

URANIUM SALES TO THE UNITED ARAB EMIRATES

Submission regarding the Agreement between the Government of Australia and the Government of the United Arab Emirates on Cooperation in the Peaceful Uses of Nuclear Energy, and the National Interest Analysis.

Submission from:

Friends of the Earth, Australia

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Again and again it has been demonstrated here and overseas that when problems over safeguards prove difficult, commercial considerations will come first.

-- Mike Rann, 1982, 'Uranium: Play It Safe'

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ACRONYMS

AONM – Australian Obligated Nuclear Materials

ASNO – Australian Safeguards and Non-proliferation Office

CTBT – Comprehensive Test Ban Treaty

DFAT – Department of Foreign Affairs and Trade

GW – Gigawatts

IAEA – International Atomic Energy Agency

MUF – Material Unaccounted For

NPT – Nuclear Non-Proliferation Treaty

WMD – Weapons of Mass Destruction

1. SUMMARY AND RECOMMENDATIONS

Friends of the Earth would appreciate the opportunity to appear before a hearing of the JSCOT to elaborate on this submission, having made substantive submissions to related JSCOT inquiries in 2006, 2008 and 2009.

The JSCOT should recommend against conclusion of the Agreement because of:

- the inadequacy of the nuclear safeguards system (an argument against uranium sales to any country and/or an argument for strengthening safeguards);
- the political volatility of the Middle East, with its recent history of political turmoil and its longer history of covert nuclear weapons programs and conventional military strikes on nuclear plants (an argument against uranium sales to any country in the Middle East);
- the inherent and untenable risks of entrusting WMD feedstock to a repressive, undemocratic, secretive state – the UAE – and associated problems such as the near-impossibility of safeguarding Australian Obligated Nuclear Materials (AONM) in the event of political chaos / revolution in the UAE.

If the JSCOT recommends in favour of the Agreement, it should recommend amendments to strengthen it. These could include:

1. The Agreement should include a blanket ban on reprocessing as opposed to the current ban on domestic reprocessing only. This is a realistic, achievable outcome that would strengthen the Agreement and set a positive precedent to help address the global problem of growing stockpiles of separated plutonium. The problem was addressed by US President Obama at a nuclear security summit last year: "We simply can't go on accumulating huge amounts of the very material, like separated plutonium, that we are trying to keep away from terrorists."
2. The JSCOT should recommend something similar to the 2009 JSCOT recommendation: "It is essential that actual physical inspection by the IAEA occurs at any Russian sites that may handle [Australian Obligated Nuclear Materials]. Further, the supply of uranium to Russia should be contingent upon such inspections being carried out."
3. The following information should be made public as opposed to the prevailing pattern of secrecy:
 - Information on the separation and stockpiling of Australian-obligated plutonium in or on behalf of the UAE (if any).
 - Information on nuclear accounting discrepancies (Material Unaccounted For) including the volumes of nuclear materials and the reasons given to explain accounting discrepancies.
 - The quantities of AONM held in the UAE. (Incredibly, ASNO has previously stated that "The actual quantities of AONM held in each country, and accounted for by that country pursuant to the relevant agreement with Australia, are considered by ASNO's counterparts to be confidential information." But does the UAE consider this information to be confidential? If so, that is indefensible and needs to be challenged.
 - Administrative Arrangements. As the National Interest Analysis notes, these include "a system of accounting and control for material, equipment and components subject to the proposed Agreement" and "provisions for the maintenance of detailed records of transactions involving AONM; an annual report on all transactions and inventories; and regular liaison with the Australian Safeguards and Non-Proliferation Office (ASNO) on the operation of the proposed Agreement, particularly reconciliation of any accounting discrepancies."

2. 'STRICT' SAFEGUARDS

A survey of 1000 Australians found that 56% believe that IAEA inspections are not effective while barely half as many (29%) believe they are effective.¹

Examples of rhetoric concerning "strict" safeguards include:

- National Interest Analysis: "Bilateral nuclear cooperation agreements such as the proposed Agreement serve Australia's national interests by setting high international standards for the use of uranium through the application of strict conditions. ... All of Australia's bilateral nuclear cooperation agreements, including the proposed Agreement with the UAE, provide stringent nuclear safeguards and security conditions designed to ensure Australian uranium is used exclusively for peaceful purposes. By virtue of Australia's extensive network of such agreements, these stringent conditions apply to a significant proportion of uranium in peaceful use worldwide, hence contributing to raising overall standards."
- Bob Carr: "Strict safeguards will apply, including for the safe handling and security of radioactive material, restrictions on re-export and guarantees of use for peaceful purposes."²
- ASNO Annual Report: "The [UAE–Australia] agreement meets Australia's strict safeguards and non-proliferation policy requirements on uranium supply."

In truth, IAEA safeguards inspections are at best periodic and partial (in non nuclear weapons states); in some cases tokenistic (e.g. China); and at worst very nearly non-existent (e.g. Russia).

The JSCOT should take note of recent history. DFAT and ASNO misled the JSCOT in 2008 by claiming that "strict" safeguards would "ensure" peaceful use of AONM in Russia and by conspicuously failing to inform that JSCOT that not a single IAEA safeguards inspection had taken place in Russia since 2001.³ The Australian Uranium Association misled the JSCOT by claiming that "the non-proliferation safeguards that will govern the export of Australia's uranium to Russia are robust" and by conspicuously failing to tell the Committee that there had not been a single IAEA safeguards inspection in Russia since 2001.⁴

The JSCOT made the common-sense recommendation that : "It is essential that actual physical inspection by the IAEA occurs at any Russian sites that may handle [Australian Obligated Nuclear Materials]. Further, the supply of uranium to Russia should be contingent upon such inspections being carried out." Yet the Gillard Government ignored the recommendation and ratified the Howard-Putin agreement, with Opposition support.

Former Director-General of the IAEA, Dr Mohamed El Baradei, is frank about the limitations of safeguards. He has noted in articles and speeches that the IAEA's basic rights of inspection are "fairly limited", that the safeguards system suffers from "vulnerabilities" and "clearly needs

¹ International Atomic Energy Agency, 2005, 'Global Public Opinion on Nuclear Issues and the IAEA – Final Report from 18 Countries', www.iaea.org/NewsCenter/PressReleases/2005/prn200516.html

² Greg Sheridan, 2 August 2012, Mid-East uranium sales on cards, The Australian, <http://www.theaustralian.com.au/national-affairs/foreign-affairs/mid-east-uranium-sales-on-cards/story-fn59nm2j-1226440724705>

³ See the relevant papers posted at <http://foe.org.au/anti-nuclear/issues/oz/u/cc>

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http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=jsct/14may2008/subs/sub3.pdf

reinforcement", that efforts to tighten the system have been "half hearted" and that the IAEA safeguards system runs on a "shoestring budget ... comparable to a local police department."

The problem of inadequate safeguards is compounded by the willingness to sell uranium to:

- all of the 'declared' nuclear weapons states (USA, UK, China, France, Russia), none of which is serious about fulfilling its disarmament obligations under the Nuclear Non-Proliferation Treaty (NPT).
- countries with a history of weapons-related research based on their civil nuclear programs (such as South Korea and Taiwan).
- countries that have not ratified the Comprehensive Test Ban Treaty (China, USA).
- countries blocking progress on the proposed Fissile Material Cut-Off Treaty (e.g. USA).
- undemocratic, secretive states with poor human rights records (e.g. China, Russia).
- there is bipartisan policy to allow uranium exports to India – a country which has not signed or ratified the NPT, has not signed or ratified the Comprehensive Test Ban Treaty, continues to produce fissile material for nuclear weapons and continues to expand its weapons arsenal and its missile capabilities.

Selling uranium to a repressive, secretive state (the UAE) – in a politically volatile region with a history of covert nuclear weapons programs and a history of conventional military strikes on nuclear plants – only compounds the problems with Australian uranium export policy.

If the JSCOT is unwilling to recommend against conclusion of the Agreement, it should hold the government to its own rhetoric and insist that "strict" safeguards actually do apply. One concrete measure would be insistence on 24/7 real-time video monitoring of nuclear plants in the UAE by the IAEA. This would raise funding issues, which could be resolved if there is the will – for example Australia's contribution to the IAEA safeguards program could be increased and that money could be recovered by a levy on uranium mining companies in Australia.

Proposals and recommendations to implement a serious safeguards system will undoubtedly meet with resistance from DFAT, ASNO and the uranium mining companies. But there is no alternative unless the JSCOT is willing to go along with the deceit that "strict" safeguards "ensure" peaceful use of AONM in the UAE.

A detailed analysis of the limitations of and problems with safeguards is included as an Appendix to this submission.

3. ECONOMICS

Uranium sales to the UAE would generate meagre export revenue:

- The UAE is planning 5.6 GW of nuclear capacity. Power reactors typically consume 182 t U / GW⁵ thus total UAE demand would be 1019 t U / year.
- If Australia supplies 18.2% of that demand (the 10-year average of Australia's share of global production from 2002–2011⁶), that will amount to 185 t U / year.

⁵ 2010 WNA figures: total uranium requirements 68,646 t U, operable reactor capacity 377.2 GW, hence 182 t U / GW. <http://web.archive.org/web/20110113183133/http://www.world-nuclear.org/info/reactors.html>

⁶ See Appendix 1 in 'Yellowcake Fever: Exposing the Uranium Industry's Economic Myths', Australian Conservation Foundation, April 2013,

- Assuming a price of \$103,000 / t U (the same as that realised for Australia's uranium exports in 2011/12), revenue will amount to \$19.1 million / year. That represents a 3% increase above 2011/12 uranium export revenue of \$607 million. Export revenue from all goods and services would increase by 0.006% above the 2011/12 figure of \$315 billion.

In the unlikely event that nuclear capacity in the UAE reaches 20 GW, and using the same assumptions, revenue would be \$68.2 million / year, total uranium export revenue would be 11% above the 2011/12 figure, and total revenue from all goods and services would increase by 0.02% above the 2011/12 figure of \$315 billion.

It is anyone's guess how Daniel Flitton, writing in *The Age*, arrived at the conclusion that uranium sales to the UAE are "potentially worth up to \$200 million".⁷ The figure has no basis in reality.

The claim in the National Interest Analysis that the Agreement would open "an important expanding market for Australian uranium producers" has no basis in reality.

4. ENRICHMENT AND REPROCESSING

"Reprocessing provides the strongest link between commercial nuclear power and proliferation."
 – US Congress, Office of Technology Assessment, *Nuclear proliferation and safeguards*. June 1977:
 p.12.

The inclusion in the Agreement of bans on domestic enrichment and reprocessing in the UAE is welcome.

The Agreement should go further by banning reprocessing altogether.

Reprocessing involves dissolving spent nuclear fuel in acid and separating the unused uranium (about 96% of the mass), plutonium (1%) and high level wastes (3%). Reprocessing is arguably the most dangerous and dirty phase of the nuclear fuel chain. Reprocessing generates large waste streams with no management solution and it separates weapons-useable plutonium from spent fuel.

Proponents of reprocessing give the following four justifications:

1. Reducing the volume and facilitating the management of high level radioactive waste.

However reprocessing does nothing to reduce radioactivity or toxicity, and the overall waste volume, including low and intermediate level waste, is increased by reprocessing. Steve Kidd from the World Nuclear Association noted in 2004: "It is true that the current Purex reprocessing technology (used at Sellafield and La Hague) is less than satisfactory. Environmentally dirty, it produces significant quantities of lower level wastes."

2. 'Recycling' uranium to reduce reliance on natural reserves.

<http://www.acfonline.org.au/news-media/media-release/high-risk-low-return-uranium-industry%E2%80%99s-poor-record-demands-inquiry>

⁷ Daniel Flitton, 2 August 2012, 'Mid-East uranium sale gets go-ahead',
<http://www.theage.com.au/national/mideast-uranium-sale-gets-goahead-20120801-23fy4.html>

However, only an improbably large expansion of nuclear power would result in any problems with uranium supply this century. A very large majority of the uranium separated from spent fuel at reprocessing plants is not reused, but is stockpiled. Uranium from reprocessing is used only in France and Russia and accounts for only 1% of global uranium usage according to the IAEA.⁸ It contains isotopes such as uranium-232 which complicate its use as a reactor fuel.

Reprocessing only marginally increases the efficiency of uranium consumption – by a factor of 1.3 according to the World Nuclear Association.⁹ In any case Australia's uranium mining companies would presumably prefer to supply fresh uranium on an ongoing basis rather than have the export market reduced by the use of reprocessed uranium (and/or reprocessed plutonium in MOX). Michael Kirwan, British Energy's finance director, said in 2000: "As far as we are concerned, reprocessing is an economic nonsense and should stop straight away."¹⁰

3. Separating plutonium for use as nuclear fuel.

However there is very little demand for plutonium as a nuclear fuel. It is used in 'MOX' reactor fuel (mixed uranium-plutonium oxide), which accounts for 2–5% of worldwide nuclear fuel, and in a small number of fast neutron reactors.

4. Using plutonium as a fuel so that it can no longer be used in nuclear weapons.

However, reactors which can use plutonium as fuel can produce more plutonium than they consume. Moreover, since there is so little demand for plutonium as a reactor fuel, stockpiles of separated plutonium continually grow and now amount to several hundreds tonnes. Reprocessing has clearly worsened rather than reduced proliferation risks. Addressing the problem of growing stockpiles of separated plutonium could hardly be simpler – it only requires that reprocessing be slowed, suspended, or stopped altogether.

The main reason reprocessing proceeds is that reprocessing plants act as long-term, *de facto* storage facilities for spent nuclear fuel. Unfortunately this sets up a series of events which has been likened to the old woman who swallowed a fly – every solution is worse than the problem it was supposed to solve:

- The perceived need to do something about growing spent fuel stockpiles at reactor sites (not least to maintain or obtain reactor operating licences), coupled with the lack of repositories for permanent disposal, encourages nuclear utilities to send spent fuel to commercial reprocessing plants, which act as long-term, *de facto* storage sites.
- Eventually the spent fuel must be reprocessed, which brings with it proliferation, public health and environmental risks.
- Reprocessing has led to a large and growing stockpile of separated plutonium, which is an unacceptable and unnecessary proliferation risk.
- Reprocessing creates the 'need' to develop mixed uranium-plutonium fuel (MOX) or fast neutron reactors to make use of the plutonium separated by reprocessing.

⁸ IAEA – International Atomic Energy Agency, 2006, "Nuclear Technology Review 2006", www.iaea.org/OurWork/ST/NE/Pess/assets/ntr2006.pdf

⁹ WNA, Supply of Uranium, updated August 2012, <http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-Resources/Supply-of-Uranium/#.UYXvj8rwBq0>

¹⁰ World Information Service on Energy, 'Nuclear Monitor'.

- All of the above necessitates a global pattern of transportation of spent fuel, high level waste, separated plutonium and MOX, with the attendant risks of accidents, terrorist strikes and theft leading to the production of nuclear weapons.

None of this is logical or justifiable on non-proliferation, environmental, public health or economic grounds but it suits the short-term political or commercial objectives of those involved.

There are compelling reasons – environmental, proliferation, public health and economic reasons – to ban reprocessing and no reason whatsoever to entertain the possibility of UAE spent fuel being reprocessed.

Finally, it should be noted that reactor-grade plutonium can be used in weapons, albeit the case that it is not ideal and potentially poses problems in relation to weapon reliability and yield. On this topic see:

- Dr Alan Robert's contribution to Briefing Paper #19 at www.energyscience.org.au
- Friends of the Earth briefing paper: www.foe.org.au/anti-nuclear/issues/nfc/power-weapons/rgpu

5. LACK OF DEMOCRATIC RIGHTS AND MEDIA FREEDOM

The pattern of entrusting WMD feedstock to undemocratic states (e.g. China, Russia) should be wound back not extended.

Australia was negotiating uranium sales with the Shah of Iran not long before the 1979 Iranian revolution. Had uranium been exported, it is difficult to envisage a happy ending – it is difficult to envisage adequate safeguarding post-revolution, and still more difficult to envisage a hostile regime voluntarily sending AONM to Australia.

Reporters Without Borders ranks the UAE 114th among the world countries in its 2013 World Press Freedom Index.¹¹

Reporters Without Borders documents some of the recent problems:¹²

- 9 April 2013 – Grip tightened – Ten months in jail for tweets, new threat to freedom of information
- 25 March 2013 – Closed-door trial – News blackout imposed on trial of 94 activists on national security charges
- 28 January 2013 – Human rights groups call for an end to the crackdown on human rights defenders and political activists. Today, the human rights record of the United Arab Emirates will be reviewed by the UN Human Rights Council.
- 22 July 2012 – Authorities resort to new wave of arbitrary arrests to bolster stability. In the United Arab Emirates, claiming one's rights is treated as a crime against state security.
- 25 May 2012 – Stateless blogger facing deportation after being tricked by immigration authorities. Reporters Without Borders condemns the possibly imminent deportation of Ahmed Abdul Khaleq, a blogger and member of a group of five pro-democracy activists known as the "UAE 5".

¹¹ <http://en.rsf.org/press-freedom-index-2013,1054.html>

¹² <http://en.rsf.org/united-arab-emirates.html>

- 30 March 2012 – Authorities crack down on social networks and activist bloggers. "The Emirati authorities are cracking down harder on bloggers and netizens who criticize the regime," Reporters Without Borders said. "March has seen a wave of arrests, attacks and acts of intimidation. We urge the government to abandon these methods. The authorities must stop arresting netizens and bloggers for what they post online and must guarantee their safety."

Reuters reported on 2 August 2012:¹³

Nine antigovernment activists have been arrested in the United Arab Emirates in the last two days. Authorities claim the arrest were connected to an investigation into foreign-linked groups that threaten the state's security. International human rights groups and activists described the recent arrests as a "draconian response to the mildest calls for modest democratic reforms." Human Rights Watch urged the US and British governments to speak up about the situation in UAE. "After all their fine words over the past year about standing up for democracy and human rights in the Arab world, the US and the UK have completely lost their voices when it comes to the UAE," HRW's Deputy Middle East Director Joe Stork said in a statement on Wednesday. Amnesty International has called on UAE authorities to disclose the whereabouts of those arrested, expressing concerns about possible mistreatment of the detainees. ...

Political studies professor Stephen Zunes of the University of San Francisco said that the UAE's stated reasons for the arrests seem unrealistic, and that the country's opposition movement is part of a general desire for greater civilian input in government. The arrests are "another sad chapter in the crackdown against any dissent under that authoritarian regime," Zunes said. "There's fundamentally no real input by the people themselves, no political pluralism, no opposition parties, no means for people to express their grievances," he said. "And no matter how rich you are and what you provide, sooner or later people are going to say 'Hey, we want some input about the direction of our country.'"

Rodger Shanahan wrote the following in an article for the Lowy Institute¹⁴:

If our relations with China have taught us one thing, it is that politics is politics and business is business. This means that the economic benefits of a close relationship with a rich partner might necessitate skipping over such unpleasantness as autocratic rule and the odd human rights abuse. But at least we can satisfy ourselves with the thought that other places do political repression much worse and on a grander scale.

So in the midst of one of the most tumultuous periods in Middle Eastern history, it appears that our 'hear no evil, see no evil' approach, which has worked so well with China, is now being employed with one of our close regional allies, the UAE.

The closeness of our relationship is not only illustrated by the Emiratis hosting our military base at al-Minhad, but also by our recent announcement of a \$200 million deal to sell uranium to the UAE, and the UAE's announcement at the same time that it would support Australia's bid for a seat at the UN Security Council.

¹³ <http://www.rt.com/news/uae-activists-arrests-draconian-response-654/>

¹⁴ Rodger Shanahan, 7 August 2012, 'Australia uses China policy on UAE', <http://www.lowyinterpreter.org/post/2012/08/07/Australias-China-policy-with-the-UAE.aspx>

What you won't hear from the Government or Foreign Affairs Minister Bob Carr is any mention of the Emiratis recent intolerance for anything that approaches free speech. This strikes one as, well, hypocritical, considering this government has espoused the need for autocratic rulers to listen to the voice of the people and in some cases to step aside when they don't adopt this approach.

On the surface, the UAE is a socially liberal Arab state with which we and many other Western countries have close relations. But below the surface, the UAE is demonstrating that it is just as politically illiberal as other Arab regimes. How else to explain the forced closure earlier this year of democracy promotion NGOs such as the US-funded National Democratic Institute and the German-funded Konrad Adenauer Foundation? Concerns about what has been happening in the UAE are neatly summarised in an article on Open Democracy.

Of more concern than the action against foreign NGOs, however, has been the detention without charge of over 50 political and human rights activists accused of a rather Orwellian-sounding plot against state security and the rather more standard claim that they had unspecified ties 'to foreign parties'. It appears that no political activists in the Arab world, be it in Syria, Bahrain, Saudi Arabia, the UAE or Egypt, ever has a legitimate domestic political complaint: all political opposition is always carried out at the behest of foreign powers.

And what is Australia's view on the crackdown on political activists and the closure of democracy-promoting institutes in the UAE? You guessed it: nothing.

Minister Carr's statements have spoken of our close trading relationship but you won't find a single word of criticism leveled against the Emiratis for their unwillingness to countenance free speech. I am an advocate of close relations with the UAE because I believe it serves both our national interests. But a relationship in which we have to remain silent about repression of individual freedoms in order to maintain business interests is one in which we reveal ourselves to be less an activist middle power than a subservient mineral exporter. Reminds one of our China strategy.

Kristian Coates Ulrichsen wrote a detailed analysis of the problems in August 2012 – excerpts follow:¹⁵

The arrest and detention of 54 political and human rights activists in the United Arab Emirates has thrown the spotlight on one of the most autocratic and least institutionalised Persian Gulf monarchies.

This depressing turn of events has momentous consequences for the sustainability of the social contract binding states and societies in the Gulf together. It also calls into question the judgement of international institutions that bought into the benevolent 'images' so carefully promoted by ruling elites. As a deeply-tribal and largely homogeneous society that has also engaged heavily both in state-branding and institutional partnerships in recent years, the security crackdown in the UAE holds particular resonance. Moreover, it raises fundamental questions about the future of authoritarian ruling families whose instinctive response to the

¹⁵ Kristian Coates Ulrichsen, 5 August 2012, 'The UAE: holding back the tide', <http://www.opendemocracy.net/kristian-coates-ulrichsen/uae-holding-back-tide>

appearance of domestic opposition is to suppress it and wish it out of existence. Failure to acknowledge the zeitgeist sweeping so powerfully across the region means rulers run the risk of losing control and ensuring that change, when it comes, will be sudden and violent, rather than incremental and consensual.

With the Arab Spring well into its second year, the authorities in the UAE have consistently mismanaged the limited pressures for reform. Far from projecting a vision of strength, these missteps have exposed the regime's absolute mistrust of any political or democratic development. A collection of seven emirates dominated by Abu Dhabi and Dubai, the country has one of the least participatory political systems in the world. Elections to the (advisory) Federal National Council were held for the first time in 2006, but were excessively, even ludicrously, controlled. Only 6889 voters - less than 1 percent of the national population who were hand-picked by their rulers - were permitted to vote for half of the seats, with the remainder filled by appointed members. Lacking legislative power, the council resembled a talking shop until the popular uprisings in Tunisia and Egypt empowered people across the Arab world with notions of political freedoms and public accountability.

By comparison with the momentous developments in North Africa and neighbouring Bahrain, early calls for political reform in the UAE were extremely cautious. On 3 March 2011, a petition signed by 132 Emiratis requested that all UAE citizens be given the right to vote and that the Federal National Council be vested with legislative powers. Yet even these most moderate of demands were too much for the leadership in Abu Dhabi, who responded by arresting five high-profile advocates for reform, for "breaking laws and perpetrating acts that pose a threat to state security, undermining the public order, opposing the government system, and insulting the President," the (unelected) hereditary ruler of Abu Dhabi, Sheikh Khalifa bin Zayed Al-Nahyan.

The five detainees included a champion of human rights and free discussion of UAE issues, Ahmed Mansour, and leading Emirati economist, Nasser bin Ghaith. Mansour had founded the www.uaehewar.net website in August 2009 as a platform for the discussion of politics, development, and society in the Emirates. This online forum featured hundreds of postings on sensitive issues (such as the acquittal in January 2010 of Sheikh Issa bin Zayed al-Nahyan, the half-brother of the President who had been captured on video allegedly torturing a South Asian man), before it was blocked the same month. ...

After eight months of detention, the 'UAE5', as they became known, were convicted of insulting the rulers of the UAE following a trial riddled with inconsistencies and denounced by human rights organisations. On the following day, they were pardoned by the President, doubtless wishing to appear the benevolent father-figure forgiving his wayward citizenry, but their criminal records remained, making it impossible for them to obtain the 'certificate of good conduct' necessary to work and even marry in the UAE.

Almost immediately, the state security cracked down again, stripping six members of the Islamist Jamiat Al-Islah wa Tawjih (Association for Reform and Guidance) movement of their citizenship. ...

This obsession with national security formed the prelude to an intensifying campaign of repression intended to stamp out the Islah threat once and for all. 50 people have been detained since March 2012 with 36 arrested since 16 July alone. The whereabouts of 38 of the men remain unknown, and Amnesty International has expressed concerns that the detainees

are at risk of being tortured. One of the original 'UAE5,' Ahmed Adul Khaleq, was re-arrested in May and deported to Thailand on 16 July, on a Comoros Island passport, after being told by prison officials that he would be imprisoned indefinitely without formal charge if he refused to leave. Abdul Khaleq is a member of the stateless ('bedoon') community and founder of the Emiraty Bedoon website that sought to draw attention to their plight. His family has been harassed by the UAE authorities and his six sisters have been threatened with arrest if he resumes his activism while in Thailand.

Of additional concern is that some of the arrests were reportedly carried out by un-uniformed men said to be non-Emiratis. These could be members of an 842-strong group of Colombian soldiers and former soldiers said to be operating within the UAE; according to a May 2011 New York Times exposé, they were hired by former Blackwater head Eric Prince at the behest of the Abu Dhabi authorities to defend the UAE from terrorist attacks and internal revolt. Explosively, the Times article claimed that Prince had given orders to recruit only non-Muslims, from South Africa and the French Foreign Legion in addition to Columbia, as Muslim soldiers "could not be counted on to kill fellow Muslims." ...

One of the most high-profile arrests was that of Dr Mohamed al-Roken, whose whereabouts remain unknown following his detention on 17 July. Al-Roken was one of the most prominent human rights lawyers in the UAE, and had served as co-defense counsel for two of the 'UAE5' in 2011. Disturbingly, when another lawyer (Salim al-Shehhi) went to the State Security Prosecution office to represent al-Roken, he himself was detained.

With the arrests continuing almost on a daily basis, it is hard to predict when they will end. Yet it is clear that they fall into a larger pattern of the suppression of the limited spaces that hitherto had existed for discussion, debate, and association in the UAE. As part of the April 2011 crackdown, the elected boards of the Teacher's Association and the Jurists' Association (the latter headed by al-Roken) were dismissed and replaced by government appointees. A draft new judicial law discussed in a closed session of the Federal National Council on 26 July 2012 would, if passed, change the UAE constitution by placing the Federal Judicial Council under the President, rather than the Minister of Justice, thereby doing away with any separation of powers between the executive and judiciary branches of government. And the outspoken Chief of Police in Dubai, Dahi Khalfan, has shown scant regard for due process or the presumption of innocence with a series of inflammatory outbursts warning of international plots to overthrow Gulf rulers. ...

Over the past few years, the country's rulers have branded it as a regional hub for businesses and institutions looking to set up in the Middle East. A large part of the appeal rested on the emphasis on tolerance of other cultures, openness to diversity, and special free zones operating beyond national laws. It was very successful, as prestigious and high-profile international organisations and multinational corporations located their regional offices in the UAE ... With each new arrest, it will become progressively harder for these predominantly cultural and educational institutions to continue to justify their engagement with a country currently so inimical to the freedoms and values they claim to represent.

6. NUCLEAR POLITICS IN THE MIDDLE EAST

There is a long history of covert nuclear weapons programs in the Middle East. This is well documented – see for example the paper posted at <http://foe.org.au/sites/default/files/CivMil-CaseStudies2010.doc>

It seems clear that the UAE has no short-term agenda of developing nuclear weapons, but that could change quickly (particularly in response to developments in Iran). Moreover a nuclear power program in the UAE will inevitably and unavoidably lower several key barriers to weapons, in particular by providing a source of fissile material, and the development of cadres of nuclear scientists and engineers whose expertise could readily be turned to a weapons program. On that last point, Ian Jackson writes in *International Affairs*¹⁶:

The scientific principles of nuclear physics developed to control energy release from nuclear fission in a reactor core apply equally well to nuclear explosive devices. The physics of nuclear weapons is really a specialized sub-set of general nuclear physics, and there are many theoretical overlaps between reactor and weapon design. The three practical skill sets common to both nuclear energy and nuclear weapons research programmes are nuclear physics, radiochemistry and metallurgy. High performance computing and fluid dynamics mathematical modelling skills are also useful from a design standpoint. In particular, the same practical metallurgical and radiochemical expertise needed to fabricate and reprocess nuclear fuel rods can be readily applied to the extraction, purification, alloying and shaping of the plutonium component of a nuclear warhead. Indeed, when I myself changed career from working at Britain's civilian Atomic Energy Research Establishment (Harwell) to inspecting the military AWE Aldermaston nearly a decade later, I was surprised at the technical similarity of energy and bomb research. The career transition was relatively straightforward, perhaps signalling the intellectual difficulty of separating nuclear energy technology from that of nuclear weapons.

Military strikes on nuclear reactors and plants in the Middle East, to date, include the following:

- Israel's destruction of the Ozirag research reactor in Iraq by aerial bomb strike in 1981;
- Attempted military strikes by Iraq and Iran on each other's nuclear facilities during the 1980-88 war;
- The US destruction of two smaller research reactors in Iraq in 1991;
- Iraq's attempted missile strikes on Israel's nuclear facilities in 1991;
- Israel's aerial bomb strike destroying a suspected nuclear plant in Syria in 2007.

Ian Jackson writes in *International Affairs*¹⁷:

A future regional nuclear arms race might be inevitable if—as seems likely—Iran eventually produces sufficient weapons-grade uranium and nuclear technology to break out of the international control regime. A matching civil nuclear energy programme undertaken jointly

¹⁶ Ian Jackson, 2009, 'Nuclear energy and proliferation risks: myths and realities in the Persian Gulf', *International Affairs* 85:6, pp.1157–1172, <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-2346.2009.00855.x/full> or http://www.chathamhouse.org/sites/default/files/public/International%20Affairs/2009/85_6jackson.pdf

¹⁷ Ian Jackson, 2009, 'Nuclear energy and proliferation risks: myths and realities in the Persian Gulf', *International Affairs* 85:6, pp.1157–1172, <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-2346.2009.00855.x/full> or http://www.chathamhouse.org/sites/default/files/public/International%20Affairs/2009/85_6jackson.pdf

and rapidly by Gulf Arab states would be a sensible strategic precaution. A civil nuclear energy programme has an implied military deterrent value because it keeps opponents guessing about whether the state also has a hidden nuclear weapons capability. ...

Before Iran's Islamic revolution in 1979, America supplied Tehran with its first 5 megawatt (MW) research reactor at Tehran University fuelled by weapons-grade 93 per cent enriched uranium-235: a situation that would be unthinkable today, such is the deterioration that has since taken place in US–Iran relations. The Tehran Nuclear Research Centre reactor started operation in 1968 and is now part of the Atomic Energy Organization of Iran. This reversal of fortune provides an important lesson on the inherent risks of nuclear technology transfer to friendly but potentially unstable developing states. Both the Islamic revolution in Iran and the communist revolution in Cuba clearly illustrate the severe geopolitical risks of nuclear technology falling into the wrong hands. ...

Major political change in the UAE cannot be ruled out. The Emirates are a young country, granted independence from Britain less than 40 years ago in 1971. Its founding fathers, His Highness President Sheikh Zayed bin Sultan Al Nahyan and Prime Minister Sheikh Maktoum bin Rashid Al Maktoum, died in 2004 and 2006 respectively. A shift within the balance of power among the seven Emirates that constitute the UAE federation, an Islamic ideological revolution fundamentally changing the UAE's commercial relationship with the West, or even a future invasion of the UAE by its stronger military neighbours would give the new ruling forces control of 4 per cent of world oil reserves and convenient access to a modern fleet of nuclear power stations. If Kuwait had had nuclear power reactors when it was invaded by Iraq in 1990, the scorched earth policy implemented by Saddam Hussein during the 1991 withdrawal of Iraqi forces might have resulted in serious radioactive contamination release, in the worst case perhaps on a similar scale to Chernobyl. As it was, hundreds of Kuwaiti oil wells were set ablaze by the retreating Iraqi army, causing an environmental and economic catastrophe.

The threat of deliberate destruction of an operating nuclear reactor core might offer a very handy bargaining chip for an occupying invader facing military defeat by western allies. ...

What can we conclude about nuclear energy and proliferation risks in the Persian Gulf region? In pragmatic terms, it is unlikely that the technologies for nuclear power and nuclear weapons can be kept totally separate. They share too much overlapping scientific knowledge and their practitioners have similar skill sets in nuclear physics, radiochemistry and metallurgy. Realistically, the UAE would probably gain sufficient domestic capability to weaponize its civil nuclear energy programme within ten years. The ENEC has publicly declared an Emiratization strategy to train and employ 2,300 home-grown nuclear staff by 2020. Iran probably already has the technical capability and merely awaits the production of sufficient enriched uranium for its bomb designs. ...

The UAE's policy commitments to lease returnable fuel supplies from the West under take-back agreements and not to reprocess spent fuel send a very strong signal of peaceful intent. ... Despite these good intentions, the Persian Gulf remains a politically sensitive region. There is a risk that the current civil nuclear technology race might accidentally tip the region into a future nuclear arms race.

Missile technology

The Nuclear Threat Initiative notes that: "The United Arab Emirates is not a party to the Hague Code of Conduct Against Ballistic Missile Proliferation or the Missile Technology Control Regime (MTCR), but asserts it abides by MTCR guidelines. However, in 1998 the UAE purchased an undisclosed number of Black Shaheen cruise missiles, which exceed MTCR capability limitations, from France and the United Kingdom. The deal drew protests from the United States, who eventually conceded that "MTCR members have not always agreed with each others' interpretation of the MTCR guidelines." ¹⁸

Inadequate export controls

Fitzpatrick notes the UAE used to be a hub for the AQ Khan nuclear proliferation network and that despite progress, more needs to be done regarding export controls: ¹⁹

The UAE is implementing new export control laws put in place at Washington's recommendation. In order to crack down on Iranian front companies, the UAE in 2008 sharply reduced the number of business licenses and work visas to Iranian citizens. Nevertheless, UAE export controls still need to be tightened, particularly in the emirate of Dubai, in order to stem the flow of illicit transshipments to Iran in contravention of UN sanctions.

The Nuclear Threat Initiative notes that: ²⁰

With its many voluntary commitments, the UAE has set a positive nonproliferation example for other nuclear newcomer states. However, the UAE will need considerable foreign assistance and time to follow through on the nonproliferation pledges it has made. Without these, experts caution a "commitment-compliance gap" may emerge, whereby the UAE lacks the institutional capacity to fully adhere to its commitments. This is of particular concern in the area of nonproliferation export controls, as the UAE only passed its first comprehensive nonproliferation export control legislation in 2007, and historically has been a major transit point for illicit transactions involving Iran and other neighboring countries.

The UAE has pledged its support for the Nuclear Suppliers Group's export control guidelines, and cooperated with efforts to bar shipments of sensitive technologies to Iran. However, historically the UAE has reportedly housed "hundreds of front companies and foreign trading agencies that actively procure dual-use items for entities in countries under sanction." Dubai's territory was a known hub for the A.Q. Khan network, which illicitly supplied nuclear technology to countries such as Iran, Libya, and North Korea. While the UAE is making good-faith efforts to crack down on illicit trafficking, the development of robust export controls, border security, and related legal infrastructure requires significant time and resources.

A.Q. Khan network's involvement in the UAE

¹⁸ NTI Country Profile – United Arab Emirates, February 2013, <http://www.nti.org/country-profiles/united-arab-emirates>

¹⁹ Mark Fitzpatrick, 'Drawing a Bright Redline: Forestalling Nuclear Proliferation in the Middle East', Arms Control Today, January/February 2009, http://www.armscontrol.org/act/2009_01-02/Fitzpatrick

²⁰ NTI Country Profile – United Arab Emirates, February 2013, <http://www.nti.org/country-profiles/united-arab-emirates>

The AQ Khan network's extensive involvement in the UAE is documented at http://www.historycommons.org/timeline.jsp?timeline=aq_khan_nuclear_network_tmln&aq_khan_nuclear_network_tmln_a__q__khan_s_proliferation_network=aq_khan_nuclear_network_tmln_united_arab_emirates

Excerpts follow:

Before September 1980: A. Q. Khan Associate Sets Up Business in Dubai

Abdus Salam, a supplier for the Pakistani nuclear weapons program run by A. Q. Khan, moves from Britain to Dubai, United Arab Emirates. Salam had supplied equipment for the weapons program from Britain, but the local authorities became extremely interested in his activities (see (Fall 1979), forcing his relocation. The move is performed in co-operation with the British businessman Peter Griffin, a close associate of Salam and Khan who also wants to leave Britain because of heavy interest in his work by the authorities. Salam and Griffin agree that Salam will move to Dubai first, with Griffin remaining in Britain to look after that end of Khan's supply chain. Griffin will say that one reason for the move is that "UK exports to Dubai were not so heavily watched and from there could go anywhere." In Dubai, Salam serves as a director of a company called Khalid Jassim General Trading, apparently named after his local partner. When visited by a reporter for The Times of London in September 1980, the company consists of a single room inside a small apartment and has only two office staff.

September 1980: Reporter Finds Equipment for Pakistani Nuclear Weapons Program outside Office of A. Q. Khan Associate in Dubai

Times of London reporter Simon Henderson finds equipment needed for Pakistan's nuclear weapons program outside the office of a supplier in Dubai, United Arab Emirates. The equipment, found in a hallway outside the office of Khalid Jassim General Trading, is in four boxes labelled "Mikron infrared thermometers." The manufacturer, Mikron Instruments of New Jersey, had been told the instruments were for a cement factory in Sharjah, near Dubai. However, Mikron says the instruments can be used to measure the temperature of "moving objects without making contact and in conditions of extreme radiation," which Henderson thinks makes them "ideal" for use in uranium enrichment centrifuges. Khalid Jassim General Trading and one of its owners, Abdus Salam, have been shipping parts to A. Q. Khan, head of Pakistan's nuclear weapons program, for some time.

1982-1983: A. Q. Khan Associate Leaves Dubai, Apparently due to Dispute with Local Partner

Some time in 1982 or 1983, Abdus Salam, a member of the nuclear proliferation ring run by Pakistani scientist A. Q. Khan, leaves Dubai, United Arab Emirates. Salam had been doing business there for some time, using the company Khalid Jassim General Trading. According to David Reed, who will later do business with Salam in Florida, Salam departs Dubai after being sued by the local partner in a joint venture, presumably Khalid Jassim. Salam will tell Reed that the partner claimed to a court that he—the partner—had started the business and put up all the money, the court had sided with the local, and Salam had lost all his money and been sent to jail. Salam arrives in the US around this time.

May 1994: A. Q. Khan Associate Asks about Setting Up Machine Shop in Dubai

Bukhary Sayed Abu Tahir, a key associate of Pakistani nuclear proliferator A. Q. Khan, calls British businessman Peter Griffin to inquire about purchasing various machines for a workshop to be set up in Dubai. Griffin will later say he asks Tahir, "Is it nuclear?" but Tahir replies it is not. Tahir apparently tells Griffin the machines are for the Libyan National Oil Company, which wants to replace burnt-out machinery—a workshop in Dubai could manufacture spare parts without being troubled by

sanctions. Griffin will say, "I saw no problem with that and sent over a container-load of catalogs, all the usual stuff for a standard machine shop." Nothing will happen with the deal, which will turn out to be related to Libya's nuclear program, until 1997.

1997: Audit Finds Major Discrepancies in Accounts of Company Owned by A. Q. Khan Associate

An audit of SMB Distribution, a Dubai-based company owned by Bukhary Sayed Abu Tahir, finds a series of problems in its accounts. The audit is conducted by Peter Griffin, like Tahir an associate of A. Q. Khan's, at Tahir's request. Based on an interview of Griffin, authors Adrian Levy and Catherine Scott-Clark will say that Griffin discovers "major discrepancies between what was being bought and sold" by the company. This will lead Griffin to be suspicious of SMB Distribution, but he will continue to do business with Tahir.

August 1997: British Associate of Khan Sets Up Dubai Company Allegedly Involved in Proliferation

Peter Griffin, a British businessman who has been working with the A. Q. Khan nuclear proliferation network for two decades (see Summer 1976), sets up a company called Gulf Technical Industries (GTI) in Dubai, United Arab Emirates. The company's establishment is a result of an order from one of Khan's other associates, Bukhary Sayed Abu Tahir, has told Griffin he will place with him. Tahir first mentioned the order, said to be worth \$10 million, in 1994, but nothing had come of it then. Tahir now says that the deal, which he claims is for a machine shop to produce spare parts for the Libyan National Oil Company, is back on. As a result of Tahir's inquiry, Griffin moves back to Dubai with his wife Anna and starts the company up.

Early 1998: Pakistan Military Tells A. Q. Khan He Should Keep a Lower Profile

At some point in early 1998, the Pakistani military tells nuclear scientist A. Q. Khan that he should keep a lower profile. The request is apparently made as a result of US pressure on Pakistani nuclear proliferation operations. In addition, Western and Israeli intelligence services are aware of Khan's operations in Dubai, a hub for his business, making it unsecure. In response to these twin stimuli, Khan will decide to make use of his contacts in Southeast Asia and Africa, to which elements of his operations will be relocated.

May 7, 1999: Shipment of Special Aluminum for A. Q. Khan Network Seized in London

A shipment of special aluminum for the A. Q. Khan network is seized in London by British customs. The shipment was arranged by Abu Bakr Siddiqui, a British-based supplier for the Khan network. Siddiqui's company, Orland Europe Ltd., received the order in November 1998 from a Dubai-based facilitator for Khan's network named Bukhary Sayed Abu Tahir, but it had originated with Mohammad Farooq, director of foreign procurement at Khan Research Laboratories.

Siddiqui Warned - Customs learned of the order thanks to a tipoff from the British intelligence agency MI6. Customs agent Maxine Crook and a colleague called on Siddiqui in January 1999 to inform him that the export of some metals required a license, and, if there was any doubt, it was best to contact the Department of Trade and Industry (DTI) to check if one was required for a specific transaction. Crook also told Siddiqui that he should contact the DTI if he again did business with three companies with which he had previously traded, and that Dubai was a well-known "diversionary point" for goods going to "countries of concern" related to the smuggling of components for nuclear programs. Finally, Crook told Siddiqui he should consult the DTI about the current order for the aluminum. After the visit, Crook sent Siddiqui a letter summarizing the main points of the visit, and Siddiqui acknowledged the letter.

Seizure - Siddiqui went ahead with the order without asking for a license anyway, and customs officials seize it on the docks in London. A search of his home and office yields records of millions of dollars' worth of equipment that has been shipped to Khan over the last decade, a brochure describing the uranium enrichment process, a photo of Siddiqui and Khan together, and a magazine

with an article on Khan in which he said he wanted to "buy whatever we can from the international market" to support Pakistan's nuclear program.

After May 10, 1999: British Customs Expands Investigation into A. Q. Khan Associate; Arranges to Arrest Dubai-Based Businessman

Following a raid on Abu Bakr Siddiqui, a supplier for A. Q. Khan's nuclear proliferation ring, British customs examines the evidence it has seized and realizes that the investigation is not a simple case of Siddiqui exporting specialized metals without a license, but that they have opened a much larger can of worms. The investigation, known as Operation Akin, is led by Atif Amin, a British-born Muslim of Pakistani descent assigned to a special counterproliferation team, and they question Siddiqui twice, learning a lot more about the Khan network in the process. Customs also arranges that if a contact of Siddiqui, the Dubai-based businessman Bukhary Sayed Abu Tahir, enters Britain, he will be arrested.

Shortly Before May 26, 1999: United Arab Emirates Minister Tours Pakistani Nuclear Weapons Site
Sheikh Abdullah bin Zayed Al-Nahyan, the United Arab Emirates (UAE) minister for information, tours Pakistan. He meets with Pakistani Prime Minister Nawaz Sharif and nuclear scientist A. Q. Khan. He is also shown around Khan Research Laboratories, the main facility for producing nuclear weapons in Pakistan. According to the Pakistani newspaper Jasarat, the visit is directly linked to nuclear activities: "Prince Abdullah bin Zayed also asked Dr. Qadeer Khan what help he could give them. Dr. Qadeer replied that Pakistan would not present the atomic bomb or a missile on a platter but could train UAE manpower."

Second Half of 1999: British Intelligence Monitors A. Q. Khan Shipments to Libya

The British intelligence agency MI6 monitors shipments made by the A. Q. Khan nuclear proliferation network from Pakistan to Libya via Dubai, United Arab Emirates. MI6 asks a British customs officer, Malcolm Nesbit, who is stationed in Dubai, to help with the operation. At MI6's request, he finds when certain containers arrive in Dubai, how long they stay, when they leave port, and what they carry. Nesbit does not understand the full implications of this surveillance at the time, but will realize why MI6 wanted the information later, when another customs agent investigates Khan's network in Dubai. The contents of the containers are not known, although it is known that Khan is shipping centrifuge parts to Libya through Dubai at this time.

August 1999-March 2000: Dubai Delays Investigation into Nuclear Smuggling Network

After British customs expands an investigation into a supplier for A. Q. Khan's nuclear smuggling network, it realizes that a key point of the operation is in Dubai, United Arab Emirates. In order for customs to prosecute the supplier for anything other than export license violations, they have to prove where the goods he shipped ended up. Customs submits a formal request to Dubai's Ministry of Justice for permission to carry out the investigation in August 1999. The request contains a list of individuals and entities they plan to investigate, as well as phone numbers, bank accounts, and e-mail addresses they want to trace. Although the Dubai authorities usually cooperate with investigations into cigarette and drug smuggling, they have acquired a reputation for rejecting requests for counterproliferation investigations. It takes several appeals and over half a year before the request is approved and lead investigator Atif Amin is allowed to come to Dubai to pursue the investigation.

March 2000: British Intelligence Warns Customs Investigator to Stay Away from Company Assisting Libyan Nuclear Weapons Program

Shortly before British customs agent Atif Amin is to leave for Dubai to pursue an investigation into the A. Q. Khan nuclear smuggling ring, he is warned off a particular company by the British

intelligence agency MI6. According to authors David Armstrong and Joe Trento, the message comes through "liaison channels" and informs Amin that he should "steer clear" of a company called Desert Electrical Equipment Factory, even if the company comes up in his investigation. British customs are not investigating the company in connection with Khan's operations, although its owner is reportedly a partner of Khan associate Bukhary Sayed Abu Tahir in another company called SMB Computers. Libyan officials will later tell investigators that at this time Desert Electrical's facilities are being used to manufacture centrifuge components and train Libyan scientists. The MI6 station chief in Dubai will warn Amin off another company involved in the smuggling ring.

March 2000: British Intelligence Station Chief Warns Customs Investigator Off Bank Involved in A. Q. Khan Nuclear Smuggling Ring

After arriving in Dubai to investigate the A. Q. Khan nuclear smuggling ring, British customs agent Atif Amin meets the chief of the British intelligence agency MI6's station in the United Arab Emirates. Amin briefs the station chief on the investigation he plans to conduct, and gives him a list of companies he intends to visit. The station chief asks to be kept up-to-date, but the only concern he expresses is that Amin should, in the words of authors David Armstrong and Joe Trento, "not get too close to one of the institutions on the list, Habib Bank." The bank was used by one of Khan's suppliers, Bukhary Sayed Abu Tahir, to send payments to another, Abu Bakr Siddiqui. It is unclear why the station chief makes this request. MI6 had previously asked Amin to stay away from another of the companies involved in the smuggling ring.

Mid-Late March 2000: British Investigation Uncovers Links between A. Q. Khan Ring and 'High-Ranking Dubai Officials'

A joint investigation by British Customs agent Atif Amin and Dubai police lieutenant Alwari Essam uncovers links between the A. Q. Khan nuclear smuggling ring and "high-ranking Dubai officials." This occurs in the first two weeks of the investigation, which the authorities in Dubai had tried to hamper. The two investigators are able to uncover the links because they are following leads uncovered by Amin in Britain, and the two agents check out a number of businesses whose names have previously come up in the inquiry in Dubai.

Mid-March 2000: British Intelligence Is Displeased by Investigation into Khan Smuggling Ring; Tells Investigators Khan Knows about Them

British customs agent Atif Amin, who is investigating the A. Q. Khan nuclear smuggling ring in Dubai, periodically briefs the local station of the British intelligence agency MI6 on how his investigation is proceeding. He tells MI6 that he has discovered new front companies and apartments used by Khan during his trips to Dubai. According to authors David Armstrong and Joe Trento: "But MI6 offered Amin no useful information or assistance. The general sense, according to a source familiar with the briefings, was one of displeasure that the inquiry was taking place at all." However, the station chief does tell Amin that the Khan network is aware of the investigation, but does not think it will turn up much. Presumably, MI6 obtains this information from communications intercepts.

Late March 2000: Investigators Learn A. Q. Khan Visits Dubai Company 'All the Time'

During the course of an investigation into A. Q. Khan's nuclear smuggling ring, British customs agent Atif Amin and Dubai policeman Alwari Essam visit a plastic bag manufacturer called Green Crest Industries (M.E.) Ltd. in Dubai. According to Amin, the visit is made because an entry in a suspect's phone book listed a Dubai phone number for Khan that is registered to Green Crest. In addition, apartments and post office boxes rented for Khan by an associate named Bukhary Sayed Abu Tahir appear to be linked to Green Crest. However, the manager and several other employees all deny any knowledge of Khan. At that point, another employee wanders past and says in Punjabi: "Sure we do. He has a flat and he comes here all the time." Amin, who speaks Punjabi, understands the remark, as

well as the manager's sharp reply. The atmosphere turns hostile and the two investigators leave. Authors David Armstrong and Joe Trento will later talk to the company's owner, Shaik Muhammad Farooq, who has a long history of dealings with Khan. Farooq will say that Green Crest had "absolutely no relationship" with Tahir, except that they had once swapped apartments in a Dubai building. However, when Farooq is asked later whether Khan ever visited Green Crest, he will curiously contradict himself as he replies: "He never visited our factories. He never visited our office. He never visited. Except sometimes he is there and he is inviting a lot of people including other businessman for dinner or so otherwise no. Absolutely baseless... I'm 100 percent sure he never visited us."

Late March 2000: British Customs Learns A. Q. Khan Is Shipping Centrifuge Components to Libya
Investigators Atif Amin of British customs and Alwari Essam of the Dubai police learn that the A. Q. Khan nuclear procurement ring has shipped ring magnets, key components for building centrifuges, from Pakistan to Libya, via Dubai, United Arab Emirates. The discovery is made when they visit a company called Deepsea Freight Services, a shipping agency that had been used by Abu Bakr Siddiqui, the subject of a British customs investigation, to ship goods from Britain to two Khan front companies in Pakistan, United Engineering and Trading Co. and Allied Engineering. The manager at Deepsea, K. Hafeez Uddin, shows the two investigators files about the traffic and they find documents about shipments of goods from Siddiqui in Britain to Dubai-based businessman Bukhary Sayed Abu Tahir, and then from Tahir to the Khan fronts in Pakistan. However, Amin then notices documents about shipments of the ring magnets from one of the front companies in Pakistan to Tahir in Dubai, and then on to Libya. The consignee for some of the ring magnet shipments is a company called Desert Electrical, a company the British intelligence service MI6 had warned Amin to avoid looking into. Amin asks to take the files, but Hafeez refuses permission, and also does not allow copies to be made, meaning the two investigators leave with no documentation. Hafeez will later make a series of contradictory statements about his business dealings with the Khan network, but a source on the British customs investigation will say, "The fact is that Deepsea received multiple shipments from Siddiqui and forwarded them on to Pakistan," adding, "It also received multiple shipments from [Khan Research Laboratories]-related companies destined for Tahir's front companies in Dubai."

Late March 2000: Dubai Police Impose Heavy Restrictions on British Investigation into Khan Network; Key Documents Go Missing

Immediately after an investigation by Atif Amin of British customs and Alwari Essam of the police in Dubai, United Arab Emirates, finds that Pakistani scientist A. Q. Khan is shipping centrifuge components to Libya, Essam's superiors impose heavy restrictions on the inquiry. There is a "widespread commotion" at police headquarters when they arrive back from conducting a key interview and they are confronted by a group of police officers. The two men are split up and Essam receives a 40-minute talk from his police bosses and Dubai's internal security service telling him that what he and Amin have been doing has to stop. He is accused of helping Amin "reveal A. Q. Khan in Dubai," and asked why Amin wants to know where Khan stays in Dubai. The security service even suggests that Amin is really an MI6 agent plotting to assassinate the Pakistani. New limitations are imposed on their inquiry:

- They cannot conduct interviews in the field, but witnesses and suspects have to be invited to police headquarters, and may decline to come. Amin will be allowed to submit questions, but will not be allowed to perform the interviews himself. However, if the interviews are to be used in a British court case, Amin has to perform them himself under British rules of law; If Atif wants materials or records, he cannot go and get them himself, but must ask the Dubai police to do so;

- In addition, Amin must give the Dubai police all the documents he has collected during the investigation, including those from the British section of the inquiry.
- Amin is understandably angry at the restrictions, which will make it impossible to conduct a meaningful inquiry, but, as there is little he can do at this time, he decides to continue and try to get the restrictions lifted. He asks the Dubai police to get him a file containing documents about shipments from Khan front companies in Pakistan to Libya, but, when the file arrives, the Libyan documents have been removed and the file is noticeably thinner.

Late March 2000: British Intelligence Fails to Disclose Information about A. Q. Khan Shipments to Libya to British Customs Agent

British customs agent Atif Amin briefs the chief of station for the British intelligence service MI6 in Dubai, United Arab Emirates, about the state of his investigation into the A. Q. Khan nuclear smuggling ring, but the station chief fails to disclose important information to Amin. Amin has found that Khan is not only procuring material for Pakistan's nuclear program, but is also shipping centrifuge components to Libya. MI6 is already aware that Khan is moving material to Libya and has actually been monitoring these shipments in Dubai, but the station chief fails to mention this to Amin. In fact, MI6 had previously warned Amin to stay away from one of the companies involved in the shipments to Libya. Instead, the station chief insists that Amin narrate a detailed report of his investigation, which is then immediately sent to London. When writing down what Amin tells him, the station chief embellishes some of the facts, and Amin has to go through the report and have the embellishments taken out.

Late March 2000: British Intelligence Apparently Exaggerates Threats to British Customs Agent Investigating A. Q. Khan Smuggling Network, Possibly in Attempt to Curtail Inquiry

The British intelligence service MI6 tells Atif Amin, a British customs agent investigating the A. Q. Khan nuclear smuggling ring in Dubai, United Arab Emirates, that the ring may attempt to kill him. However, Amin will later suspect that MI6 exaggerates these threats in an attempt to hamper his investigation. MI6 passes the news to Amin by having him woken at two o'clock in the morning at his Dubai hotel, and telling him to come down to the lobby, where he is met by the MI6 station chief and another customs agent.

Threats - At a table, the station chief leans over and whispers to Amin, "You're at risk here," and, when Amin seems not to understand the urgency of the threat, adds, "You're in *danger*." He also tells Amin, "You can't stay here," and: "You can't keep doing what you're doing. You have to get out." The station chief then says he has received a telex from London that said Khan and his associates were discussing Amin and were angry about him. Apparently, physical reprisals had been mentioned, and, implying MI6 is monitoring Khan's phone, the station chief says that the Pakistani scientist has called Amin—a Muslim—a "traitor" to the "cause." The station chief adds, "These people are dangerous," because: "They have assets in the local mafia they use for smuggling. They won't hesitate to kill people." He even suggests Amin might not be safe in his hotel and that he should move in with the other customs agent, Malcolm Nesbit. However, Amin does not regard the threats as serious and remains in his hotel.

Exaggerated - Later that day, Amin speaks to Nesbit on the phone and expresses the idea that the station chief may have been playing up the threat from Khan's network. Nesbit agrees and suggests it is because Amin has stumbled across information showing that Khan is shipping nuclear technology to Libya. MI6 had been monitoring these shipments, had warned Amin off one of the companies involved, and had failed to disclose information about the Libyan shipments to him. Authors David Armstrong and Joe Trento will comment, "It seemed both Khan and MI6 shared an interest in shutting down Amin's inquiry."

Late March 2000: British Intelligence Officer Says British Customs Agent Is 'Finding Out Too Much' about A. Q. Khan Network

Euan Stewart, a senior official at British customs, talks to a high-level representative for the British intelligence service MI6 about a British customs investigation into the A. Q. Khan nuclear smuggling network in Dubai, United Arab Emirates. According to lead investigator Atif Amin, who Stewart later tells about the discussion, the MI6 official compliments customs on its work, "Your man's turned over far more stones over there than we've managed in the last few years and he's found lots of insects crawling around underneath." This is apparently a reference to Amin's discovery that the network is shipping centrifuge components from Pakistan to Libya via Dubai. MI6 has been monitoring Khan's operations in Dubai and knows a lot about them, but did not know of these components. However, the MI6 official then says, "If I was you, I'd get my man out of there." This is seemingly a reference to threats coming from the Khan network against Amin and also MI6's displeasure at the investigation. Authors David Armstrong and Joe Trento will explain: "But while Amin had turned up valuable intelligence, he had also created what MI6 and the policy makers who control it perceived to be a quandary: Should they act on the intelligence, disrupt Khan's network, and expose Libya's nuclear program, or should they continue their monitoring operation? They chose the later option. In fact, it would be another three years before MI6 and its American counterpart finally deemed the time right to take action—a move that would be accompanied by great fanfare and self-congratulation. In the meantime, Khan's network had been allowed to continue peddling its dangerous goods."

Late March 2000: British Customs Agent Recalled from Dubai Due to Threats Made by A. Q. Khan Network

British customs recalls one of its agents, Atif Amin, from Dubai, United Arab Emirates, where he was investigating the A. Q. Khan nuclear proliferation network. Amin learns of his recall in a phone call from his acting boss, who tells him to "[g]et your ass on the next flight to London." Amin protests, saying that threats that have apparently been made against him by the network are not as bad as is being made out, and that he could stay at the British embassy, rather than a hotel. However, his boss says that the orders have come from above and there can be no discussion. Amin had been about to interview a key Khan associate, Bukhary Sayed Abu Tahir, but is forced to return home before doing so.

July 2000: \$2 Million Transferred to Account of Dubai Company Linked to A. Q. Khan's Activities, Used to Finance Equipment for Libyan Nuclear Weapons Program

Bukhary Sayed Abu Tahir, a Malaysia-based associate of A. Q. Khan, pays \$2 million into the account of Gulf Technical Industries (GTI), a Dubai-based company run by another of Khan's associates named Peter Griffin. According to Griffin, Tahir told him the money was to pay for a workshop to manufacture spare parts for the Libyan oil industry, although in reality it is to pay for components for Libya's nuclear weapons program. The workshop is understandably not built and Tahir regularly calls Griffin to ask him to transfer money to different accounts. Griffin will comment: "He'd say, 'I promised to send some money, can you send it for me to [Gotthard] Lerch, to Gunes [Cire, both associates of Khan], to Nauman Shah [Khan's son-in-law]?' " Griffin apparently does not ask any questions about the payments, of which there are at least nine. He will recall: "I did point out to Tahir at one stage that this money was coming out of the Libyan National Oil Company cash. He said, 'Don't worry, I'll pay you back,' and he did. The only problem, as I realized to my cost later, was I had no paperwork for these deals. Nothing to protect myself with." Griffin is suspicious, but having known Tahir for years, not unduly so: "I was asked later if it had not appeared unusual to use money set aside for one thing to pay off another, without making any official receipts. But I said: 'Tahir was a good friend. It was like a mate asking to borrow a fiver.' But since there was nothing in writing I could not prove that Tahir had lied to me. I was disappointed. I'd known Tahir since he was a kid."

(July or August 2000): Lathes Possibly for Libyan Nuclear Weapons Program Delivered to Dubai

Two lathes ordered by Bukhary Sayed Abu Tahir, an associate of A. Q. Khan, are delivered to Dubai from Spain. The delivery is organized by another associate of Khan's, Peter Griffin, who set up a company used by Khan's network in Dubai in 1997. "Again, he [Tahir] said they [the lathes] were for the Libyan National Oil Company," Griffin will say. "They were 15.6 tons each, enormous machines as big as my living room, each costing \$350,000. I delivered them to Dubai in July or August 2000. Tahir asked if I could rent some factory space and set them up so his clients could see them running." However, the clients do not show up and Tahir calls a month later to say that the clients will take the lathes away. When the Khan network begins to unravel in early 2004, Griffin will learn that Tahir has told Malaysian authorities that the lathes were for the Libyan nuclear weapons program. Griffin will then investigate what happened to the lathes and learn from customs authorities in Dubai that Tahir had sent at least one of them to South Africa in November 2000, using a forged invoice from Gulf Technical Industries (GTI), a company owned by Griffin. Griffin will claim not to have known anything about the shipment to South Africa, but the freight is allegedly paid in Dubai by GTI. The delivery address is Tradefin Engineering, a metalworking company based in Vanderbijlpark, a town close to Johannesburg. Documents indicate the lathe remains in South Africa for 13 months, until it is shipped back to Dubai, apparently en route to Malaysia. Griffin will comment: "It was possible that it had been adapted while away in South Africa, modified to be able to perform very fine definition work, something it couldn't do when it left my warehouse." The lathe is dispatched to Malaysia in December 2001, apparently on the orders of a Mr. Hussain of GTI. However, Griffin will say that he does not employ anyone of that name and that the contact number Mr. Hussain gave was for SMB Distribution, a company owned by Tahir. Based on these events, authors Adrian Levy and Catherine Scott-Clark will conclude that Tahir had attempted to frame Griffin for the deal.

August 2001: Khan Associate Leaves Dubai-Based Business to Go Back to Europe

Peter Griffin, an associate of A. Q. Khan's who has been doing business with him for decades, decides to return to Europe. Griffin has spent the last several years in Dubai running a company called Gulf Technical Industries, which has been used for Khan's assistance to Libya. However, Griffin now decides to leave Dubai and return to Europe, where he takes up residence in a villa in France.

August 29, 2001: A. Q. Khan Procurement Agent Found Guilty of Export Violations in Britain

Abu Bakr Siddiqui, a procurement agent for A. Q. Khan's nuclear smuggling ring, is convicted in Britain on three counts of violating British export regulations. He had been shipping materials and technology to be used to build nuclear weapons, but his activities were uncovered by British customs. The prosecution had argued that Siddiqui knew well that what he exported was destined for Pakistan's nuclear program, and linked him to Bukhary Sayed Abu Tahir, a Dubai-based middleman in the network. Many of the details of Khan's operations are revealed in court, but, due to obstruction by authorities in Dubai, not all of them can be submitted as evidence. Siddiqui will be given an extremely lenient sentence.

November 2001: Aluminum Tubes Apparently for Libyan Nuclear Program Arrive in Dubai

A set of aluminum tubes arrives at the docks in Dubai addressed to a company called Gulf Technical Industries (GTI), which is owned by Peter Griffin, a long-time A. Q. Khan associate. Griffin will later recall that he gets a call from his office manager: "He said he'd been advised by a shipping company there was a consignment of aluminum tubes that had just arrived at Dubai docks for GTI but he could not find any record of us having ordered them." Griffin realizes immediately that the aluminum tubes may well be for use in a nuclear weapons program by the Khan network. He will comment, "I sensed right away it was [Bukhary Sayed Abu] Tahir," an associate of both Khan and Griffin. Griffin calls Tahir, who admits the tubes are really for him, but that he has used the name of Griffin's

company for the delivery. Although Griffin and Tahir have an ongoing business relationship, Griffin is angry at being used, and says: "This is the end of it. If you do anything like this again I'll take you to court in Dubai. Do you hear?" It appears that the tubes are for Libya's illicit nuclear weapons program, and that, in Griffin's words, he is being set up "as the fall guy" if anything should go wrong.

(November or December 2003): Khan Associate Tells Business Partner to Destroy All Records
Bukhary Sayed Abu Tahir, an associate of A. Q. Khan, sends an emissary to see one of his business partners, Peter Griffin, to tell him to destroy all records of his dealings with Tahir. Griffin and Tahir have been assisting Khan's activities for some time, but their most recent transactions concerned equipment for Libya's outlaw nuclear program. Griffin will later say: "A Dubai sponsor who had helped us start up a company arrived on my doorstep in France in November or December 2003. He just turned up out of the blue. He had an important message from Tahir in Kuala Lumpur. He wanted me to destroy all records of our business together. I rang Tahir and asked what was going on. He said, 'I can't say, I can't talk to you. Just destroy everything.' I said, 'No, these documents are my only insurance.'" At this time Tahir is under investigation by Malaysian authorities for nuclear proliferation activities in their country, and this is apparently an attempt to get Griffin to destroy documents showing he did not know the equipment he helped Tahir procure was for Libya's nuclear program. If Griffin destroyed the documents, Tahir would be able to place a greater part of the blame on him.

Early 2004: Dubai-Based Company Linked to A. Q. Khan's Operations Collapses
Gulf Technical Industries, a Dubai-based company used by the A. Q. Khan proliferation network to facilitate Libya's nuclear weapons program, collapses. The reason is that the firm, owned by long-term Khan associate Peter Griffin, suffers adverse publicity following Khan's public confession to his nuclear proliferation activities. This leads its local sponsor to pull out and its bank to close its accounts, meaning the company has to close.

Early 2004: Brother of Key A. Q. Khan Associate Arrested in Dubai
At some point after the A. Q. Khan network begins to unravel, Saeed Buhary, the younger brother of one Khan's most important associates, is arrested in Dubai. Buhary is the brother of Bukhary Sayed Abu Tahir and the chairman of SMB Distribution, a Dubai-based company Tahir owned that was involved in Khan's proliferation operations. According to authors Adrian Levy and Catherine Scott-Clark, Buhary is locked up "without a proper trial" in a prison known as the "Jumeira Hilton," which has "a reputation for harsh conditions." Buhary will reportedly still be there in 2007.

APPENDIX: THE NUCLEAR 'SAFEGUARDS' SYSTEM: AN ILLUSION OF PROTECTION

Adapted from a 2010 Friends of the Earth paper.

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A1. INTRODUCTION

Uranium is the only energy source with a direct and repeatedly-demonstrated connection to the proliferation of Weapons of Mass Destruction. Of the 60 countries that have built nuclear power or research reactors, over 20 are known to have used their 'peaceful' nuclear facilities for covert weapons research and/or production. Of the 10 countries to have built nuclear weapons, six did so with technical support and/or political cover from their peaceful programs (France, India, Pakistan, Israel, South Africa, North Korea)

The WMD potential of nuclear power programs is all the more important given that numerous countries are considering introducing nuclear power. Former US Vice President Al Gore has said that "if we ever got to the point where we wanted to use nuclear reactors to back out a lot of coal ... then we'd have to put them in so many places we'd run that proliferation risk right off the reasonability scale."

Likewise, the Bulletin of the Atomic Scientists (2010) editorialised: "As we see it, however, the world is not now safe for a rapid global expansion of nuclear energy. Such an expansion carries with it a high risk of misusing uranium enrichment plants and separated plutonium to create bombs."

The international nuclear safeguards system does not have the necessary authority or resources to adequately safeguard existing facilities and nuclear materials inventories and those problems will become all the more acute if a nuclear power 'renaissance' takes place.

A2. THE LIMITATIONS OF SAFEGUARDS

"It is clear that no international safeguards system can physically prevent diversion or the setting up of an undeclared or clandestine nuclear programme."

-- IAEA, 1993, *Against the Spread of Nuclear Weapons: IAEA Safeguards in the 1990s*.

The uranium industry and its promoters routinely claim that safeguards "ensure" that Australian Obligated Nuclear Materials (AONM – primarily uranium and its by-products such as plutonium) will not be used in nuclear weapons.

However Australia has no authority or capacity to safeguard AONM – we are entirely reliant on the International Atomic Energy Agency (IAEA). The cornerstone of IAEA safeguards involves inspections of nuclear plants and materials stockpiles. These inspections are at best periodic and partial and at worst (e.g. Russia) non-existent.

The former Director-General of the IAEA, Dr Mohamed El Baradei, is frank about the limitations of safeguards. He has noted that the IAEA's basic rights of inspection are "fairly limited", that the safeguards system suffers from "vulnerabilities" and "clearly needs reinforcement", that efforts to tighten the system have been "half hearted" and that the IAEA safeguards system runs on a "shoestring budget ... comparable to a local police department."

In addition to resource constraints (discussed below), issues relating to national sovereignty and commercial confidentiality adversely impact on safeguards. In a 2004 paper, Harvard University academic Matthew Bunn points to the constraints enshrined in the IAEA's basic safeguards template, 'INFCIRC 153': "INFCIRC 153 is replete with provisions designed to ensure that safeguards would not be too intrusive. They are to be implemented in a manner designed "to avoid hampering" technological development, "to avoid undue interference" in civilian nuclear energy, and "to reduce

to a minimum the possible inconvenience and disturbance to the State". The IAEA is not to ask for more from the state than "the minimum amount of information and data consistent with carrying out its responsibilities", and specific upper bounds are placed on the number of person-days of inspection permitted at various types of nuclear facilities."

The IAEA has no mandate to prevent the use of civil nuclear facilities and materials for weapons production, and no capacity to prevent weapons production. At best, the IAEA's safeguards system detects diversion and then the matter is handballed to the UN Security Council and to the realms of international diplomacy more generally. Numerous examples illustrate how difficult and protracted the resolution (or attempted resolution) of such issues can be, e.g. North Korea, Iran, Iraq in the 1970s and again in the early 1990s.

There are precedents for the complete breakdown of nuclear safeguards in the context of political and military conflict - examples include Iraq, Yugoslavia and several African countries. In the event of safeguards breaking down, Australia could suspend further uranium shipments of uranium., However, as Kelvin Thomson, former chair of the Australian Parliament's Joint Standing Committee on Treaties, noted at a hearing into the Howard/Putin uranium agreement, that would be "locking the stable door after the horse has bolted".

Meanwhile, there is no resolution in sight to some of the most fundamental problems with safeguards such as countries invoking their right to pull out of the Nuclear Non-Proliferation Treaty (NPT) and developing a weapons capability as North Korea has done. More generally, responses to suspected non-compliance with safeguards agreements have been highly variable, ranging from inaction to economic sanctions to UN Security Council-mandated decommissioning programmes. Some states prefer to take matters into their own hands: Israel bombed and destroyed a nuclear reactor in Iraq in 1981, the US bombed and destroyed a reactor in Iraq in 1991 and Israel bombed and destroyed a suspected reactor site in Syria in 2007.

A3. THE SCOPE OF SAFEGUARDS ACROSS THE NUCLEAR FUEL CYCLE

Currently, IAEA safeguards only begin at the stage of uranium enrichment. Application of IAEA safeguards should be extended to fully apply to mined uranium ores, to refined uranium oxides, to uranium hexafluoride gas, and to uranium conversion facilities, as well as enrichment and subsequent stages of the nuclear fuel cycle.

Federal Parliament's Joint Standing Committee on Treaties (2008) recommended that "the Australian Government lobbies the IAEA and the five declared nuclear weapons states under the NPT to make the safeguarding of all conversion facilities mandatory." However the Australian Government (2009) rejected the recommendation.

A4. MATERIAL UNACCOUNTED FOR

Nuclear accounting discrepancies are commonplace and inevitable due to the difficulty of precisely measuring nuclear materials. The accounting discrepancies are known as Material Unaccounted For (MUF). As the Australian Safeguards and Non-proliferation Office (ASNO) notes: "Every year inventory reports involving bulk material will include a component of MUF."

This problem of imprecise measurement provides an obvious loophole for diversion of nuclear materials for weapons production. In a large plant, even a tiny percentage of the annual through-put of nuclear material will suffice to build one or more weapons with virtually no chance of detection by

IAEA inspectors. For example, when fully operational the Rokkasho reprocessing plant in Japan will have the capacity to separate about eight tonnes of plutonium from spent nuclear fuel each year. Diverting just 1% of that amount of plutonium would be very difficult for the IAEA to detect against the background of routine accounting discrepancies, yet it would be enough to build at least one nuclear weapon per month.

Australia's uranium has resulted in the production of just under 150 tonnes of plutonium – sufficient for 15,000 nuclear weapons (assuming 10 kgs of 'reactor grade' plutonium per weapon). If just 0.1% of this plutonium is written off as MUF, that is sufficient for 15 plutonium bombs similar to that which destroyed Nagasaki; if 1% goes missing, that would suffice for 150 weapons.

MUF discrepancies occur in either direction – the recorded quantity may be higher or lower than the expected amount. Unfortunately, even if the recorded quantity is greater than the expected quantity, or exactly the same as the expected quantity, the possibility of diversion cannot be discounted. A key problem here is the source of the information. To a large extent, Australia is reliant on customer countries for information on nuclear materials accounting, which raises the obvious problem that any state diverting AONM for WMD production is hardly likely to own up to the fact.

As ASNO (2008) notes, a particular accounting discrepancy is not proof of diversion of nuclear materials. The problem is that imprecise measurement provides an obvious loophole – one which is difficult or impossible to rectify.

There have been incidents of large-scale MUF in Australia's uranium customer countries such as the UK and Japan. An example is given in the 'Atoms in Japan' publication. In 2003 it was discovered that of the 6.9 tons of plutonium separated at the Tokai reprocessing facility in the period from 1977 to 2002, the measured amount of plutonium was 206 kg less than it should have been. Given that the IAEA defines a "significant quantity" of plutonium as 8 kg, this means that enough plutonium was unaccounted for to make about 26 bombs. After further investigations, the Japanese government claimed that it could explain where some of the missing plutonium had gone and reduced the figure to 59 kg, but that is still enough for seven bombs. (Japan Atomic Industrial Forum, 2003.)

The Union of Concerned Scientists (2007) provides another example involving one of Australia's uranium customer countries: "In 2005, a large leak of dissolved spent fuel at the Thorp reprocessing plant in the United Kingdom went undetected for more than eight months. The leaked solution contained some 19 metric tons of uranium and 190 kilograms of plutonium. The fact that a shortfall in the amount of plutonium produced at the plant – enough for some 30 nuclear bombs – did not arouse concern for many months suggests that the theft of a significant amount could also go undetected."

ASNO claims that: "To date, reported MUF involving AONM has been explained to ASNO's satisfaction." ASNO further states that: "In many cases MUF can be attributed to unavoidable measurement differences, but where the size of the MUF is outside the expected range further investigation is undertaken." However, ASNO refuses to provide any information on the number of occasions that it has undertaken "further investigation", which countries were involved, what the "investigation" involved, or what reasons were proffered by the country in question. It would be difficult or impossible to determine to what extent ASNO's evaluations are based on independent verification by the IAEA, and conversely, to what extent ASNO is reliant on customer countries for the information (which raises the obvious dilemma that a country diverting AONM is hardly likely to acknowledge that diversion).

ASNO (2008) refuses to publicly release information about MUF involving AONM – even aggregate, non-country-specific information.

The Joint Standing Committee on Treaties (2009) recommended that: "Further consideration is given to the justification for secrecy of Material Unaccounted For'." There is no legitimate justification for the secrecy surrounding MUF. ASNO (2008) has done no better than to cite commercial confidentiality. All MUF information, past, present and future, should be reported publicly and this should be done on a country-by-country and facility-by-facility basis. Some other countries (e.g. Japan) release MUF data.

ASNO appears to favour a semantic non-solution to the problem by doing away with the term Material Unaccounted For and replacing it with a term such as "inventory difference".

The Australian Uranium Association states: "The [AUA] has examined those [ASNO] reports, which have taken a different form over the years. However, the key conclusion of the Office has been consistent: 'All Australian Obligated Nuclear Material was satisfactorily accounted for'. ASNO's stewardship and reporting show that Australia's uranium has not been diverted from peaceful purposes. Moreover, there is no evidence to the contrary that would justify a conclusion different from the one that ASNO has reached consistently."

However, the Australian public has no information whatsoever on which to assess the effectiveness of AONM accounting and safeguards. ASNO is not a trustworthy organisation (see below). ASNO relies heavily on information from customer countries for information rather than independent verification by the IAEA. In short, there is no evidence to support the Australian Uranium Association's position.

A5. THE SCALE OF THE SAFEGUARDS CHALLENGE IS EVER-INCREASING

The scale of the safeguards challenge is ever-increasing. Of course, the scale of the safeguards challenge does not increase in direct proportion to the tonnage of nuclear materials or the number of nuclear facilities to be safeguarded, but it increases nonetheless.

The following table shows the increase in Australian-obligated nuclear materials (AONM) overseas. AONM primarily comprises uranium and products and by-products of uranium enrichment and reactor irradiation – depleted uranium, enriched uranium and plutonium.

DATE (31 Dec. each year)	2001	2006	2011	10-year increase
Total Australian Obligated Nuclear Materials overseas (t)	101,922	130,756	171,744	69%
Total Australian-obligated plutonium (t)	64.0	103.7	149.6	134%
Depleted Uranium (t)	52,083	80,580	110,079	111%

*Source: Australian Safeguards and Non-Proliferation Office, Annual Reports.
http://www.dfat.gov.au/asno/annual_reports.html*

A6. IAEA SAFEGUARDS ARE UNDER-RESOURCED

The IAEA lacks the resources to effectively carry out its safeguards role.

The IAEA relies on voluntary funding for 90% of its nuclear security program, 30% of its nuclear safety program, and 15% of its verification/safeguards program (IAEA, 2008).

In 2006, then IAEA Director-General Dr Mohamed El Baradei told an International Safeguards symposium in Vienna: "Financial resources are another key issue. Our budget is only \$130 million; that's the budget with which we're supposed to verify the nuclear activities of the entire world. Reportedly some \$1 billion was spent by the Iraq Survey Group after the war in that country. Our budget, as I have said before, is comparable with the budget of the police department in Vienna. So we don't have the required resources in many ways to be independent, to buy our own satellite monitoring imagery, or crucial instrumentation for our inspections. We still do not have our laboratories here in Vienna equipped for state-of-the-art analysis of environmental samples."

Dr El Baradei said in 2006: "Everybody says nuclear terrorism is the No. 1 national and international security issue. But until they translate this grandstanding statement into dollars and cents, we will not be able to deal effectively with the danger we are facing. This is simple. Our safeguards budget is \$120 million a year. With that, we're supposed to verify what's happening on the entire globe. I'm sure that even our little Vienna police department has a larger budget than we have. One of the most daunting challenges is to try to discover undeclared activities: the small enrichment facility tucked somewhere in a huge country, or some weaponization activities that are taking place somewhere underground. To do that you need a lot." (Dickey, 2006.)

Dr. El Baradei said in his 11 June 2007 speech to the IAEA Board of Governors: "I should also underline that, even with the proposed budget, the Agency's financial situation remains vulnerable, and we still fall short of what is needed to carry out our mission in an effective manner. Significant additional resources are still sorely needed. Our laboratories are full of equipment that is outdated, although vital to carry out essential verification, safety and development functions. Our nuclear security programme remains 90% funded through unpredictable and heavily conditioned voluntary contributions. Our safety department continues to rely heavily on extra-budgetary staff."

Dr El Baradei told the IAEA Board of Governors in 2009: "I will be cheating world public opinion to be creating the impression that we are doing what we're supposed to do, when we know we don't have the money to do it."

Dr El Baradei and a 2008 Commission of Eminent Persons both recommended a doubling of the budget by 2020.

The underfunding of the IAEA's safeguards functions could easily be resolved, but it persists year after year, decade after decade.

Australia contributes just 1.77% of the IAEA's regular budget (Joint Standing Committee on Treaties, 2009) in addition to some voluntary contributions to support aspects of the IAEA's work.

A7. AUSTRALIA'S BILATERAL URANIUM AGREEMENTS

In addition to IAEA safeguards, countries purchasing Australian uranium must sign a bilateral agreement. However there are no Australian inspections of nuclear materials stockpiles or facilities using AONM – Australia is entirely reliant on the partial and underfunded inspection system of the IAEA.

The most important provisions in bilateral agreements are for prior Australian consent before Australian nuclear material is transferred to a third party, enriched beyond 20% uranium-235, or reprocessing. However no Australian government has ever refused permission to separate plutonium from spent fuel via reprocessing (and there has never been a request to enrich beyond 20% U-235). Even when reprocessing leads to the stockpiling of plutonium (which can be used directly in nuclear weapons), ongoing or 'programmatic' permission has been granted by Australian governments. Hence there are stockpiles of Australian-obligated separated plutonium in Japan and in some European countries.

Globally, the amount of separated 'civil' plutonium continues to steadily increase and now amounts to several hundreds tonnes. The resolution to this problem could hardly be simpler – suspending or reducing the rate of reprocessing to draw down civil stockpiles of separated plutonium. But commercial imperatives come first. Australia could take a lead role by tying uranium export approvals to the draw-down of separated plutonium stockpiles – but commercial imperatives come first.

A8. NOT ALL FACILITIES PROCESSING AONM ARE SUBJECT TO IAEA INSPECTIONS

Australia allows the processing of AONM in facilities which are not covered by IAEA safeguards at all. While AONM is meant to be subject to IAEA safeguards from the enrichment stage onwards, ASNO is willing to make exceptions.

For example ASNO has recommended that the Australian government agree to the processing of Australian uranium in unsafeguarded enrichment plants in Russia. ASNO (2008b) states: "Russia does not propose to place these enrichment facilities on its Eligible Facilities List because the facilities were never designed for the application of safeguards and could not be readily adapted for safeguards purposes."

The enrichment facilities would not require any adaptation whatsoever. Russia simply needs to permit the application of safeguards and the IAEA could then adopt safeguards measures such as inspections, the use of video monitoring etc.

A9. AUSTRALIA EXPORTS URANIUM TO COUNTRIES WITH UNACCEPTABLE PROLIFERATION / DISARMAMENT RECORDS

According to ASNO's former Director-General John Carlson (1998), "One of the features of Australian policy ... is very careful selection of our treaty partners. We have concluded bilateral arrangements only with countries whose credentials are impeccable in this area."

However Australia exports uranium to:

- all five of the 'declared' nuclear weapons states (USA, UK, China, France), none of which has fulfilled its disarmament obligations under the NPT;
- countries with a history of weapons-related research based on their civil nuclear programs (such as South Korea and Taiwan)
- countries which have not ratified the Comprehensive Test Ban Treaty (China, USA)
- countries blocking progress on the proposed Fissile Material Cut-Off Treaty (e.g. USA).

Australia also exports uranium to one country which is not a signatory to the NPT – Taiwan. However it can reasonably be assumed that Taiwan would be a signatory to the NPT if not for its complicated status *vis a vis* China.

Coalition/Labor support and approval for uranium sales to China in 2006 set a new precedent: uranium sales to undemocratic, secretive states with appalling human rights records.

Both the Labor government and the Coalition Opposition agreed to permit uranium sales to Russia despite the fact that not a single facility in Russia has been subjected to an IAEA safeguards inspections since 2001. The uranium supply agreement does not require any inspections to take place in future. The Joint Standing Committee on Treaties argued against ratification of the Howard/Putin uranium agreement until "IAEA inspections are implemented for Russian facilities that will handle Australian Obligated Nuclear Materials". A reasonable recommendation – but it was rejected by the Labor government. There are further concerns: Russia is undemocratic and secretive and human rights abuses are widespread; incidents of theft/smuggling from Russian nuclear sites are common; and Russia has not fulfilled its disarmament obligations under the NPT.

The Government ought to set a timeframe for nuclear weapons states to meet their disarmament obligations and to make further uranium supply conditional on meeting those obligations. Those obligations have not been met 40 years after the NPT entered into force. A 2008 survey of 1200 Australians found 2:1 opposition to uranium exports to nuclear weapons states (ACF, 2008).

Australia should use its influence to bring the Comprehensive Nuclear Test Ban Treaty (CTBT) in to effect – including withdrawal of uranium sales from countries such as China and the US that have failed to ratify the CTBT. Australia should also require verifiable closure of all nuclear test sites.

South Korea is another major customer of Australian uranium with less than impeccable credentials. In 2004, South Korea disclosed information about a range of activities which violated its NPT commitments – uranium enrichment from 1979-81, the separation of small quantities of plutonium in 1982, uranium enrichment experiments in 2000, and the production of depleted uranium munitions from 1983-1987. Australia has supplied South Korea with uranium since 1986. It is not known – and may never be known – whether Australian-obligated nuclear materials were used in any of the illicit research.

A10. REPROCESSING AND PLUTONIUM SEPARATION

"Reprocessing provides the strongest link between commercial nuclear power and proliferation."
-- US Congress, Office of Technology Assessment, *Nuclear proliferation and safeguards*. June 1977: p.12.

Japan, a major customer of Australian uranium, has developed a nuclear 'threshold' or 'breakout' capability – it could produce nuclear weapons within months of a decision to do so, relying heavily on facilities, materials and expertise from its civil nuclear program. An obvious source of fissile material for a weapons program in Japan would be its stockpile of plutonium – including Australian-obligated plutonium. In April 2002, the then leader of Japan's Liberal Party, Ichiro Ozawa, said Japan should consider building nuclear weapons to counter China and suggested a source of fissile material: "It would be so easy for us to produce nuclear warheads; we have plutonium at nuclear power plants in Japan, enough to make several thousand such warheads."

Japan's plutonium program increases regional tensions and proliferation risks. Diplomatic cables in 1993 and 1994 from US Ambassadors in Tokyo describe Japan's accumulation of plutonium as "massive" and questioned the rationale for the stockpiling of so much plutonium since it appeared to be economically unjustified. A March 1993 diplomatic cable from US Ambassador Armacost in Tokyo

to Secretary of State Warren Christopher, obtained under the US Freedom of Information Act, posed these questions: "Can Japan expect that if it embarks on a massive plutonium recycling program that Korea and other nations would not press ahead with reprocessing programs? Would not the perception of Japan's being awash in plutonium and possessing leading edge rocket technology create anxiety in the region?"

Yet Australia continues to provide open-ended ('programmatic') approval for Japan to separate Australian-obligated plutonium. The Government could and should prohibit the stockpiling of Australian-obligated plutonium. At the very least, the Government should revert to the previous Australian policy of requiring approval for plutonium separation / reprocessing on a case-by-case basis.

It is frequently claimed that the "stringent" conditions placed on AONM encourage a strengthening of non-proliferation measures generally. However, by permitting the stockpiling of plutonium the Australian government is not 'raising the bar' but setting a poor example and encouraging other uranium exporters to adopt or persist with equally irresponsible policies. (The Australian government does not have the authority to prohibit stockpiling, but it does have the authority to permit transfers and reprocessing of AONM and could therefore put an end to the stockpiling of Australian-obligated plutonium.)

Reactor-grade plutonium can be used in weapons albeit the case that it is not ideal and potentially poses problems in relation to weapon reliability and yield. On this topic see:

- Dr Alan Robert's contribution to Briefing Paper #19 at www.energyscience.org.au
- Friends of the Earth briefing paper: www.foe.org.au/anti-nuclear/issues/nfc/power-weapons/rgpu

A11. AUSTRALIA'S URANIUM EXPORTS ARE SHROUDED IN SECRECY

Some example of indefensible secrecy include the refusal of successive Australian governments to publicly release:

1. Country-by-country information on the separation and stockpiling of Australian-obligated plutonium.
2. 'Administrative Arrangements' which contain vital information about the safeguards arrangements required by Australia.
3. Information on nuclear accounting discrepancies (Material Unaccounted For) including the volumes of nuclear materials, the countries involved, and the reasons given to explain accounting discrepancies.
4. The quantities of AONM held in each country are confidential. ASNO (2001-02) states: "The actual quantities of AONM held in each country, and accounted for by that country pursuant to the relevant agreement with Australia, are considered by ASNO's counterparts to be confidential information."

A12. THE AUSTRALIAN SAFEGUARDS AND NON-PROLIFERATION OFFICE

ASNO has established a track record of making demonstrably false claims and otherwise behaving unprofessionally.

In 2008, ASNO misled the JSCT with claims that safeguards will "ensure" that Australian uranium is not used for weapons production in Russia even though there have been no safeguards inspections in Russia since 2001 (a fact which ASNO conspicuously failed to provide to the Committee).

ASNO's falsely claims that nuclear power does not present a weapons proliferation risk; that Australia sells uranium only to countries with "impeccable" non-proliferation credentials; and that all AONM is "fully accounted for".

The Government should establish an independent public inquiry into ASNO's unprofessional behaviour as per the recommendation of the EnergyScience Coalition (2007):

The authors of this paper believe there is a compelling case for major reform of ASNO as a matter of urgency. An alternative course of action would be for the Australian government to establish an independent public inquiry. Such an inquiry should have a broad mandate to review all aspects of ASNO's structure and function, should be adequately resourced, and should have powers similar to those of a Royal Commission to access witnesses, documents and other evidence.

Such an inquiry should be carried out independently of ASNO. It should also be carried out independently of the Department of Foreign Affairs and Trade (DFAT), given that the current relationship between ASNO and DFAT is arguably one of the areas in need of review. DFAT has declined a request to review a paper detailing numerous inaccurate statements made by ASNO (letter to NGOs, 28 May 2007, available on request).

Such an inquiry should address the competence and performance of ASNO; its scientific and technical expertise; whether its current management, organisation, structure and relationships best serve its mandate; any conflicts of interest; the implications of ASNO's structural connection to DFAT (whether it has sufficient independence or operates as a 'captured bureaucracy'); and options for reform including consideration of organisational models in other countries.

ASNO's previous responses to criticism have included angry and dismissive attacks on its critics, assertions that an entire document can be dismissed on the basis of questionable challenges to just one or two points (see for example ASNO, 'Reactor Grade Plutonium', <www.asno.dfat.gov.au>), and a conspicuous failure to address the substance of a large majority of the criticisms. We sincerely hope that the multiple serious concerns raised in this paper will prompt serious consideration by government and parliamentarians, and responses which are substantive and constructive.

The Australian Uranium Association (2008) has also called for an inquiry into the role and resourcing of ASNO, albeit for different reasons than those outlined above.

For more information on ASNO see: www.foe.org.au/anti-nuclear/issues/oz/u/safeguards

A13. THE REALPOLITIK OF AUSTRALIAN SAFEGUARDS POLICY

It is sometimes claimed that Australia's safeguards requirements are the equal of or better than those applied by any other uranium-exporting country. However the IAEA is responsible for safeguards regardless of the origin of uranium supplies.

As we have seen there are many, serious flaws with Australia's safeguards policies:

- Australia can claim little or no credit for the provisions of bilateral agreements given that key provisions – most importantly, concerning reprocessing and plutonium stockpiling – have never once been invoked.
- In some cases Australia allows AONM to be processed in non-safeguards-eligible facilities.
- Australia allows uranium sales to nuclear weapons states which show little inclination to abide by their NPT disarmament obligations; states with a history of weapons-related research based on their civil nuclear programs; states blocking progress on the Comprehensive Test Ban Treaty and the proposed Fissile Material Cut-Off Treaty; and to undemocratic, repressive, secretive states with appalling human rights records.
- Uranium exports are shrouded in secrecy at many levels.
- ASNO is in great need of radical reform, or abolition and replacement with a credible safeguards agency.

Australia could use its status as the world's largest holder of uranium reserves to leverage non-proliferation and disarmament outcomes. Australia could, for example, have promoted the adoption of 'Additional Protocols', strengthened safeguards agreements which provide the IAEA with greater authority to inspect suspected diversion of nuclear materials. Australia could have insisted that all of Australia's uranium customer countries must have an Additional Protocol in place. Indeed Australia does require Additional Protocols of all customer countries – but that policy was only adopted *after* all of Australia's customer countries had already concluded an Additional Protocol with no prompting or persuasion from Australia.

ASNO states: "The non-proliferation regime is also strengthened through Australia's requirement that recipients of Australian obligated nuclear material adhere to the Additional Protocol." But Australia had nothing at all to do with that strengthening of the safeguards system. Instead of using Australia's position to leverage a positive outcome, Australia has indulged in a cynical, retrospective PR exercise in relation to Additional Protocols.

(As at October 2010, 102 countries have concluded an Additional Protocol with the IAEA, but 18 countries with plans to develop nuclear power have not (Alger, 2010).)

Australia's position is also compromised by the practical and political support it provides to the US nuclear weapons program and Australia's reliance on the 'extended nuclear deterrence' of the US weapons umbrella. As IAEA Director-General Mohamed El Baradei (2007) noted: "Why, some ask, should the nuclear-weapon States be trusted, but not others – and who is qualified to make that judgment? Why, others ask, is it okay for some to live under a nuclear threat, but not others, who continue to be protected by a 'nuclear umbrella'?"

A14. RECOMMENDATIONS TO STRENGTHEN SAFEGUARDS

1. The International Atomic Energy Agency's (IAEA) safeguards/verification program is seriously and chronically underfunded. The Australian Government should take the lead to ensure that this problem is rectified.
2. Basing the IAEA safeguards system on periodic inspections is inadequate. A minimum requirement ought to be that all nuclear facilities of any proliferation significance have IAEA inspectors permanently stationed on-site. Nuclear facilities typically employ hundreds of people so the additional costs associated with that proposal would not be prohibitive.

3. The promotion of nuclear power should be removed from the IAEA's mandate.
4. Safeguards should apply at all stages of the nuclear fuel cycle. Currently safeguards begin at the uranium enrichment stage.
5. Action needs to be taken to address the stockpiling of ever-growing amounts of plutonium as plutonium separation at reprocessing plants continually exceeds its very limited use as fuel in nuclear reactors. The problem can easily be addressed by stopping or suspending reprocessing. The Australian Government could take a lead by prohibiting the reprocessing of Australian-obligated Nuclear Materials by (or on behalf of) countries which stockpile plutonium. A strong case can be made to prohibit reprocessing altogether – it serves no useful purpose. A strong case can also be made for international (United Nations) control of all reprocessing and enrichment.
6. All nuclear facilities processing Australian-Obligated Nuclear Materials ought to be subject to IAEA inspections (i.e. the IAEA ought to have the authority to carry out inspections of those facilities). At the moment, it is a general rule that all facilities processing AONM must be subject to IAEA inspections (from the enrichment stage onwards) but exceptions are made for the flimsiest of reasons (e.g. in Russia).
7. Important information about safeguards is kept secret by the Australian government and there is a compelling case for greater transparency. Examples of unwarranted secrecy include the refusal to publicly release: country-by-country information on the separation and stockpiling of Australian-obligated plutonium; Administrative Arrangements, which contain important information about safeguards arrangements; information on nuclear accounting discrepancies; and the quantities of Australian-Obligated Nuclear Materials held in each country.
8. Since the framework for Australia's safeguards policies was established in the 1970s, there has not been a request to enrich Australian-obligated uranium to 20% or beyond (highly-enriched uranium). The Australian Government should prohibit the enrichment of Australian-obligated uranium to 20% or beyond under any circumstances rather than leaving open the possibility of granting consent. Highly-enriched uranium is not required for nuclear power reactors and its use in research reactors (as fuel or irradiation targets) is being phased out.
9. A credible safeguards regime for Australian uranium exports depends on having a credible safeguards agency. Sadly, the Australian Safeguards and Non-proliferation Office has a poor track record. An independent public inquiry is urgently needed.
10. While uranium is exported, the following exclusions should apply:
 - Exclusion of states possessing nuclear weapons. Alternatively, uranium supply to nuclear weapons states should be made conditional on demonstrated compliance with disarmament obligations under the Nuclear Non-Proliferation Treaty (NPT). A complete separation between civil and military nuclear programs should be a condition of supply (a condition which is not met in some of Australia's current customer countries, e.g. China, Russia).
 - Exclusion of states that are not compliant with their obligations under the NPT.
 - Exclusion of states that are not party to the NPT (India, Pakistan, Israel, North Korea).
 - Exclusion of states that continue to produce fissile material for weapons (India, Pakistan and possible other countries).
 - Exclusion of states with a recent history of covert nuclear weapons research (e.g. South Korea), whether or not they have been formally found to have breached IAEA safeguards agreements.

- Exclusion of states (e.g. China, USA) which have not both signed and ratified the Comprehensive Test Ban Treaty (CTBT).
- Exclusion of States which do not have full-scope IAEA safeguards and an Additional Protocol in place, with a consistent record of compliance.
- Exclusion of uranium enrichment in facilities not under international control.
- Exclusion of states which reprocess spent nuclear fuel to extract plutonium.
- Exclusion of states which do not have excellent standards of nuclear regulation and safety.
- Exclusion of states which do not comply with the best available storage of radioactive waste.

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