, and is suspected to still have strong ties to that organization. They are also considered to hold deep sympathies for local militants, and are afraid of creating conflict which might backfire on themselves or their own families.^{xx} Although the Frontier Corps hold the essential knowledge of the culture and land, it will take years, not months, to transform them into a useful weapon against Pakistan's terrorist groups. Meanwhile, these groups enjoy an autonomy that allows them to plot further attacks.

Pakistan: Military, Intelligence, Political Background and Recent History

A mere list of terrorist organizations may be enough to make U.S. intelligence analysts lose sleep, but imagining a group such as Lashkar-e-Taiba or Al Qaeda in command of an entire nuclear arsenal would alarm any American.^{xxi} There is an ongoing debate between American and Pakistani officials over precisely *how* safe the Pakistani nuclear arsenal is. The country's officials defend the safety of their estimated 50 to 120 nuclear weapons while U.S. officials continue to push for greater safety measures.^{xxii} In a January 2008 interview with *Newsweek*, then-President Pervez Musharraf was asked what he thought about further American assistance in securing Pakistan's arsenal. His reply seemed somewhat defensive: "We will ask if we need assistance. Nobody should tell us what to do."^{xxiii} Pervez Hoodbhoy, chairman of the Department of Physics at Quaid-e-Azam University in Islamabad, put into perspective the security situation in Pakistan in a recent *Arms Control Today* issue: "In thinking how well Pakistan may be able to secure its nuclear weapons, materials, and experts, it is worth remembering that Pakistan has been unable to protect its constitution from military coups, has

lost half its territory [East Pakistan, now Bangladesh] in 1971, and has failed to safeguard the lives of its most prominent political leaders in recent months.”^{xxiv} These diverse views of Pakistan’s security indicate its complex nature.

Several factors unique to Pakistan have added complications to its power situation and increased concern for the world’s nuclear safety. These issues revolve around the precarious balance between the military, Inter-Services Intelligence (ISI), and government. Understanding the balance between these powers is crucial to understanding the reality of Pakistan’s nuclear security. These three centers of power have been struggling over control of the country for decades.

Military

Historically, the military has been the single most powerful institution in the country.^{xxv} It has even been said that “while most countries have armies, Pakistan’s army has a country.”^{xxvi} The military has maintained this dominance based on the insistence that the sectarian and ethnic divisions within the country require the strong hand of the military to ensure stability. Since the 1999 coup by Pervez Musharraf, the military has developed a stronger secular reputation after years of polarization between religious and secular schools.^{xxvii} Despite this development, many remain concerned about potential breaches of security within the army. One expert notes, “For more than 25 years, the army nurtured Islamist radicals as proxy warriors for covert operations on Pakistan’s borders in Kashmir and Afghanistan. This produced extremism inside parts of the military and intelligence. Today, some parts are at war with other parts.”^{xxviii}

Many have noted a growing sense of disorder within the military—a disorder linked to its increasing diversity.^{xxix} The 2008 *Securing the Bomb* study points out, “In at least two cases, serving Pakistani military officers working with al-Qaeda came within a hair’s breadth of

assassinating former president Musharraf. If the military officers guarding the President cannot be trusted, how much confidence can the world have in the military officers guarding the nuclear weapons?"^{xxx} The military also holds singular control over the country's nuclear facilities, making it that much more vulnerable to an ambush.^{xxx}

As we have seen, the military has also been known to use extremists for its own advantage. Over time, this has caused the tribal northern region of the country to degrade into a state of disorder, allowing terrorist training and ideologies to expand across the regions. Not long after the Mumbai attacks, the military conceded an imposition of *sharia* law in the tribal regions of the North-West Frontier Province. This move was declared a victory by the tribes in Bajaur. To some observers, it appears the military is accommodating terrorists.^{xxxii} Though there is little evidence suggesting the military directly trained the terrorists responsible for the Mumbai and Lahore attacks, their freedom to train within Pakistan is the direct result of the privileges they have enjoyed as unofficial allies of the military. Even still, the military has still not shown a wholehearted effort to uproot and exterminate Islamic radicalism, perhaps still intending to use these relationships for influence in the area. But from the perspective of outside observers, it is difficult to tell who is using whom.^{xxxiii}

An explanation of the military would be incomplete without mentioning the infamous founder and former head of the Pakistani nuclear program, Ahmed Qadeer Khan, who sold nuclear secrets and technology for personal profit. Khan's customers included countries such as North Korea, Iran, Iraq, Libya, and perhaps others.^{xxxiv} His "nuclear black market" turned over a huge profit from the 1980s on until his arrest in 2004.^{xxxv} Many U.S. experts believe this illegal exchange was made possible by a lack of effective government oversight, but it is hardly so simple. Dr. Sharad Joshi of the James Martin Center for Nonproliferation Studies explains that

the “Khan network emerged at a time of political instability and corruption in Pakistan, [and] such an environment would once again permit conditions that would encourage proliferation.” This is true—but it is not insignificant to recall that this “time of political instability” lasted about twenty years.

The military seems to have had a direct influence in the emergence of this nuclear market: Khan himself made an official statement that successive army chiefs during the 1990s endorsed his actions,^{xxxvi} despite two official statements addressed to the U.S. assuring the opposite.^{xxxvii} Evidence suggests that Khan’s personal profits were known by Pakistani intelligence as early as 1988. After the ISI reported this information to the military, they refused to act.^{xxxviii} In spite of the military’s dominance in the country, Pakistan’s defenses were still open to manipulation by a single individual, resulting in the careless selling of the world’s most perilous technology.

Unfortunately, many of the details surrounding the network’s activities and business partners remain a mystery. Although Pakistan’s government wishes to downplay the Khan controversy as a “closed chapter,” reports published in 2008 have suggested that investigations into the network remain incomplete.^{xxxix} Mark Fitzpatrick, a former U.S. nonproliferation State Department official, stated in 2007 that “there are undoubtedly some [members of the Khan network] out there, lying low and ready to resume illicit supply if the price is high enough.”^{xl} This network’s existence is a reminder to the world of the dangers produced by weak control over nuclear programs.

Inter-Service Intelligence

The second side to this triangular power structure is the official intelligence agency of Pakistan, the Inter-Service Intelligence (ISI), which is notorious for waging its own personal

wars against Pakistani politicians and for its covert support of Taliban cells in northern Pakistan. Leaders of the government, such as slain former Prime Minister Benazir Bhutto, have described the ISI as “a state within a state” which works separately from the government to accomplish its own foreign policy goals.^{xli} Though the ISI has been an ally to American forces in the fight against Al Qaeda in northern Pakistan, it continues to use extremist jihadist militants to preserve its influence in Afghanistan and Kashmir.^{xlii} Groups like the Lashkar-e-Taiba were originally *created* by the ISI. It is strongly suspected by Washington experts that these groups still have ISI connections.^{xliii} For a country struggling to control more than forty terrorist organizations, these networks pose a serious problem.^{xliv}

The ISI was thrust back into the spotlight over its possible involvement in the November 2008 terrorist attacks in Mumbai, India. Although the ISI denies any recent contact with such groups, most experts believe that they continue to use these militants as a “strategic asset.”^{xlv} This conflict of interests has strained the relationship of American and Afghani forces. American officials believe that ISI agents tip off militants before scheduled missile strikes.^{xlvi} For this reputation of secrecy, it has been popularly dubbed the “Invisible Soldiers Inc.”^{xlvii} Even more telling of its repute is that a third of Pakistani citizens believe that intelligence agencies were behind the assassination of Benazir Bhutto.^{xlviii}

Admiral Michael Mullen, chairman of the U.S. Joints Chief of Staff, has voiced the Obama administration’s concern about the ISI’s relationship with extremist organizations.^{xlix} He warns the ISI to not allow the Mumbai attacks to absorb all its resources, but to pursue forces that would destabilize Pakistan. “They have been very attached to many of these extremist organizations. In the long run, they have got to completely cut ties with those in order to really move in the right direction. ISI fundamentally has to change its strategic approach... and I don’t

believe they can make a lot of progress until that actually occurs.”¹ Sadly, without the cooperation of the ISI, Admiral Mullen has a difficult road ahead of him in the struggle for Pakistani stability.

Government

The assassination of Benazir Bhutto in December 2007 shocked the world. As horrific as it was, it was hardly inconsistent with the messy political history of Pakistan. A description of the historical violence that has plagued Pakistani politics could fill several hundred pages. Suffice it to say that in the case of Pakistan, through decades of coups, declarations of martial law, party division, and assassinations, political tumult has been more the norm than the exception.

Despite her now-legendary fame and popularity, for many years Ms. Bhutto had a reputation for being corrupt. Not long after her death, controversy revolving around the firing of several lawyers led to a threatened impeachment of long-time president and former military leader, Pervez Musharraf. To avoid the shame of being forced out, Musharraf begrudgingly stepped down. His replacement is the widower of Bhutto’s widow, Mr. Asif Zardari, who brings little hope for stability and change. Zardari’s checkered past includes several years in prison on charges of corruption, and an accusation of bizarrely tying a remote-controlled bomb to the leg of a businessman and forcibly sending him into a bank to make a withdrawal for a pay-off.ⁱⁱ He was coined “Mr. 10%” in the 1990s for his reputation of siphoning off government funds to add to his own fortune. Now, as he holds power over the entire country, many popular newspapers have upgraded (or possibly downgraded) him to “Mr. 100%.” Many pessimistic commentators predict a chaotic, brief, and disastrous presidency.ⁱⁱⁱ Less than a year into his watch, he has already failed to prevent such catastrophes as the massive Pakistani terrorist

attacks in Mumbai, India, as well as the deadly assault on Sri Lankan cricket players in Lahore, Pakistan. In a span of less than five months, 180 lives have been lost from these two separate events.

Public Opinion

Along with political and economic changes, Pakistan public opinion is shifting. President Zardari's recent fiscal policies and apparent pandering to wealthy lobbyists are already the source of critical concern, especially with rising food prices and the rupee hitting an all-time low in September 2008.^{liii} The Economist Intelligence Unit predicts that economic policy will continue to focus on "crisis management" throughout 2009, along with Real GDP growth slowing to 1.2% in 2008/2009 from 6% in 2007/2008.^{liv}

According to a study conducted in June 2008 by the Center for Public Opinion (the most recent poll of its kind currently available), 86% of Pakistanis have been facing difficulty obtaining flour for their daily basic food consumption.^{lv} Pakistan's former Foreign Minister Abdul Sattar remarked that the general feeling in Pakistan is that "the economy is declining on this side of the world."^{lvi} This decrease in public confidence is also leading to greater disillusionment with the government as well as with Pakistan's biggest Western supporter, the U.S. As Pakistani citizens struggle to obtain basic nourishment, an increase in pro-Al Qaeda and anti-American sentiment is also on the rise. According to the same survey, a shocking 62.9% of Pakistanis view America unfavorably, and 52% believe the U.S. is the most responsible for the violence that is occurring within Pakistan.^{lvii} On the other hand, there has been a rise in opinion regarding Osama bin Laden, Al Qaeda, and the Taliban. Support for bin Laden has increased by 10% since January 2008.^{lviii} Support for Al Qaeda has doubled from earlier in the year as well, most recently up to one-third.^{lix}

The three tiers of power that control Pakistan are, at best, flawed and at worst, corrupt. The military serves as the most powerful institution in the country as well as the guardians of the state nuclear arsenal. For this reason, it is under greater scrutiny than any of the other tiers, especially given its history. The ISI continues to be both friend and foe in the fight against extremist militants in Kashmir and on the border of Afghanistan. The politics of Pakistan are constantly in flux and hardly to be assumed stable at any given point. With the current food shortage sweeping many developing parts of the globe, Pakistan is being thrown into even greater desperation. As was made evident in recent elections, a majority of Pakistanis favor moderate parties and politics.^{lx} However, as September 11, 2001 and the Mumbai attacks show, it only takes a very select and determined few to trigger large-scale terror.

PALS: An Evolving Technology

Pakistan's military, intelligence and political circumstances, in conjunction with its internal terrorist presence, make the country's nuclear arsenal quite possibly the most vulnerable in the world—even more so than North Korea, whose government, though totalitarian, still maintains strong central control. After Pakistan admitted the meeting between Al Qaeda and two nuclear scientists, the U.S. made a decision to increase aid to Pakistan by \$100 million, specifically to reinforce its nuclear arsenal.^{lxi} However, most of this money has gone towards basic physical security, including surveillance systems, equipment for tracking nuclear material, and fencing.^{lxii} Despite the inflow of hundreds of millions of dollars, PAL technology has not been adopted for Pakistan's nuclear weapons.^{lxiii} Certain reports claim that Pakistan has adopted its own PAL technology, but these devices are shrouded in mystery. It is likely that, if these devices do exist, they are not the highly effective ones of American design.^{lxiv} If, despite excuses on both American and Pakistani authorities, PAL technology *were* to be implemented into

Pakistan's arsenal, it would virtually eliminate the chances of outside parties being able to successfully detonate any obtained nuclear weapon.

PAL technology has been developing over decades and has become highly sophisticated. One weapons designer put it frankly: "Bypassing a PAL should be about as complex as performing tonsillectomy while entering the patient from the wrong end."^{lxv} There are several different types of PALs. Early PAL lacked foolproof capability, and resembled a glorified combination lock. The first generation consisted of simple electro-mechanical combination locks.^{lxvi} They were originally just attached to the electrical circuitry of the weapons, making them easy to "wire around."^{lxvii} If this is the type of device Pakistan claims to have adopted, the security of these weapons could easily be compromised.^{lxviii}

More recent versions, like the "Category F" PALS, were updated to address past weaknesses and to include new safety measures. These PALs involve a 6 or 12-digit key which calculates to a total of up to one trillion possible combinations.^{lxix} PAL technology also involves a "limited try" feature. If the individual attempting to unlock the weapon makes too many unsuccessful attempts, it triggers a mechanism that permanently disables the weapon.^{lxx} This technology additionally involves a tamper resistant "skin" which prevents further interference.^{lxxi} These are the PALs of choice for most modern U.S. nuclear weapons, as they provide the highest level of security available. Modern PAL technology is integral to the weapon, which could admittedly make it more difficult to adopt for Pakistan's weapons—but, according to experts, not impossible.^{lxxii} These technical improvements have created nearly insurmountable odds for any unauthorized people who might attempt to set off a nuclear bomb.

Differing Opinions

Though there are certainly disagreements between the U.S. and Pakistan on sharing PAL

technology, there are also differing opinions within the countries themselves. In order to discover the best possible solution to this complex issue, a thorough exploration of the points of view must be made.

Many politicians, intelligence officers, statesmen, and experts support the sharing of PAL technology, and this support seems to have increased as Pakistan's security continues to be of growing concern to the world. With the recent assassination of Benazir Bhutto, many experts worry that further violence will inevitably throw the government into anarchy and cause nuclear weapons security to be compromised by radicals.^{lxxiii} As extremism rises, so does the concern for top officials such as President Zardari and General Ashfaq Parvez Kayani: if these leaders are taken captive or killed, the country's nuclear arsenal would be made vulnerable. However, PAL technology would ensure that even under such circumstances, nuclear weapons could not be set off without proper authorization.

Another cause for greater weapon security comes from the historic and ongoing hostility between Pakistan and India. Based upon extreme religious ideologies, anti-Indian radicals could potentially use nuclear weapons as a way to trigger violence and mayhem between the two countries. It is an understatement to describe a nuclear exchange between Pakistan and India as a calamity of global proportions. Both countries contain cities with very densely populated cities. India's Mumbai is the second largest city in the world with a staggering 13.9 million people.^{lxxiv} Pakistan's Karachi is third with 12.8 million people.^{lxxv} A single bomb dropped on any of these populated areas would be catastrophic.

Anti-Indian groups are not the only concern. Other terrorists groups, such as Al Qaeda, would also be prevented from using Pakistan's nuclear weapons in the event that they were to be stolen.^{lxxvi} Despite substantial American financial assistance in securing against such dangers,

Pakistan still faces huge threats from armed *jihadi* groups and nuclear insiders that have shown willingness to sell sensitive technology.^{lxxvii} These same insiders could not be trusted to refrain from assisting such groups from overthrowing nuclear facilities. An even more likely scenario is that in the event of a crisis between Pakistan and India, a military commander could potentially order the use of nuclear weapons on his own independent authority.^{lxxviii} Without the safety which PALs provide, such a threat would intensify Indian concerns.

Indirect threats can also appear if high-security military targets are attacked and nuclear program technicians and scientists are apprehended by terrorists. This would allow for the kidnapers to learn of vulnerabilities in the system from the perspective of an insider. Three recent kidnapping incidents have involved nuclear program personnel of the Pakistan Atomic Energy Commission (PAEC). In 2006, two PAEC scientists were kidnapped by the Taliban in the Northwest Frontier Province (NWFP). The second incident was in January 2007 when the Taliban failed at an attempt to kidnap six PAEC scientists and take them to their headquarters in Waziristan.^{lxxix} One was in February 2008, when two PAEC technicians were kidnapped by armed men, also in the NWFP.^{lxxx} As Dr. Joshi notes, “While such groups might not have the intention to acquire nuclear/radiological materials or attack nuclear facilities due to the technical challenges involved, intentions and strategies can change in potential opportunities present themselves.”^{lxxx} However, if Pakistan’s weapons were equipped with PAL technology, any information gained from kidnapped personnel would be useless even in the event of a terrorist takeover of a nuclear weapons facility.

The final reason the U.S. should choose to support Pakistani adoption of PAL technology would be for diplomatic reasons. Although U.S.-Pakistan relations are positive overall, there has undeniably been recent friction. As Musharraf stepped down from the presidency, the U.S. lost

one of its closest allies in the region. Rising violence on the Afghan border is causing grievances on both Pakistani and American ends. Americans accuse Pakistan of being reluctant to completely commit itself to fighting militants in its territory. In turn, Pakistanis accuse U.S. forces of overstepping their bounds with recent unilateral attacks against militants.^{lxxxii} This is seen by Pakistanis as a threat to their sovereignty and has led to growing animosity towards perceived American interference.

In spite of the benefits of increased weapon security, some Americans believe PAL technology should not be shared, and they base their claims on three arguments. The first revolves around the legality of sharing such information and technology. The second is that with PAL technology, nuclear weapons will be more likely to be deployed in moments of heightened tension, which could ultimately lead to a better chance of a nuclear war between Pakistan and India. The third view argues that sharing such information would have the undesirable effect of teaching Pakistan too much about American weaponry.^{lxxxiii}

The first question to address is the legality of sharing PAL information. Those critical of sharing PAL technology often point to the Nonproliferation Treaty (NPT). Article I of the NPT forbids signatories “to assist, encourage, or induce any nonnuclear weapon state to manufacture, or acquire nuclear weapons or other nuclear explosive devices, or control over such weapons of explosive devices.” It is important to note that Article I refers to *nonnuclear* states. Under the NPT, Pakistan is legally considered a “nonnuclear” state, as it is not a signatory.^{lxxxiv}

The Atomic Energy Act (AEA), or McMahon Act as it is commonly called, is also referenced as a legal concern. This Act originally went into effect in 1946 as an effort to maintain America’s world monopoly on nuclear weapons.^{lxxxv} Clearly it was not as effective as was hoped, and improvements were later made through the Nuclear Non-Proliferation Act

(NNPA) of 1978. The McMahon Act forbids any sharing of nuclear secrets with foreign powers on penalty of death. This was maintained within the NNPA.^{lxxxvi} Some critics of sharing PAL technology point to the grave language of this Act. Of course, this depends upon the definition of “sharing nuclear secrets.”

Another requirement that carried over from the AEA to the NNPA was for an Agreement for Cooperation to be signed when the U.S. makes any significant nuclear trade.^{lxxxvii} In addition to this, a nuclear proliferation statement (NPAS) must be provided by the Secretary of State to the President. This statement would evaluate several specifications regarding the agreement, including proof and assurance that the assistance furnished would in no way further military or nuclear explosive purpose. Some experts consider this to rule out the possibility of sharing PAL technology, as it could theoretically serve to further military or nuclear purposes.^{lxxxviii}

The final possible legal barrier lies in the Nuclear Suppliers Group (NSG), which is described as “a group of nuclear supplier countries which seeks to contribute to the non-proliferation of nuclear weapons through the implementation of Guidelines for nuclear exports and nuclear related exports.”^{lxxxix} One of the requirements the NSG makes of potential technology recipient countries is to have full IAEA safeguards met. Pakistan, however, does not meet this condition.^{xc}

Aside from legal concerns, skeptics also point to the potential impacts PAL technology could have on Pakistan’s nuclear arsenal. Pakistan’s nuclear weapons are, at present, unable to be immediately deployed as they are kept in what former President Musharraf has described as a “disassembled state.”^{xc} The adoption of PAL technology could potentially cause military leaders to change this strategy. The fear is that adoption of PALs would encourage the military to bring the bombs into an assembled state, which some say could undesirably increase the

Pakistan's ability to deploy their weapons more regularly. In the extreme view, this could lead to a higher chance of nuclear war, particularly with India.^{xcii}

Beyond issues of law, critics also point to the vulnerabilities that the U.S. itself may have to risk in the exchange of nuclear information. If an exchange of information and technology does occur, there is a concern that Pakistan will learn too much about American weaponry and safety technologies. Before September 11, 2001, there was frustration on the part of Pakistan and India for American's supposed concern for their nuclear situation. They argued that this concern was "not reflected in the American denial of technology cooperation with India and Pakistan on safety and security measures—especially those that involve interaction among scientists and sale of equipment related to nuclear safety."^{xciii} Post-September 11th policies have improved in this regard, with increased cooperation and support towards Pakistan's nuclear security. Still, U.S. officials remain reluctant to allow certain safety technologies to be shared.

There is debate within Pakistan about the adoption of PAL technology as well. Some argue in favor of adoption, citing the increased security and incentives it could mean, but politicians and scientists that remain critical of a PAL technology exchange are concerned mainly with information exchange issues as well as the belief that such securities are superfluous and unnecessary.

Those who support the technology transfer refer to the obvious reasoning that PALs would increase the security of Pakistan's arsenal. With PAL technology, nuclear weapons would be more secure from unauthorized use. Critics of the military within Pakistan cite recent failures by the military to maintain control over their personnel at the same time as fighting off increased attacks and suicide bombings.^{xciv} This increased security would guard from those apparent threats, namely the possibility of unauthorized use, access to terrorists, and breakdown in civilian

control. Another motivation for this technology exchange is an increase in US-Pakistan relations and a possible increase in U.S. financial incentives. With the current economic and food crises occurring in Pakistan, the continuance of U.S. financial support is becoming even more important.

In congruence with U.S. security concerns, Pakistani military officials are also concerned with the vulnerability that may occur during information exchange. According to Brigadier Feroz Hassan Khan, the installation of PALs would require information that he believes “in no way any country will share.”^{xcv} Such information would include particulars regarding its nuclear weapons design and system functioning details.

Lastly, Pakistan argues that PAL technology is superfluous to its arsenal. Musharraf claimed that Pakistani nuclear weapons are protected by the best systems in the world. In an interview with *Newsweek* in January of 2008, he stated that

there is a national command authority. It is the top body, headed by the president and the prime minister, and there are members from the military and the civilian side. And there's a huge strategic planning division, a full secretariat headed by now-retired [Lt. General Khalid] Kidwai. He is in charge of this Strategic Planning Division that is the secretarial arm of the National Command, responsible for development and employment. Then we have army, navy, air force, the strategic force command. If anything happens, indeed it's a failure of everyone from myself to SPD to the Army Strategic Force Command.^{xcvi}

Unfortunately, each of these lines of defense mentioned by General Musharraf has weaknesses.

Even from the most optimistic point of view—that Pakistan’s military currently has complete control of its nuclear arsenal—it remains true that PAL technology would add yet

another line of defense for an arsenal surrounded by ever-changing threats. The legal concerns described by U.S. officials have long been the single greatest argument against PAL adoption for Pakistan.

The Nonproliferation Treaty (NPT), being a multilateral treaty, does present some particular difficulties. It cannot be amended like domestic legislation, since it involves the agreement of several sovereign states. However, the NPT's forbiddance for signatories to assist non-nuclear states to "manufacture or otherwise acquire nuclear weapons" does not necessarily apply directly to security technology on pre-existing nuclear weapons. Such technology *could* be categorized under the "otherwise acquire" language. According to Gregory Giles of the Science Applications International Corporation, such a "violation" could be considered merely a breach of the "spirit" of the NPT.^{xcvii} This vague violation would likely be successfully argued against in international court if indeed it came to it.

Despite the NPT, there have been occurrences of the U.S. sharing technology to enhance the security of foreign nuclear weapons.^{xcviii} The best-known exchange involved the U.S. helping the French military to improve the safety of its nuclear weapons, which was at the time of disclosure considered to be "perhaps the best-kept secret in recent Washington history."^{xcix} To work around NPT rules, U.S. officials developed a system termed "negative guidance" or "20 questions." By listening to French descriptions of the country's research programs, the U.S. was able to give guidance by indicating whether or not they were "on the right track."^c The legality of this exchange was defended repeatedly. White House spokesman Marlin Fitzwater defended the arrangement as "entirely consistent" with the laws of both nations.^{ci}

This particular history demonstrates two things about current proliferation law. First, it shows a legal precedent of technology sharing between the U.S. and an ally when it specifically

involves the security of a nation's nuclear arsenal, and legal precedent is upheld in domestic U.S. law. More importantly, however, it shows the inefficient maneuvering that must be undergone to share weapons safety technology both as a result and in spite of outdated legislation. If a law becomes less of a barrier and more of an obstacle to be creatively circumvented, then evidently, it is outdated and senseless.

International practice shows that, as a rule, domestic legislation trumps international law.^{cii} Even if the NPT were unable to be circumvented in order to share PAL information, an amendment to domestic legislation would overrule the NPT. This is not unprecedented, since the existence of the NNPA is in effect an amendment on the McMahon Act. It is only logical that legislation regarding nuclear weapons should evolve over time as different threats change over time. Laws written in response to Cold War circumstances cannot be expected to translate perfectly to the circumstances the world faces today. Pakistan faces modern threats impacting the entire international community. Such a reality should be reflected in U.S. legislation regarding nuclear weapons. Harold M. Agnew of the Los Alamos Weapons Lab stated, "Lawyers say it's classified. That's nonsense. We should share this technology. Anybody who joins the club should be helped to get this."^{ciii} Even after legal issues have been circumvented, however, there are still other concerns that have been voiced.

The next issue to consider is the fear that weapons are more likely to be deployed after the adoption of PALs. This concern is merely speculative. Pakistani officials such as General Kidwai have repeatedly reiterated their determination to stick to "rational decision-making" to ensure that both countries keep away from the nuclear brink. It is true that animosity towards India has been constant for many years, but despite this, there have been no discussions covering the possible consequences of an attack on India, based on a mutual determination to avoid such

circumstances, especially as both sides would have much to lose in a nuclear exchange.^{civ} Even if Pakistan was determined to use its nuclear arsenal, its present “disassembled” state would not prevent rapid deployment. Indeed, General Kidwai stated that the bombs could be assembled “very quickly, which suggests that PAL technology would have little impact on the speed of deployment.”^{cv} The real danger does not come from official orders to bomb India but from terrorist plots and breakdown in military or civil control.

A third and last set of opinions to address are the American and Pakistani apprehensions regarding the vulnerability of information exchange. It cannot be denied that the details of a state’s nuclear program are understandably its most closely guarded secrets. Even the closest of allies would consider it to be hypersensitive information. For the growing security concerns in Pakistan, an extra effort should be made to find a way to share this technology. The tactics adopted to work around legal stipulations in the 1989 French example should be modified to work around sensitive information concerns between Pakistan and the U.S. However, more wide-reaching actions must be taken to create a long-term solution which would allow nuclear states to adopt the safety technologies that they require.

These difficult circumstances shed light on the necessity for a more complete reform. If indeed the chance of nuclear terrorist attacks is increasing over time, as Senator Lugar’s report claims, then swift reform is needed. Both legislation and international treaties are notoriously time-consuming when it comes to nuclear weapons and proliferation issues. With violent episodes continuing and increasing, both by domestic groups within Pakistan and by Pakistan-based terrorist groups in places such as Mumbai, long-winded debate over legislation may end up being a deadly waste of time.

In the case that Congress lacks the expediency needed to make these quick changes in

current proliferation law, the IAEA should instead be granted more power. The IAEA works as a nonbiased international organization to “promote safe, secure and peaceful nuclear technologies.”^{cv} By expanding the powers of the IAEA, a safety-technology-sharing program could be set in place, making it possible to ensure all nuclear weapons are fitted with appropriate safety technology such as PALs. With this new program, the technical transfer process of the NSG would conceivably become more adaptable as well, since the two bodies already work together in this field.

Despite its potential, the IAEA historically has been a well-meaning, but weak force in the fight for nonproliferation. Director-General Mohamed El Baradei stated in 2005, “We are limited in authority. We have a very modest budget. And we have no armies. But armed with the strength of our convictions, we will continue to speak truth to power.”^{cvii} Sadly, simple words will do little good in securing nuclear weapons or preventing proliferation. These are some of the reasons that President Obama presented while campaigning in 2008 when he took a platform to support the increase in budget for the IAEA. As Matthew Bunn points out, nuclear safety requires constant vigilance if global nuclear security is to be someday maintained. However, many of the factors involved in this endeavor are simply not within the control of Washington. With increased authority, the IAEA could work as an international independent and nonbiased party, making it more likely for nuclear states to participate and comply. International cooperation is vital.^{cviii}

PAL Potential

Pakistani adoption of PAL technology could have several positive direct and indirect impacts. Increasing the security of Pakistan’s arsenal would certainly translate into increased security for the US, Asia, and the world at large. Pakistan is often considered to be the least

secure of the nuclear states, rivaled only by North Korea. Despite the government and military's insistence that its security is impenetrable, the country's violent history has led to serious doubts about this claim. As John E. McLaughlin, former Deputy Director of the CIA pointed out, "I am confident of two things: that the Pakistanis are very serious about securing this material, but also that someone in Pakistan is very intent on getting their hands on it."^{cxix} Pakistan can do what it thinks is adequate in order to ensure the security of its nuclear weapons, but the present technical precautions are "only as good as the men who operate them."^{cx} The security which PALs would contribute to nuclear safety could make up for any shortcomings in internal personnel safety. Even if terrorists or other extremists were to gain access to the weapons, any amount of tampering would have the effect of immediately and permanently disabling them.

Another positive consequence of Pakistani PAL implementation would be to encourage India to also adopt them. Since the day India detonated its first nuclear bomb, the two countries have been competing in an arms race, and it is conceivable that the race could work in the reverse as well—towards a safer nuclear situation in the region. There is proof of this in a statement by General Kidwai, who claimed that if India renounces the possession of nuclear weapons, Pakistan would follow suit. Therefore, it is feasible that security measures successfully adopted by Pakistan could also be adopted by India.

Lastly, PAL adoption for Pakistan would be a positive result of years of U.S. investment. As of June 2008, the U.S. government had provided Pakistan's military with more than \$10 billion since 2001.^{cx} This transfer of technology would be a great accomplishment for U.S.-Pakistani relations and an indication of cooperation between the two countries. It would prove to U.S. taxpayers that Islamabad does not consider its alliance with the U.S. as a guarantee of preferential treatment or a reason to ignore American counsel.^{cxii} Successful adoption on the part

of Pakistan would indicate positive Pakistani cooperation and would allow for greater concentration on the ongoing fight against extremists in the Tribal regions.

As proliferation expert Scott Sagan observed, the world's trend towards proliferation means a world where a nuclear accident is inevitable.^{cxiii} Pakistan in particular remains an "unsettled and unsettling political phenomenon."^{cxiv} The instability of its military, intelligence, and government are of real concern to the world's safety. The fact that Al Qaeda continues to use this nuclear state as its safe-haven is not an issue of minor concern. Of course it is an exaggeration to portray Pakistan's weapons as completely unprotected, as Generals Musharraf and Kidwai have repeatedly insisted. However, history has proven time and again that the unexpected is to be expected in Pakistan.

Seven years after the attacks of September 11th, Osama bin Laden and Al Qaeda have yet to be brought to justice. They have continued their organizing and plotting over the years, first in Afghanistan and now in Pakistan. Though specifics revolving their plots may be limited, it is plain that they are not idle. They have shown interest in obtaining nuclear materials in the past, and there is no reason to assume they have given up. With everything that can be seen from Pakistan's unstable history, the U.S. is obligated to do everything within its power to keep nuclear weapons out of the grasp of its enemies. PAL technology would ensure that, in the event of any disasters in Pakistan, there would be little-to-no possibility of nuclear attack on U.S. soil. PALs may just be the one tool that keeps our modern civilization from ever becoming a "smoking ruin."^{cxv} It is time to tell Pakistan that "trust us" is simply not enough.^{cxvi}

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