

**ECSSR 14th Annual Energy Conference - Nuclear Energy in the
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**PANEL VI: THE FUTURE OF NUCLEAR ENERGY IN THE WORLD
CONSEQUENCES FOR THE ARABIAN GULF**

LESSONS FROM THE NUCLEAR COUNTRIES

CIVILIAN POWER vs WEAPONIZATION PROGRAMS

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CHAIRMAN, DELEGATES:

I'm going to do two things simultaneously: I'm going to run a slide show which will introduce you to the essential nuclear materials required to build relatively unsophisticated nuclear warheads – these are a compressive plutonium device and a highly enriched uranium gun weapon.

Then the slides will lead you through how Iran is possibly planning to procure these materials at its nuclear facilities of Esfahan, Arak and Natanz. And then Iran's approach will be compared with those of other nuclear states that have developed their individual weapons programs in clandestine ways - these two states are North Korea and Israel.

And then the potential effects of starving Iran of nuclear know-how by embargos and international sanctions, will be touched upon and, specifically, examine to see if this could lead to nuclear safety issues at the Bushehr nuclear power plant. Once operational Bushehr will become the largest source of radioactivity in the Gulf region – the slides run through the dispersion of radioactivity from a moderate, but hypothetical, accident with deposition of radioactive fall-out occurring on the Gulf States.

Finally, the slide show which I hope is mainly self-explanatory will globally show those states that have involvement in nuclear weapons procurement – obviously, the United States, Russia, Britain, France and China, then those states that have tried and been caught out, and finally those states that have the technological ability but not, so far, the inclination.

My following spoken presentation will not relate directly to the slides running automatically on the screen behind me, but and of course I will be happy to discuss any issues that are raised by the slide show.

You can either watch the slides, listen to me, or do both!

It was so good to see my fellow countryman and Secretary of State David Milliband open this conference on Monday.

David seemed eager to sing the praises of nuclear power but he was surprisingly taciturn about the troubled times that nuclear power has experienced in the United Kingdom.

If he had told you, he would have described how Britain led the way with the first generation on nuclear electricity in 1954, a World-first and pioneering for those times. He could have gone on telling of Britain's investment in the graphite moderated reactor series of nuclear power plants building a total of twenty four Magnox reactors, and, more, to the fourteen Advanced Gas-Cooled Reactors or AGRs which, together with the single pressurised water reactor located on the Suffolk coast, generated a little more than 36% of the United Kingdom's electricity demand at the peak of this nuclear program.

And, moreover, he could have told of how our own front-end nuclear fuel industry provided for all of our needs and exported to overseas markets. Then he could have gone on about the back-end fuel processes, at the now infamous British Nuclear Fuels at Sellafield, that is fuel reprocessing to extract the plutonium that, according to Hans Blix, has the potential of one million times more energy than the equivalent amount of wood kindling.

And he could have gone on and on, describing the advanced reactor designs, the British universities then stocked with researchers such as myself, and of Britain's great expectations for the first nuclear age.

Here then was the very model of how to develop and practicably implement a self-sufficient national nuclear industry.

So why did David Milliband, when extolling the virtues of peaceful nuclear energy, not mention the apparent success of the United Kingdom's nuclear past?

Well, he probably did not do so because over the last two decades Britain's nuclear industry has collapsed into the doldrums – today, this past World nuclear leader doesn't have the skills, resources and facilities to restart its nuclear energy program for which it now has to turn to France,

Much of what is left of Britain's nuclear past has been passed to a government nuclear decommissioning authority - this radioactive waste legacy is reckoned to be at least upwards a total of eighty billion sterling.

Britain is now paying the price of its own sub-prime nuclear crisis – it lived high with its nuclear adventure of the fifties, sixties and seventies but now it has to pay the price.

Britain's, David Milliband's and, indeed, my woes about the United Kingdom nuclear industry leads me nicely into proliferation issues.

This is because the failure of our nuclear industry is that, from the onset, Britain mixed-and-matched its civil peaceful and military weapons programs - the civil Magnox reactors were chosen because these heavily moderated reactors could produce spent fuel giving a very high yield of plutonium; reprocessing spent fuel demands at Sellafield to produce the military plutonium were disproportionately greater than that available from Britain's domestic Magnox reactors, so overseas fuel was imported under somewhat dubious 'safeguarded' reprocessing contracts.

And, Britain and the United States entered a number of secretive mutual defence agreements, swapping fissile materials and nuclear weapon design details, all to the extent that today the management of Britain's nuclear weapon plants at Aldermaston and Burghfield is in the hands of a mainly American contractor; that Britain's strategic nuclear deterrent is delivered via Trident missiles of wholly American design and manufacture; which are held ready for launch from Royal Navy submarines that are not only powered by American design nuclear power plants but for which the highly enriched uranium fuel is American in origin.

This example of cooperation between Britain and the United States demonstrates that nuclear proliferation is not just the expansion of the numbers of nuclear weapons, but the transfer of nuclear weapons data, information, technology and materials between states and organisations.

Nuclear proliferation is fostered by and prospers in a climate of suspicion and mistrust between states; it involves the perceived intentions of neighbouring states about the clandestine activities of another state.

Sometimes it is based on well proven fact but sometimes on rumour, and sometimes even on a desire to engender a belief that proliferation is underway when it is manifestly not.

Here I intend to provide my insight into these aspects of proliferation of nuclear technology – it is not a narrative on the detailed nuts and bolts of proliferation but, as applied here in this geo-political region, particularly in account of the recent movement of the Gulf States to explore the possibilities of civil or peaceful nuclear energy.

First, consider the recent moves by the Gulf States to evaluate peaceful nuclear power.

In two thousand and six, the Thirty-Third Session of the Islamic Conference of Foreign Ministers considered and concluded that the Muslim world was weak despite its considerable human, material and natural potentials.

Its Final Communiqué reiterated the importance for Muslims to acquire state-of-the-art sciences and technologies, including nuclear technology for peaceful purposes. This endorsement of nuclear technology and call for its adoption was once again declared by the Ministerial Council held in Riyadh in March two thousand and seven and then, and more specifically, later that same year at the six-member Gulf Cooperation Council, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and, our generous hosts here today, the United Arab Emirates.

Now, one might well ask, what has prompted these Gulf States to welcome nuclear technology, albeit as it is claimed entirely for peaceful purposes?

Gulf Ministers placed a unified emphasis on the right of any country to possess and develop nuclear processes for peaceful purposes and much ado was made about transparency, security and a resilient non-proliferation regime being in place from the onset.

So be it, but is nuclear technology becoming increasingly relevant to the Gulf States and is it a judicious path to venture along?

The point I make here is that the mainly economic rationale favouring the acquisition of nuclear power by the Gulf States represents only a few jigsaw pieces of the broader picture.

First, I am going to address the potential proliferation risks implicit with the adoption and development of civil nuclear power programs. I shall ask the question, although I doubt that I will find a convincing answer, whether it is entirely possible to eliminate the likelihood of proliferation running alongside the peaceful use of this dual-purpose technology.

The first consideration is whether the Gulf States' declaration of interest in peaceful nuclear technology is, in fact, a statement of proliferation in itself.

In this context, we have to account for the developing situation immediately to the North in Iran whereby, or so it seems to all but the Islamic Republic's most ardent supporters, Iran is following a strategy that points strongly towards a nuclear-military objective.

Then to the West there is Israel, with its undeclared but potent nuclear weapons arsenal and ability to launch and deliver by air, from land and via submarine launchers, a nuclear punch to any of the Middle East states. Using conventional arms, Israel has previously moved against nuclear installations in Iraq and, more recently, at a suspect nuclear plant under construction in Syria and, so it is strongly rumoured, Israel has been ready for some time to strike at Iran's nuclear installations at Arak, Natanz, Esfahan and Bushehr.

And to the West there is a declared nuclear weapons states of Pakistan and its nuclear neighbour India.

Pakistan is of particular interest with its erstwhile Chief Nuclear Scientist, A Q Khan, now retired in quiet disgrace following his involvement in nuclear proliferation trading within and beyond the immediate region - A Q Khan might well be renowned within his homeland as *Father of the Islamic Bomb* but he is, surely, infamous for his technological assistance in support of Iran's purportedly clandestine nuclear activities throughout the last decade or more.

Whatever, the proposed Gulf States entry into civil nuclear power has the potential for tipping a tottering but just stable regional situation into instability?

Put another way, so far as Iran is concerned, the regional situation might remain stable, for five or more years until Iran has, itself, produced sufficient weapons-grade fissile material and nuclear technology to *break-out* of the international control regime to then, unfettered, assemble a nuclear weapons arsenal. It is in Iran's interest to cool down the situation until it is ready, if this is its intent, to *break-out*.

But it might well be that a civil nuclear program undertaken jointly and rapidly by the Gulf Arab states would be sufficient to fuel instability, particularly if the Israeli government looks adversely at such a move to be a general strengthening of nuclear activities within the region.

The response of the next, and forthcoming, Israeli government might well be, and there have been hints of this recently, to lift the lid off its longstanding opaqueness about its nuclear weapons capability.

Now, would the composite of a then declared nuclear weapons state, Israel, and an aspiring nuclear weapons state, Iran, be sufficient to trigger a regional arms race in weapons of mass destruction?

Obvious candidates to enter into the fray of a regional nuclear arms race are Egypt, Turkey and Saudi Arabia.

The United States and its immediate western allies maintain considerable economic and political influence over two of these states.

For, given this situation, the political savvy is that Egypt would withdraw early from any nuclear weapons proliferation, mainly in the face of threat from Israel and risk of loss of relations with the US. Likewise for Turkey, its NATO commitments and aspirations towards European Union membership would not bolster its entry into nuclear weaponry.

But for Saudi Arabia the determination is not so straightforward.

Saudi Arabia does not maintain a technologically-based infrastructure yet it operates a sophisticated, high-tech military. It does so by reliance upon overseas governments and private sub-contractors, and it uses its petro-dollar power to leapfrog into new technologies as it chooses to do so. It could, arguably, fashion this same power to procure a nuclear weapons capability in the relative short-term – that is Saudi Arabia could possibly petro-dollar procure an effective nuclear warhead arsenal ahead of Iran’s lead-in time of five or so years hence, thus accelerating nuclear arms tensions in the Gulf region.

So, Delegates, the **first** issue to address in the risks of Civil Nuclear Power leading to *Nuclear Weaponization* is not from spies and spooks trading in nuclear secrets; nor from civil fuel processing and enrichment plants diverting streams of weapons grade fissile materials from peaceful use to clandestine military activities; nor from the hoodwinking of international inspectors or the wrangling of politicians.

I suggest, danger lies from the suspicions and mistrust that is so prevalent in this sensitive geo-political region.

This is because it is the respective positions of the regional players - Iran, Israel and Pakistan - that have immediate bearing on further proliferation in and around the Gulf and not those established weapons states – firstly the United States, then to some degree China and Russia, and to a much lesser extent France and Britain and the European Union.

Could it be that in this highly charged and turbulent region, the Gulf States’ genuine desire to engage in civil and peaceful nuclear power could, quite possibly, tip the region into a nuclear arms race?

Now Delegates I turn to the **second** issue of proliferation.

For this I need to briefly examine the information exchange processes that enable proliferation mechanisms.

First, nuclear weapons technology is going on sixty years old.

This information database of nuclear weapons technology is old and creaky, over the years and decades this information has seeped from country to country, being akin to a seeping tea bag with a constant outflow of information.

For an advanced industrial country, acquisition on this technology is relatively rapid – for example, following the first nuclear warhead test *Trinity* in nineteen-forty-five by the United States, its Cold War rival the Soviet Union demonstrated its first nuclear explosion in just four years, that is in forty-nine. The United Kingdom required much the same time to stage a nuclear explosion demonstration in four years from forty-eight when its government decided to ‘go nuclear’.

France followed in nineteen-sixty and China in nineteen-sixty-four.

These countries achieved these rapid acquisition times because they were not subject to international constraint: They operated their uranium enrichment and spent fuel reprocessing plants openly and, moreover, some countries, Britain particularly, combined civil nuclear power and military nuclear activities with little distinction – a practice that continued in Britain well into the nineteen-seventies possibly, the eighties - that is well beyond the enactment of the *Treaty on the Non-Proliferation of Nuclear Weapons* in nineteen-seventy - and they dabbled in mutual defence agreements that facilitated the transfer of weapon design and performance knowledge.

In fact, mutual defence agreements whether declared or otherwise, played and continue to play an important role in proliferation. For example, the United Kingdom – United States *Mutual Defence Treaty* of nineteen-fifty-four remains in force today and it does so, some would argue, completely contrary to the non-proliferation treaty.

Even if the opportunity for individual countries to openly exchange information is removed, that is by the imposition of a non-proliferation regime, then this slows but does **not** halt the process of any one state, alone or in combination with another, or others, to develop a nuclear weapons arsenal.

A determined state, such as North Korea even under a harsh sanctions and self-imposed economic exile, can achieve the goal of attaining a small, deployable nuclear weapons arsenal within about fifteen years,

But unlike North Korea individual states very rarely go it alone and proliferation via inter-governmental exchanges has been and most likely continues to be, to coin a phrase, proliferate.

In the nineteen-sixties and seventies the French provided Israel with plants and facilities to found and accelerate its nuclear weapons program at Dimona.

Israel itself, struck up an accord with South Africa during the seventies and, together, these two states are believed to have conducted an atmospheric nuclear test in the Indian Ocean in September of nineteen-seventy-nine.

However, some commentators suggest that cooperation between these somewhat odd bedfellows, Israeli and South African, was not that significant but, that said, it is known that they traded in the nuclear trigger initiator material tritium, to South Africa, and enriched uranium, from South Africa to Israel.

Mutual exchanges of proliferation, whether declared or otherwise, have also occurred between the then Soviet Union and China; from China to Pakistan in heavy water and centrifuge bearings; and then from Pakistan to North Korea, possibly involving missile know-how.

The recently brokered *One-Two-Three* United States – India deal is a sophisticated example of a *Mutual Exchange Agreement* that borders on, indeed some would opine encourages, nuclear weapons proliferation.

In this agreement, the United States almost wholly brokered the deal keeping the *International Atomic Energy Agency* at arm's length and then organising the *Nuclear Suppliers Group* countries into ready compliance.

Some interpret the *United States – India Nuclear Cooperation Agreement*, to give it its full name, to have introduced a novel form of proliferation. This is whereby the United States, and some of the *Nuclear Suppliers Group* countries, are to provide nuclear fuel for India's expanding civil nuclear power program, leaving India's scarce domestic resources of uranium to be devoted almost entirely to its unsafeguarded nuclear weapons activities.

In this way the United States might be seen to be underwriting India's procurement of weapons-grade fissile material.

Finally, there is the third aspect of proliferation.

It is often argued that in order to develop nuclear weapons, a State intent on weaponisation would need to develop uranium-enrichment or spent fuel reprocessing capabilities to produce the highly enriched uranium and or plutonium fissile material required for the core or fissile pit of a nuclear warhead.

Both front- and back-end fuel activities provide opportunity for the proliferator to exploit the weaknesses of all of this radio-chemical alchemy – this is that a small stream of highly enriched fissile uranium, HEU, can be diverted from the main stream of civil low enriched uranium, LEU. And, similarly, reprocessing of the irradiated or spent fuel enables accountancy fiddles to be made of both irradiated or spent fuel stocks and the separated plutonium inventory.

However, proliferation is entirely confined to the front-end nuclear fuel processes for enriched uranium production and to the fuel back-end reprocessing for plutonium separation, although it is these two areas of the nuclear fuel cycle activity that attract the most scrutiny.

The UAE *policy paper* that I have previously referred to, is quite resolute on this, stating that its peaceful nuclear program will have no part in any dual-use technology and, commiserate with this, that all nuclear fuel services will be purchased from and remain the responsibility of overseas organisations.

Delegates, join me in pausing here to savour the irony that a fuel-rich state upon which the developed nuclear world is highly dependent for its oil supplies, now proposes to render **itself** entirely dependent upon the nuclear world for its nuclear fuel!

Just for a moment, put aside what might be compelling evidence that Iran has embarked upon its own nuclear weapons program. Assume instead that Iran is investing, at Bushehr to start with, in a long term peaceful nuclear energy program, and that its uranium enrichment and fuel pin and assembly fabrication facilities, now being simultaneously developed at Natanz and Esfahan, are to provide it with nuclear fuel self-sufficiency in years and decades to come.

Now, Delegates, if this was indeed the case, then surely Iran has to be congratulated and applauded for standing up against the what some term as the international nuclear fuel supply cartel.

Now the Gulf States plan to exclude front- and back-end fuel processes which leaves the proposed nuclear activity somewhat curtailed.

However, simply removing front- and back-ends does not entirely deny the nuclear fuel processes involved from being used for third party proliferation.

And, of course, there remains proliferation risks and opportunities with new fuel deliveries, particularly if the mixed oxide or MOX fuel based on fissile plutonium, so promoted by Hans Blix, is used – transportation of this highest security category of nuclear material is reckoned to be at very high risk by the IAEA.

And, the intensely radioactive burnt-up or spent fuel in store at the back-end of the nuclear power plant, which might remain in ever increasing quantities and amassed radioactivity on site over the sixty or so year life of the plant – the spent fuel stores represent a very risk of terrorist attack and radioactive release to the local and regional environment.

So Delegates, the Gulf Cooperation Council has published its own tight non-proliferation specification of DOs and DON'Ts as a basis and foundation **if**, that is, it should proceed with peaceful nuclear energy.

However in the first instance and in the interim term, the Gulf States will depend on others to supply the nuclear hardware, to establish the regulatory framework for environmental and health controls, for independent scrutiny of nuclear safety, and, of course, to police any potential proliferation activity.

The Gulf States can take their choice on just who is to undertake these roles on their behalves – AREVA of France might supply the nuclear power plants; like at Bushehr, Russia might provide and manage the nuclear fuel cycle from cradle to grave; Britain might provide the model regulatory regimes; and no doubt the United States will keep a zealous scrutiny of proliferation issues, whether invited to do so or not.

Of course, the Gulf States will realise that all of this assistance and skills in building a peaceful and strictly non-military application of nuclear energy has to be drawn from the very the countries – the United States, Britain, France and so on - that themselves have been major proliferators in the past and, as some would opine, are continuing to do so today.

Chairman, Delegates, Thank You for providing me with the opportunity today .