CONFERENCE PROGRAMME (Final)

9.00 am Registration/coffee

9.30 am Welcome: Simon Sedgwick-Jell (NSC Chair)

9.35 am **KEYNOTE ADDRESS**
The Myth of Nuclear Deterrence
Bill Arkin (Greenpeace USA)

10.00 am **INTERNATIONAL FRAMEWORK**
(A) Bedrock of Britain's Defence into the C21?
Dr Paul Rogers (Dept of Peace Studies, Bradford University)
(B) A new security framework for the UK
Marjorie Thompson (Chair, CND)

10.55 am Panel Discussion

11.15 am Coffee

11.45 am **PEACETIME HAZARDS**
(A) Reactor, Missile and Warhead
William Peden (Consultant to Greenpeace and National Steering Committee on Military Nuclear Hazards)
(B) Public Health Hazards
Dr Mary Brennan (Fellow, Faculty of Public Health Medicine)

12.30 pm Panel Discussion

12.50 pm LUNCH

2.00 pm **ECONOMIC COSTS**
(A) Opportunity Cost: How People Pay
Bill Speirs (Deputy General Secretary, Scottish Trade Union Congress)
(B) Conversion: A Missed Opportunity?
Sue Willet (Centre for Defence Studies, Kings College, University of London)

2.45 pm Panel discussion

3.05 pm TEA

3.25 pm **LOCAL AUTHORITIES' POLICY DEVELOPMENT**
Stewart Kemp (Policy Officer, Nuclear Free Local Authorities)

3.45 pm Discussion

4.00 pm Close of Conference

Note: Bob Aldridge, ex Trident Missile engineer, will also be in attendance at the conference and will join the speakers for both morning panel discussions.

5541A

LIST OF DELEGATES

LIST OF DELEGATES

AUTHORITY	
Aberdeen City Council	
Blaenau Gwent Borough Council	Cllr R Jenkins
Blaenau Gwent Borough Council.	Cllr G Griffiths
Blaenau Gwent Borough Council.	Cllr N Daniels.
Bolsover District Council	Cllr. F. Revell
Central Regional Council	Cllr. Montgomery
Clwyd County Council	Mr. D. Norris
Clydebank District Council	John Gilleece
Derwentside Disitrict Council	D Khamis
Doncaster Borough Council	Terry Sellars
Doncaster Borough Council	Tony Sellars
Edinburgh CND	Kenneth Benjamin
Gwent County Council	Cllr D Bosley
Gwent County Council	David Goulding
Glasgow District Council	
Glasgow District Council	
Glasgow District Council	
Greater Manchester CND	Rae Strret
Greenpeace	William Peden
Greenpeace	Huw Jones
Humberside County Council	W Haughey
Humberside County Council	H Whatling
Kirklees District Council	Cllr John Lumb
Kirklees District Council	Caroline Melotte
Leeds City Council.	Cllr. Jim McKennay
Leeds City Council.	
London Borough Of Merton.	Mark Vines
Lothian Regional Council.	Cllr William Herald
Manchester City Council	Bill Risby
Manchester City Council	Olive Bowers
Medact.	David Summer
Merseyside FCDA	E Burns
Merseyside FCDA	C Turner
Mid Glamorgan County Council.	Mr A Young
Mid Glamorgan County Council.	Cllr L Lodwig
Midlothian District Council	Mr Atack
Midlothian District Council	Cllr S Campbell
Midlothian Peace Committee	Christine Soane
Midlothian Peace Committee	William Prentise
Motherwell District Council	William Wilson
Motherwell District Council	Vincent Mathieson
NFZ Scotland	
NFZ Scotland	
NFZ Scotland	
North Cumbria CND	Nigel Chamberlain
Norwich CND.	Davida W Higgin
Nukewatch USA	Bonnie Urfer
Nukewatch USA	Alistair Cairns
Nukewatch USA	Linda Urfer
Rotherham Metropolitan B.C.	Cllr K J Wyatt
Scottish CND.	Kenneth McNeil

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AUTHORITY	
South Glamorgan County Council	Mr R I Thomas
South Yorkshire FCDA	S.J. Turney
South Yorkshire FCDA	
South Yorkshire FCDA	Cllr F White
South Yorkshire FCDA	Alan Brooke.
Stirling CND	Ellen Moxley
Stratclyde Regional Council.	
Strathclyde Regional Council	
Strathclyde Regional Council.	J MacVicar
Tayside Regional Council.	
Tayside Regional Council.	
Tayside Regional Council.	
Tayside Regional Council.	
The Scotsman	
The Scotsman Press	Severin Carrell
West Midlands CND	Andy Pritchard
Wrexham Maelor Borough Council	Cyril Williams
Borough of Watford	Cllr Maria Green
CND	Declan McHugh
West Lothian Borough Council	Mr Morrice
West Lothian Borough Council	Mr Richardson
Delyn Borough Council	E Joyce

SPEAKERS' PRESENTATIONS

The Future of Nuclear Deterrence

William M. Arkin
(Director of Military Research, Greenpeace International)

I want to talk to you today about the nuclear shadow. Despite the end of the Cold War, no one should underestimate the resilience of the bomb and the magical quality that it unfortunately still retains. Hence the attention focused on nuclear proliferation today, and the dominance that nuclear weapons continue to have in our lives, and in the newspaper headlines. And, I will argue, the unfortunate dominance that nuclear weapons still have in the development of post-Cold War military and foreign policies.

Like a shadow, the nuclear shadow has ephemeral qualities. It is the special status accorded nuclear weapons, and all of the images relating to nuclear weapons that continue to govern much too much of our political and cultural lives. The nuclear shadow isn't just the direct impact of nuclear weapons -- we are all too familiar with the fact that the bomb continues to suck off billions of dollars, pounds and rubles from our public treasure through the continued testing of nuclear weapons and the continued manufacturing of nuclear materials and nuclear bombs. What I mean more is a way of thinking that accompanies nuclear weapons, a way of thinking that we have to eradicate if we want to be successful in moving beyond the bomb.

The nuclear shadow guarantees a certain behavior when it comes to international relations, even though nuclear weapons are

no longer popular, even though everyone seems to agree that they are not usable in battle, even though the usefulness of nuclear weapons as a deterrent outside of Europe has been called into question. In short, even though nuclear weapons no longer serve any purpose.

In the minds of the nuclear policy elites, nuclear weapons are a comfortable foundation and familiar territory for international relations. They connote a stable world that never changes, one where the victorious allies of the Second World War continue to possess power. And even though nuclear status no longer guarantees an economic well being, being a nuclear power still means being a permanent member of the UN Security Council, having special political power, and being in a different league. And because they have become such familiar territory, nuclear weapons tend to always find their way to prominence in virtually any area of the world where there is a problem worth solving.

Of course, part of the nuclear shadow is that in any area of the world where nuclear weapons are not an issue, where there is just hunger, or war, or poverty, or environmental destruction, or human rights abuses, in these places the governing nuclear elite of trained academics in the field of "international relations" aren't interested. Problems that are not nuclear problems just do not receive the same prominence. At least in Washington, if you want the attention of the Bush Administration you have to have a nuclear problem to solve. Anything else they're just uninterested in.

I've made this observation on a number of occasions recently to people in Washington, and the answer I get is 'well, if Iraq gets the bomb, or North Korea, or if a nuclear weapons finds its way out of the Russian republics and into the hands of terrorists or criminals, then it's everyone's problem.' Of course, the insinuation is that hunger or environmental problems are not everyone's problem. That anything that is not nuclear is not worth their brainpower -- nor their attention. That is the nuclear shadow. And this shadow, and dominance, in a world where there are more important things than the nuclear machine, is a good reason to get rid of nuclear weapons. To shift the weight of political power to something else, and to move out of the post-war period.

I was recently at a conference on the subject of the Korean peninsula, and it was through that discussion that I realized just how powerful the bomb can be. North Korea must survey the world after the Cold War and after the Gulf War and see two very contradictory pictures. On the one hand there are the military lessons of the Gulf War -- and the reality of utter insecurity they must feel both because of political isolation and military inferiority. On the other, there is Korea's ironic rise to prominence in the last six months, the attention it is receiving, and the new respect it is being accorded because it is a nuclear power. Not because it has the bomb, mind you, it doesn't. But because a nuclear crisis is now at the center of the Korean problem.

To be a sort-of nuclear power means to get the attention of the "big boys," and the protection if you will, of the international community. For North Korea, it means all of the leverage, and the negotiations, and the considerations, of nuclear politics. Thus, there's been a definite positive benefit for North Korea of stepping up to the nuclear table. Before all of the attention on North Korea's bomb, the country was merely irrational. Joint Chiefs Chairman General Powell referred to the north as one of his "demons" not too long ago. Yet now, with the bomb, the North seems to be instantly made rational. It is as if being a nuclear power confers a sort of maturity that now makes the North a force to be reckoned with.

The North must be confused by the unprecedented attention it is getting, because on the one hand all of the benefits signal how politically powerful a nuclear weapon is. If the schooled international relations types in Washington and London think that the bomb is this important, then why shouldn't other countries think that acquiring one wouldn't be equally important for them? This is the nuclear shadow. And it is a good reason to get rid of nuclear weapons altogether.

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For 45 years, the U.S. military, together with its British partners, and in unison with the Soviets and the French and the Chinese, prepared for nuclear war. During that period, the bulk of military strategy, planning, and weapons acquisition followed the nuclear path and it followed nuclear rules. Eighty-five

percent of the U.S. defense budget went towards conventional forces, but nuclear weapons got all of the attention. Through the heyday of the nuclear age, from the 1950s through the 1970s, mass destruction was stressed. This meant stuffing as many bombs as could be stuffed into a bomber, or in putting as many warheads as possible on intercontinental missiles. And it meant building up arsenals of hundreds, then thousands, then tens of thousands of nuclear warheads. Nuclear culture didn't just drive weapons. The entire intelligence community rooted out Soviet "targets," characterized their attributes, ordered their importance -- all preparing the central war plan of deterrence and mass destruction.

Even before Hiroshima and Nagasaki, war had reached unparalleled levels of mass destruction (hence Tokyo, Dresden, or Coventry), but it was the emergence of "strategic bombardment" in the form of the nuclear bomb, and then in the development of long-range nuclear missiles, that set the standard for the nuclear age. And in the same way that nuclear weapons were seen in the opening decades of the Cold War as the counter to the numerical superiority of Soviet conventional military forces, so was "airpower" -- the son of nuclear weapons -- seen as the technology that would compensate for any enemy's advantages in geography or numbers, whether in Korea, or Vietnam, or the Gulf War.

In the Gulf War, we see the nuclear shadow fully in action. Nuclear weapons played an enormous role before, during and after

the war. Not because they were actually used, mind you. Not because they "deterred" Iraq from entering Kuwait, or forced Iraq to withdraw. It was instead the nuclear shadow -- the role nuclear weapons played in mobilizing public opinion and in demonizing Saddam Hussein, in the design of the conduct of the war, in our missile fetish -- whether SCUD or Tomahawk -- the role of nuclear weapons in setting the terms of the ceasefire.

Even long before the war began, an "air war" was described to the public -- and thought of internally -- in particularly nuclear terms. In his first testimony before Congress following Iraq's invasion of Kuwait -- in September 1990 -- Secretary of Defense Dick Cheney described a potential air war as "holding at risk targets...that Saddam Hussein holds dear...inside Iraq." In his off-the-cuff remarks that got him fired the same month, General Michael Dugan, chief of staff of the air force, referred to the U.S. objective as "decapitation." Both of these concepts are particularly nuclear. And by the way, even though precise targeting and decapitation were never proven in the Gulf War -- after all, the Iraqi military was defeated in old-fashioned bloody conventional military style, and Saddam is still there, capitated -- the nuclear shadow created a false pretension about the instant ease with which a button could be pushed, and Iraq would be blown away.

The nuclear shadow also creates the notion in the minds of many in the public that an apocalypse is to be expected whenever military force is applied. Writing from Baghdad on 18 January --

the day after the air war began -- Marie Colvin of the Times captured the essence of this persistent image:

> An Iraqi businessman explained to me why people were so calm. Listening for weeks to the propaganda from Washington, they had expected Armageddon. Now that the bombing had come at last and they had survived, he said: 'Well, if that's it, we can take it.'

It is now common for military observers to say that Iraq fought a version of World War I while the coalition fought World War III. This was not just Saddam's error of military science. The vision of mass destruction in the mind of this Iraqi businessman persisted also in the news media, as it did amongst the public as well. It is the nuclear shadow.

But the bulk of the damage in the Gulf War was not apocalyptic, nor was it accidental, nor so-called "collateral." It was the consequence of a so-called successful air campaign to destroy Iraq's industrial base and urban infrastructure. The mass weapons didn't kill masses, the precision weapons did.

The nuclear shadow ultimately governed our images in assessing the damage. What started with two atomic bombs in Hiroshima and Nagasaki set the ball rolling for what has been a 45-year endless and macabre analysis of the "effects" of nuclear weapons. In this effort, the nuclear powers have blasted 2,000 nuclear weapons since Trinity, and fought thousands of nuclear war games. They have obliterated Moscow and Kiev and Budapest and Leipzig countless times over, and have watched Cheyenne

Mountain, and Omaha, and Holy Loch be wiped off the map. All to evaluate the weapons, to develop new theories, new strategies, new technologies, and new delivery systems, all with the objective and the promise of doing something impossible, of having a nuclear war without effects. Of pushing a button and evading the consequences.

The nuclear game has always been to make believe that nuclear weapons would not land on cities and incinerate hundreds of thousands of civilians. Weapons developers would make believe that "advances" in nuclear technology meant that more accurate weapons would come ever so close to their targets that this would spare any deaths. The ultimate manifestation of this illusion was the so-called neutron bomb which emerged from the laboratories in the 1970s, a bomb that would spare destruction even of buildings. And this is the thinking that led to the "advance" of Trident over Polaris.

I don't want to dwell on nuclear destruction, though, but to show how the nuclear shadow has led to a false image of war. For the nuclear shadow has created only one of two alternatives. One is the apocalypse, in which everyone dies and all is destroyed. This is what I would call the old image of nuclear war, one that the weapons designers have been trying so hard to eradicate from people's minds over the years. Or there is the second possibility, the bloodless, button-pushing, instant war. In which the winner is assessed and declared from the score but not from the results. Because as we have heard so many times, 'there

are no real winners in a nuclear war.' That is, in a real nuclear war.

If there are only two types of destruction to be expected in war, then actually minding the true effects of war, and considering war's purpose, and studying war's aftermath, is not important to war strategists. During the Gulf War, the discussion followed the absolute dichotomy created by the nuclear shadow: that the war was either apocalyptic or bloodless. This dichotomy allowed the media, and the military spokesmen, to focus on the performance of the bombing campaign, and of the weapons. And this preempted any discussion as to the purpose of the bombing missions in Iraq. All very convenient, all very evasive. It is the nuclear shadow. The message being that we should all be grateful -- and we are -- that there wasn't a nuclear war.

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Over the years, we have acquired a special nuclear language, and as the nuclear generals and admirals waged their nuclear wars, the language allowed policy discussions without confronting the prospects of indiscriminate killing, or of true destruction. So it is no surprise that in the Gulf War the dehumanizing Pentagonese came out: of "sorties," "targets," "packages," and "bomb damage assessment." This is language of the bomb, and it is a language to suggest that only machines are involved in warfare.

The nuclear shadow, however, is not just about machines. It is also about the way the system functions, and about the way our

leaders, and the elite, retains a certain control over society. Even though nuclear weapons continue to have a most corrosive effect on foreign policy and international relations -- that is, they create many more problems than they solve -- they persist.

That is because of the "business" of nuclear weapons. And it is a business. Maybe at one time, nuclear weapons establishments operated in unison with societies' political objectives. Maybe at one time we were so in awe of the bomb, and believed in it so much, that we didn't even, and couldn't even, think of its cost, or its waste. But not any more. Now, nuclear laboratories, and nuclear manufacturing complexes, and nuclear dependent corporations, and nuclear commands, and nuclear bureaucrats -- all what I call the nuclear machine -- have only their own interests at heart. The nuclear shadow is jobs, and big business, and power politics. Economically, everyone knows nuclear weapons are becoming more and more insupportable. The B-2 bomber costs more than its weight in gold. The new Trident-class submarines being built in Britain are outrageously expensive. But, the nuclear addicts argue, the grave economic and political dislocation that would occur if the economically insupportable and wasteful were stopped is worse than if it is continued. This kind of thinking can only survive when it comes to nuclear weapons.

But the nuclear business -- and the nuclear elite -- are hardly idle when it comes to making new justifications for their beloved machine. So already, we are seeing old/new restatements

of the need for nuclear weapons. We have new threats, new instabilities, and new dangers present and lurking over the horizon. And whether the dangers be true or not, they are all intended to insure that the nuclear shadow doesn't move away. All to keep the system alive.

First is the role of nuclear weapons in defining the greatness of a state. Recently it came to light that the Bush Administration believes that its possession of nuclear weapons -- and its possession of more nuclear weapons than everyone else combined is the objective in the future -- confirms its role as the single superpower. General Lee Butler, commander of the Strategic Air Command, stated before Congress in April that, "A US nuclear deterrent force is a key element in the pervasive international role we must continue to play well into the future." I don't need to remind a UK audience as to what nuclear weapons represent for the British government and elite. But we really need to ask: Do nuclear weapons define whether a country is powerful or great anymore? And should they?

Second is the role of nuclear weapons in deterring conflict. Nuclear weapons did not deter Iraq from invading Kuwait, nor Argentina from invading the Falklands, nor is there much hope that they will deter any conflicts in the future. Nor does anyone particularly want the US or the UK to brandish nuclear weapons for this purpose. But "deterrence" is the central thesis of the existence of nuclear weapons, and therefore, they are always described with this purpose. General Butler can claim

just a few weeks ago that "Deterrence does in fact provide a constraint on the behavior of potentially adversarial states" but it seems that such a claim rests on nothing. Yet the notion is a key part of the nuclear shadow.

Third is the role of nuclear weapons in deterring the development of nuclear weapons by more nations. This is a particularly timely and effective role for them, given the hype that Iraq and North Korea, and others have gotten recently for their real or concocted nuclear ambitions. Now I'm as much in favor as anyone in eliminating the spread of nuclear weapons, but the way to do so is so obvious as to be unfathomable to the nuclear elite. And that is to commit ourselves to getting rid of our own. But no, instead we have the Assistant Secretary of the Air Force stating in April 1992 that, "The emphasis of the deterrence equation has been shifted from just deterring the use of nuclear weapons by the Soviet Union, to deterring the development or use of nuclear weapons by other countries, as well." And we are to be grateful. But it is all a shadow.

Fourth is the role of nuclear weapons in deterring "nuclear blackmail." This is one step beyond deterring nuclear proliferation. Which of course means that just in case that level of deterrence fails, the same devices will be brought to bear to solve an even more difficult problem. Writing in the May 1992 issue of Proceedings, the magazine of the U.S. Naval Institute, Admiral David Jeremiah, vice chairman of the Joint Chiefs stated, "As long as nuclear weapons exist anywhere in the

world, we will need credible strategic forces, if only to protect ourselves from nuclear blackmail." What would we do with our nuclear weapons in this case? Don't worry, it is being war gamed and modeled, and just the right type of weapon is being developed for this purpose. The nuclear shadow.

Fifth and last is the role of nuclear weapons in deterring the actual use of nuclear weapons. Two retired naval officers wrote in the Spring 1990 issue of Submarine Review that the US should equip submarines with a single warhead Trident II ballistic missile to "deter the use of nuclear weapons in third power conflicts." I almost hesitate to use such an example because it is so absurd. But it does help, I think, to show the lengths that the advocates will go to keep the nuclear machine alive.

But again, it is the thinking. It is not just evil money-grabbing bad-people at work. It is the natural and logical end point of a certain way of thinking. What I call the nuclear shadow. What we have to change in order to have some sunshine.

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In preparing for this talk, I've been torn between using a tone of ridicule, or one of reconciliation. Ridicule is an easy path. I can just describe the shameless efforts of the nuclear weapons advocates, the scientists, and the aparachiks, to keep the nuclear machine alive. I can describe their arrogance in believing that their departmental interests -- the interests of the Department of Energy, the Atomic Weapons Establishment, the

Ministry of Atomic Energy -- are the same as the public interest. I can recount the dark side of the "peaceful" bomb -- Bikini, Nevada, Windscale, the Cuban missile crisis, Hanford, Polomares, Semipalatinsk. This is the nuclear history and geography that always makes the nuclear elite wince, and then explain, and if that doesn't work, to manufacture new secrets. I could just make fun of the vocabulary, from mushroom clouds, to red beards and blue danubes, broken arrows, and peacekeepers.

Ridicule annoys, even alienates, the nuclear elite. It even makes the "arms control" community, and the liberal establishment, uncomfortable. These are people who see the task of disarmament in terms of practical and impractical, in terms of dollars and cents, these are tinkerers and technicians working through the institutional rules and agreements, the requirements of verification and balance, insurance policies and options. Through careful measured work they believe they are reducing the dangers of nuclear weapons.

As the Cold War struggled through its final decade, the establishment increasingly sought to contain ("control") the abuses of the nuclear machine. They ultimately gained the grudging acquiescence of the nuclear advocates, who had their own interest in control. The nuclear advocates wanted to make nuclear weapons as invisible as possible, to minimize their public exposure. Get nuclear weapons off the front pages, whether through secrecy or arms control. That was the way to

keep control of the nuclear machine, and to ensure the never-ending process of modernization and advance.

It is not coincidental that the more attention a nuclear weapon got during the waning days of the Cold War, the more effort was applied to control it. This is true for the SS-20, Pershing IIs, cruise missiles, neutron bombs, MXs, SS-18s. I don't mean to say that public interest was activated because the arms control process alerted them to focus their attention; more that the public intuitively recognized the nuclear danger and their discomfort was translated by the establishment into some form of reasonable arms control to reduce the likelihood of nuclear war. While the establishment was working to control, the advocates scurried around to make other weapons more invisible. This sometimes even meant eliminating them.

While all this "progress" was being made in arms control, nuclear weapons continued their uncanny habit of doing things that brought them more and more ridicule, and more and more attention. Submarines would sink. New sites would be added to the ancient nuclear ruins: Chernobyl, Rocky Flats, Novaya Zemlya. The nuclear infrastructure became more and more transparent. So one might imagine that a partnership would have built between the nuclear elite and the anti-nuclear movements. One might have thought that there would be a common interest in restricting the dangers and eliminating the threat. But it never quite worked that way. And that is perhaps the saddest part of the nuclear shadow.

And that is where reconciliation enters the picture.

It is sometimes important to remind ourselves that there is a true conflict between disarmers and armers. There is a real struggle going on about the future of our society. It is not necessarily a struggle between good and evil. In my mind it is more a struggle between one idea and another. And that is where the nuclear shadow is important, because somehow nuclear weapons seem to always get in the way. Survey the globe, and there they are -- in the former Soviet republics, in the Middle East, in Korea, here in the UK, in Washington, everywhere. We pay for them, we read about them, we fear them, we are still controlled by them. They stand in the way of the future.

Reconciliation -- to me -- is a belief that there is an argument to be made, and public pressure to be brought to bear -- to eliminate the nuclear shadow. The turn from nuclear weapons in the 1980s was largely the product of a turn in public opinion. Now we are entering the final phase of the nuclear age. We all see the corrosive effect of decades of debate where all-knowing experts led us to believe that only they had the knowledge, or the wisdom, to decide what was good for the public. Their button pushing days are over. But they need to understand why.

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The Cost of Trident - Issues for Local Authorities

Glasgow, 10 June 1992

Trident - Bedrock of Britain's Defence into the 21st Century?

Paul Rogers
Department of Peace Studies
University of Bradford

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Introduction

With the ending of the Cold War, it might be assumed that Britain's possession and deployment of nuclear weapons is becoming largely superfluous. It might, in particular, be assumed that the Trident programme is an appropriate candidate for cancellation.

In practice, and in the face of the collapse of the "Soviet threat", Trident is, in the view of the defence establishment, very much alive and kicking, and is intended to form one of the foundations of Britain's defence policy for the next thirty years. In order to appreciate the reasoning behind this attitude, it is useful to examine the history of Britain's involvement in nuclear weapons, as this provides us with the context to this unlikely reality.

The British Defence Context

Britain developed as a naval power over several centuries and used its power extensively in pursuit of colonial gain. Although it was capable of raising a massive army during the First World War, much of its global military power derived from the wealth of its overseas territories, especially India and its financing of the Indian Army. Following the crippling economic effect of the Second World War and the retreat from Empire in the two decades afterwards, Britain's economic status and the desperate need for industrial investment in the domestic sector should have dictated a defence budget lower than its principal competitors such as West Germany, France and, increasingly, Japan.

In practice, British politics in the late 1940s and 1950s were dictated by a yearning for global status. Indeed, a common belief among much of the population was that Britain was one of three world superpowers. Much of this belief focused on the need to maintain a global military presence and to develop and maintain an independent nuclear force. More generally it resulted in consistently high levels of spending on military research and development.

This reached the height of economic folly in the middle 1950s. At that time, Britain had around 800,000 people in its armed forces and was maintaining 80,000 troops in the Suez Canal Zone alone, with many thousands more "East of Suez". It had

tested and begun to deploy nuclear bombs, was developing a thermonuclear bomb, and was developing, simultaneously, three different medium-range nuclear-capable jet bombers. Furthermore it was investing in several other advanced military projects including the Black Night rocket and TSR2 supersonic bomber, both ultimately cancelled.

The commitment to nuclear weapons, in particular, had been born out of experience during and immediately after the Second World War. At the start of the war, Britain had already commenced a research and development programme aimed at producing an atomic bomb. With the entry of the United States into the war, this work was transferred to the US and formed a small but quite significant part of the Manhatten Project which resulted in the testing of an atom bomb in July 1945 and the use of two bombs against the Japanese cities of Hiroshima and Nagasaki the following month.

After the end of the war, the US Congress passed the McMahon Energy Act in 1946 which controlled access of data on its nuclear weapons research to its allies. Eeesentially, the US wished to develop its nuclear programme without the involvement of its war-time allies. Most of the British participants in the Manhatten Project had returned to Britain, enabling the Labour Government to take the decision to embark on a solely British programme to develop nuclear weapons. This commenced in the late 1940s, based principally on a research centre at Aldermaston and a reactor centre at Windscale (now Sellafield).

This decision to "go nuclear" was taken for two broad reasons, the first being in the expectation that the Soviet Union would develop nuclear weapons by the early 1950s. It actually tested its first device in 1949, giving the British programme an added boost. In addition to this, though, was the more general view that a British bomb would help maintain Britain's status as a world power. With the "loss" of India in 1947, this was considered to be particularly important. Then, as now, British nuclear weapons were largely a matter of status rather than security. By the early 1950s, though, this commitment, allied to the heavy spending on conventional forces and nuclear delivery vehicles such as bombers, was resulting in a relatively high level of defence spending, when compared with European allies.

Some small sense of reality intervened after the Suez debacle of 1956, with an end to conscription, a scaling down of the global role and a partial redirection of defence commitments to NATO, but Britain persisted with high levels of <u>per capita</u> defence spending into the 1960s. Right through until the end of the 1970s, it can be argued that Britain consistently failed to match defence spending to the realities of its reduced economic power. Typically, defence spending at any one time tended to be in tune with Britain's actual global status perhaps twenty or thirty years before.

Even this was not large enough to maintain all the nuclear and conventional forces which defence strategists would have liked, and one result was a particular commitment to nuclear weapons as a means of demonstrating power at relatively low

cost. As a result, the 1950s and 1960s saw the development of quite a wide range of nuclear forces which included the basing of nuclear weapons in Cyprus and their deployment on aircraft carriers.

More generally, and partly as a result of this quite comprehensive nuclear commitment, Britain maintained a very substantial defence research and development sector, with up to half of all spending on science and technology R & D going into the defence sector, contrasting with countries such as Japan, West Germany and Italy, where the figures ranged from 5 to 20 per cent.

Britain's commitment to high spending on defence was maintained and indeed enhanced in the first six years of the Thatcher administration from 1979. Substantial increases in defence budgets, of around 28 per cent in constant figures between 1979 and 1983, were partially a response to new Cold War tensions but partly a reflection of the priorities of Thatcher-style Conservatism. Even the attempt to curb the size of the surface navy from 1981 onwards was thwarted by its conspicuous role in the Falklands/Malvinas conflict in 1982. By 1986/87, defence spending topped out at figures substantially higher than those typical of the 1970s, but modest increases were planned for 1990 and 1991.

In the late 1980s, Britain's armed forces were maintaining six distinct roles, just four of them directly related to NATO:

- maintenance of the British Army of the Rhine (BAOR) and RAF Germany, with around 80,000 personnel and a large infrastructure, including tactical nuclear forces

- a major commitment to the security of the North Sea, Channel and North East Atlantic, mainly comprising surface combatants and submarines but with some maritime patrol and strike aircraft as well, including tactical nuclear forces,

- defence of air space around the UK, especially in the northern part of the North Sea and towards Iceland,

- the maintenance of an independent nuclear force, normally committed to NATO but available, like the tactical nuclear weapons, for independent use,

- defence of UK territory itself, a function partly overlapping with the first three roles although including the major security commitment in Northern Ireland, and

- "out of area" activities including the Falklands garrison, the Gulf Patrol, the West Indies naval presence, garrisons in Gibraltar, Cyprus and Hong Kong, and numerous training and advisory roles in more than twenty countries.

British Nuclear Forces in the 1980s

The nuclear forces deployed in support of these military roles were many and varied. The strategic force comprised four Polaris submarines equipped with a total of 64 missiles, each equipped with the Chevaline warhead system and available for use by NATO or, theoretically, as an independent force by Britain alone.

The Royal Air Force deployed about 200 nuclear-capable strike aircraft comprising Vulcan, Buccaneer, Jaguar and Tornado aircraft, although the Vulcans were withdrawn from service in the mid-1980s. All these aircraft carried the British-produced WE-177 free-fall bomb. The RAF also deployed around 30 Nimrod maritime strike aircraft equipped with a US-produced anti-submarine nuclear depth bomb which was available for use under a "dual-key" system.

The British Army in West Germany deployed three types of tactical nuclear weapon system. Two were howitzers, of 155mm and 203mm calibre, and the third was the Lance surface-to-surface tactical artillery missile. All three systems used US-produced warheads held under a "dual key" system.

Finally, the Royal Navy deployed free-fall WE-177 nuclear bombs on its Sea Harrier jump-jets operating off the Invincible-class aircraft carriers, and a depth-bomb variant for delivery by helicopters operating from carriers, destroyers or frigates. This involved a total of around 50 surface warships.

It follows that the British commitment to nuclear forces went far beyond the Polaris force, and most of the weapons were routinely integrated into NATO's theatre nuclear forces, and were consequently subject to NATO nuclear planning with its commitment to first-use of nuclear weapons embodied in the strategy of flexible response.

NATO Nuclear Planning

NATO's policy of flexible response, codified in document MC 14/3 dating from January 1968, envisaged two levels of nuclear employment, selective use and general response. The former involved use of a limited number of nuclear weapons, mostly low-yield warheads, against Warsaw Pact troops and their immediate logistic support. Numbers of weapons might be as few as five, amounting to no more than demonstration shots, but could be as many as one hundred.

Such selective use would be employed in the belief that Warsaw Pact forces would cease their aggression and withdraw, but in the event of escalation, then NATO's second strand, general response, came into effect involving hundreds or even thousands of nuclear weapons used against a wide range of targets in Eastern Europe and the western part of the Soviet Union. Such a sceanrio would involve co-ordinated action with US strategic nuclear weapons.

Peace researchers in Europe were concerned that such a posture was intrinsically destabilising, a view which was given added

weight by two further developments in the mid-1980s. One was a report that first-use would inolve immediate "demonstration targeting" of sites in the western Soviet Union, using Pershing 2 missiles, and the other was increasing evidence that NATO was adopting more aggressive tactics including a more offensive conventional armed forces posture.

The latter included concepts such as deep strike, follow-on forces attack and AirLand battle, all concerned in different ways with taking a war deep into Warsaw Pact territory at a very early stage in a conflict. Even more worrying was an apparent commitment to early first use of nuclear weapons. This was demonstrated by the Supreme Allied Commander, Europe (SACEUR), General Bernard Rogers, describing his the nature of his orders in an interview published early in February 1986:

> "Before you lose the cohesiveness of the alliance - that is, before you are subject to (conventional Soviet military) penetration on a fairly broad scale - you will request, not you may, but you will request the use of nuclear weapons". (Emphasis in the original)

The location of the British Army of the Rhine and Royal Air Force Germany on the central front, with both forces equipped with tactical nuclear weapons, meant that Britain was integrally involved in planning the early tactical use of nuclear weapons. While publically acknowledged policy might imply that nuclear weapons are the ultimate deterrent - weapons of absolutely last resort - the military reality is that they have been quite routinely integrated into tactical military strategies. This has significant implications for British attitudes to nuclear weapons after the Cold War.

Changes in UK Nuclear Forces in the 1990s

With the collapse of the Soviet Union and the easing of East-West tensions, some decreases in British nuclear forces have been made. Army tactical nuclear weapons are being withdrawn entirely, as are the nuclear depth bombs for the Nimrod maritime strike aircraft. The Royal Navy will not normally deploy nuclear weapons on ships in peace-time and the RAF is cutting the number of nuclear-capable squadrons by up to half.

At the same time, there is still a firm intention to develop a stand-off nuclear-armed missile for the RAF to replace the WE177 free-fall bomb, primarily on Tornado strike aircraft. Moreover, the Trident programme continues, and will produce a force of four submarines, each with 16 missiles carrying up to eight nuclear warheads. Britain thus appears committed to a nuclear future. Why this should be, given the ending of the Cold War, is best explained by examining the outlook which is apparent in sectors of the US defence community.

Proliferation and Intervention

One key factor currently concerning strategic analysts is the legacy of militarisation stemming largely from the Cold War, which includes the proliferation of weapons of mass destruction, whether nuclear, chemical, biological or

conventional in nature. While annual military spending of almost one trillion dollars in the late 1980s was concentrated in the NATO and Warsaw Treaty blocs (accounting for over 80 percent of global spending), patterns of arms transfers, indigenous military production and regional crises all conspired to enhance a process of global militarisation. This was concentrated in regions of conflict such as the Middle East and Southern Africa, but resulted in the progressive spread of advanced weapons systems throughout the world.

To an extent, nuclear proliferation occurred in the 1980s at a slower rate than predicted, with a possible nuclear arms race in South America being contained; but the break-up of the Soviet Union in 1991 and the escalation of proliferation pressures in the Middle East has conspired to produce a dozen nuclear weapons states: the USA, Russia, Ukraine, France, China, Britain, Khazakstan, Belorus, Israel, India, South Africa and Pakistan.

There were some early indications that three of the CIS members, Ukraine, Belorus and Khazakstan, would adopt non-nuclear policies. This now seems unlikely - although the great majority of the tactical nuclear weapons are being moved to Russia, it is probable that each of the states will retain a small nuclear capability.

The US and the former Soviet states are likely to cut back their nuclear arsenals heavily, but there is no prospect of moving away from nuclear weapons as instruments of military strategy. Quite the reverse - indications from the US Defense Department are that US nuclear strategy is being rapidly transformed to take into account a potentially dangerous multipolar world in which smaller more specialised nuclear forces can readily be deployed against threats from the Third World.

This change in strategy may even extend to the production of small, highly sophisticated nuclear weapons such as enhanced radiation systems for use against troop concentrations, and accurate earth penetrating warheads for use against deep bunkers which are too heavily protected to be destroyed by conventional weapons.

Thus, a Strategic Deterrence Study undertaken for the US Strategic Air Command late in 1990, was conditioned, in part, by its terms of reference, to pay particular attention to future Third World threats against US interests. The language used is indicative of the outlook. For example, the terms of reference point especially to the belief that "the growing wealth of petro-nations and newly hegemonic powers is available to bullies and crazies, if they gain control, to wreak havoc on world tranquility".

The study itself calls specifically for a new nuclear targeting strategy which will include the ability to assemble "a Nuclear Expenditionary Force...primarily for use against China or Third World targets." Such a strategy is required because "Nations with the wealth and ideological fervor to pursue nuclear programs, no matter what the time and cost, are

very different" from traditional nuclear powers such as Britain and France . North Korea, Algeria, Libya, Iran, and of course Iraq fit this bill. They and their terrorist cousins, are more likely driven by...the desire to...terrorise, blackmail, coerce, or destroy" among other motives.

Thus, any idea that we are entering a period of complete nuclear disarmament after the ending of the Cold War is somewhat premature. As the Soviet threat is seen to decline. so new threats are perceived from the Third World. This policy shift in the United States is accompanied by similar views evolving in Britain, where Trident and air-delivered tactical nuclear weapons are required to deter unspecified by serious threats, principally from the Middle East.

Nor should we assume that such attitudes are limited to western states. After early expectations that economic and political trends would ensure an almost wholesale denuclearisation in Russiea, there are now preliminary indications that a powerful strategic and tactical nuclear capability will not just be retained but will be enhanced.

The nuclear legacy of the Cold War thus persists, but it is accompanied by a much more general process of proliferation of military technology which is already in progress but has been given a hefty new lease of life by post-Cold War realities. Chemical and biological weapons research and development programmes are under way in at least a dozen countries outside the Northern industrialised bloc. Conventional weapons of mass destruction, including ballistic missiles, cluster bombs, multiple rocket launchers and fuel-air explosives are now available from many Northern states and are increasingly produced by developing indigenous arms industries within the Third World.

The effects of these trends will be complex, but it may be possible to isolate some significant features. It is probable that a number of regional powers will see the less rigidly constrained post-Cold War world as requiring military capabilities including weapons of mass destruction. In a few cases, this will include nuclear weapons programmes, but a much wider trend will be towards medium- to long-range ballistic missile systems combined with area weapons likely to include chemical, conventional area-impact and, possibly, biological warheads.

At a regional level, and possibly globally on occasions, individual states, or coalitions of states, may regard such trends as contrary to their long-term security interests. They may therefore consider diplomatic or economic counter-action or even pre-emptive military intervention in their own security interests. They may regard this as ethically acceptable, but it is difficult to envisage circumstances in which an independent analysis would support this view. Furthermore states on the receiving end of such action will certainly not take such a line, seeing it as an imposed and dubious rule of law.

Trends in British Nuclear Policy

There are now clear indications that British nuclear planners already see a dangerous new world disorder developing which involves the devlopment of a North-South confrontation, focussed particularly on resource-rich areas such as the Middle East. This "violent peace" will be increasingly nuclearised becuase the planners, operating over the 30-year life cycle of a programme such as Trident, do not believe that proliferation will be controlled.

According to this outlook, it would be most desirable for Britain to retain two nuclear systems, the tactical Tornado/TASM combination and the Trident system for sub-strategic and strategic use. Such systems, it is argued must be available to deter, or in extremis to attack, nuclear-armed third world states which threaten Britain's interests. Such a strategy might involve single-country action, but is more like to be conducted in alliance with Europen states or as part of a wider coalition.

What is clear is that there is now a firm military view that the post-Cold War world is at least as threatening, if not more so, than before, especially in terms of potential instability. The British establishment still perceives Britain as a major power, and, according to this dominant view, its nuclear forces continue to give it substantial status, as well as having a firm military value in the complex and unstable new world which is emerging. It may be a delusion, but it is remarkably persistent and is likely to be a determining factor in the evolution of UK defence policy over the next several decades.

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Marjorie Thompson

Chair

Campaign for Nuclear Disarmament

A New Security Framework for Britain (synopsis)

"....But the relevance of nuclear weapons to Germany's pressing needs is not at all clear. And it is still the case that the Atlantic Alliance is the only really effective framework for military security, as the Gulf Ward showed." (my emphasis) - Martin Woollacott, The Guardian 16.5.92

This quote extracted from an article on European policy by the Guardian's award winning journalist of the year, appeared directly above an article by an American Pulitzer Prizewinner entitled "The Silver Bullet in Desert Storm" about deaths as a result of friendly fire. That controversy rages on, and the inept collusion of the U.S. and U.K. Governments remains worthy of surprise even for those of us who are somewhat cynical on that front. But it should say a lot - about what we view to be accurate and challenging reporting and just what the last 13 years have meant for dissent and freedom of thought.

In this paper, I will challenge what passes as 'analysis' in the media of British 'defence' policy; if there is ever to be healthy and democratic debate it must be underpinned by rigorously measuring it against the views of journalists who are not comfortably welcome in Whitehall and Westminster.

Then I will assess the definition of security, summarising the views put forward by the main political parties at the last General Election when the entire security debate, south of the border at least, consisted of one late night discussion of proliferation amongst three senior statesmen where it was left to the newscaster to splutter, "But why is Britain getting Trident which could obliterate the northern hemisphere" and concerted efforts by at least three newspapers to 'expose' the names of parliamentary candidates who were/are/ever have been members of the Campaign for Nuclear Disarmament. There was heated discussion over whether Britain should have 3 or 4 Trident submarines and little attention has been paid to the report of the House of Commons Select Committee "The Progress of the Trident Programme" ordered to be printed on 11th March but only released subsequent to the election which concluded, "Nonetheless, the justification for Trident, the number of warheads to be deployed and the relationship of the scale of the strategic deterrent to that deployed by any potential enemy are once again legitimate political and military issues, although we have not addressed them in the context of this annual report to the House."

Other speakers will be taking up themes of human, environmental and economic security so I will not dwell on those other than to emphasise that these concerns must be integral to anything that can possible be defined as new. In the past policy has roughly been characterised as "Weapons? We want them!" and has been woven in with status and the legacy of Britain's history, something all countries need to take into consideration but which, in this expatriot's view, seems to dazzle policy makers and opinion formers, to say nothing of the peace movement itself to an incredible degree.

The stage is set then, for the complications of negotiating any new framework. Existing and future relationships and alliances must be re-examined in the light of the end of the Cold War, the ongoing tragedy of the former Yugoslavian republics and the post "Gulf" New World Order. I will briefly touch on the European Community and the West European Union, Britain's relationship with those countries and, as a possible European defence entity evolves, its implications for democracy and accountability. Overriding it all, of course, is the Special Relationship with the United States, a subject which is fascinating, insidious and frustrating and which above all else must be renegotiated. I will attempt to enlist Thomas Jefferson in my argument saying that.

> "....any laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times. We might as well require a man to wear still the coat which fitted him when a boy as civilised society to remain ever under the regimen of their barbarous ancestors."

Penultimately, while experts assess 'new areas of crisis' and crisis response and rapid reaction forces are now the vogue, I propose to point out that the really pressing problems, of treaty ratification, pacts based on economic, rather than military, security and dismantling nuclear weapons, as well as seizing opportunities to halt proliferation, are not getting the staffing or financial resources necessary to address them. The "Nuclear Mirror" that we find ourselves gazing into seems to have frightened rather than inspired our teachers and having had the certainty for so long of the predictable enemy the are, not unexpectedly, responding in old ways.

We now need to push for disarmament regimes, and protocols, not just against individual weapons systems and take seriously the shifting fault lines from East-West to North-South as it becomes more obvious that our governments are targeting the Third World and engaging no longer in "surrogate warfare" as Regis Debray once charmingly called it, but in nuclear threats.

In conclusion, I want to raise questions around the future of the U.N. as a vehicle for common security ensuring that it does not reflect the North's control of the South and attempting to show that if we fail to address problems internal to our societies we end up with, in the words of one NATO/SHAPE official, "The Christians against the rest". Surely now is not the time to re-run the Crusaders and by not compartmentalising security issues (nuclear v conventional, instead of addressing "militarism"; domestic v 'international' instead of making the "global village" a reality; condemning the nationalism of others while turning a blind eye to ongoing wars within the nation state boundaries) and so on.

Disarmament begins at home, and Trident is being deployed in Scotland which has rejected the 'UK' government and all its policies. There are fundamental questions that we must all address. How can there be a 'framework' for a disunited kingdom?

Marjorie Thompson, May 1992

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NUCLEAR WEAPONS AND THE ENVIRONMENT

INTRODUCTION

Trident is a system that deploys unsafe nuclear warheads ontop of a missile, the fuel of which is highly volatile, then places not just one but up to 128 warheads, containing an estimated 496 kilograms of plutonium in toto, and 16 missiles, weighing over 100,000 lbs each, into a submarine that is powered by a nuclear reactor. It is a dangerous and potentially lethal combination in any accident, and a constant threat to the environment.

The effects nuclear weapons have on the environment are wideranging and in this brief paper I hope to outline some of the most important. Behind every nuclear weapon is a complex infrastructure of manufacture and servicing facilities each having their own environmental effect and waste by-products.

WARHEAD PRODUCTION

A nuclear warhead is a highly radioactive and toxic cocktail of materials. All of these materials have to be produced or mined, then milled, machined and manufactured into components for nuclear weapons. All these processes produce toxic and nuclear waste and all subject workers, people around the plants and the environment to radiation.

Radioactive materials are routinely discharged into the environment as a result of these processes. Toxic and radioactive waste is produced and either disposed of or stored. All of these materials have to be transported to one place or another resulting in the exposure of far more people to a risk of some form of nuclear or toxic release.

WARHEAD TRANSPORTATION

Trident warheads will soon be regularly transported along British roads amidst intense secrecy. There could be as many as one nuclear warhead convoy every month, possibly even one every fortnight, along highways between Burghfield near Reading and Coulport, only 30 miles from this conference.

The manufacture of a nuclear weapon involves the assembling of over 2,000 seperate components, which are produced at sites all over Britain.

The final assembly of all these components takes place at the Atomic Weapons Establishment, Burghfield. When completed and checked, a nuclear convoy will deliver the Trident warheads to the Royal Naval Armaments Depot at Coulport.

All radioactive materials decay with time and nuclear warhead componentents are no exception. This means that the warheads themselves have a limited shelf life, after which they need to be overhauled or refurbished and this is the main reason why they are transported.

The weapons are overhauled at their site of assembly, AWE Burghfield. Here the weapons are stripped down, the fissile components are sent for refurbishment and the electronic components are checked and replaced if necessary. The warhead is then rebuilt and returned to its operational site, which in the case of Trident is the Royal Naval armaments Depot at Coulport.

WARHEAD and MISSILE SAFETY

In December, 1990 a panel of eminent American scientists, appointed by Congress, reported on their investigation into US nuclear weapons safety. The panel was headed by Dr Sydney Drell and their report has become known as "the Drell Report". The findings were alarming.

The Drell panel expressed concern that serious safety issues, known, for at least a decade, have not been dealt with. They found that many nuclear weapons in the US stockpile did not meet present design criteria. Further, they discovered with the aid of new computer modelling techniques that "unintended nuclear detonations present a greater risk than previously estimated (and believed)" for some US nuclear weapons.

This meant that the possibility of a nuclear explosion in an accident involving nuclear weapons could no longer be ruled out.

Weaknesses in nuclear warhead safety practice was attributed to "the chilling environment of the Cold War" where the priority was not designing the safest warhead but obtaining the smallest, lightest warhead with the largest yield.

The Trident missile and its warhead was one of the weapons that received special attention by the panel. The Drell report called for an urgent rethink into the way the Trident missile system was designed.

The problem with the warhead for Trident is that in order to make it smaller and lighter, normal high explosives were used in both the W76 and the W88 - the two US warheads that can be deployed on Trident missiles. The alternative would have been to use "Insensitive High Explosives" or IHE which are relatively impervious to fire, shock, crushing etc, this type of explosive is, however, denser and heavier than normal high explosives, and as such would increase missile weight and reduce missile range.

The problem with the missile design is two-fold. Firstly, the rocket motors use the most volatile missile fuel available and secondly, rather than placing the warheads above the third stage rocket motor they are arranged in a ring around it with no fire-shield between the two components.

This combination of high explosive that can burn and detonate in an accident, missile propellant that can also burn and detonate, and no protection between missile and warhead, means that the chance of an accident resulting in major consequences with widespread scattering of radioactive materials or even a nuclear explosion is far greater than for many other nuclear weapons systems.

These problems identified in the US, apply to the UK Trident system as, we are merely renting missiles from them. Although the

UK Trident warhead is designed and built in the UK it has been done with a great deal of US assistance. The likelihood is that with both US Trident warheads employing normal high explosives as a trigger, UK designers will have followed suit.

If this is the case then Trident warheads soon to be transported within the UK will be more susceptible to explosion or fire, possibly resulting in the widespread release of radioactive materials to the environment, if a serious accident was to occur.

When placed on board the submarine there are added dangers because in the event of fire or explosion not only would all the volatile missile fuel and nuclear warheads be present but a nuclear reactor with its own associated hazards is then located next to the missiles.

TRIDENT'S NUCLEAR REACTOR

The Trident submarine is powered by a Pressurised-Water reactor, a 100 mega-watt nuclear power station.

Submarine propulsion systems, because of their size, mobility and the hostile environment in which they must operate, are exposed to substantially greater risks than land-based nuclear power stations; potential accident situations are appreciably more numerous because of the possibilities of collision, fire, sinking, grounding, stranding, and sea effects etc.

The restricted amount of space in a submarine, means that shielding has been sacrificed to reduce weight and increase speed and manoeuverability. Safety systems that are standard in civil nuclear plants necessarily have to be omitted or reduced.

In a normal civil reactor, the final containment consists of extremely thick concrete walls which are unlikely to melt and difficult to breach. The final containment in a submarine is simply the steel hull with a relatively low temperature melting point and which can be easily breached in an explosion or collision.

Delegates here today will know about the accident record of the civil nuclear industry. The Royal Navy's record is seemingly little better, although all accidents involving nuclear powered submarines are shrouded in secrecy.

ACCIDENT HAZARDS

Little is known about the accident scenarios the Royal Navy plan for. In the select details that have been published there is no technical or engineering data to justify their selection of likely accident scenarios, or probability statistics (which are in any case extremely vague), or radioactive material release estimates.

Worldwide, between 1954 and 1988, there were some 200 accidents involving nuclear powered submarines, 50 of them involved ballistic missile submarines.

There are at present eight nuclear reactors and 50 nuclear warheads on the oceans of the world as a result of accidents.

An indication of the real risks may be gained from a series of articles in the Journal of Naval Science, written by and for the Royal Navy, which reveals that there were 712 incidents involving submarine nuclear reactors between 1964 and 1978 - an average of roughly one a week; between 1973 and 1978 there were 106 'reactor scrams' - a rough average of one every ten weeks.

These articles also state that the Royal Navy have a 'spurious scram' once every 4 months on average. These are described as reactor shut-downs 'which can only be attributed to an irresponsible malfunction of the Reactor Protection System', and are said to be 'mercifully rare'. This may be indicative of Navy thinking that a malfunction is considered to be irresponsible rather than the processes which lead to it.

FIRE ONBOARD A SUBMARINE

Fire has always been a major hazard in any warship packed with electrical equipment and employing oil and steam at high temperatures. In a submarine this situation is exacerbated by the contained atmosphere and even more cramped conditions.

Fire is the greatest danger to a nuclear warhead and missile propellant for reasons outlined above. Explosives and propellant can burn and explode. The reactor and its safety systems can also be damaged. Nobody knows what damage could be caused to the nuclear reactor by the explosion of ballistic missiles.

Fire is not an unknown event onboard submarines. In 1976 HMS Warspite whilst berthed in Liverpool suffered a fire in its backup diesel generating room. Three people were injured and the damage caused took over three years at a cost of over 5 million pounds. A couple of months ago HMS Turbulent suffered a fire in the switchroom next door to the reactor compartment, the reactor was "scrammed" and over twenty three people were injured. The extent of damage to the submarine remains unknown. During the period March 1986-to April 1987 there were 312 fires in Royal Navy ship and shore establishments.

WHAT WOULD HAPPEN IF FIRE WERE TO ENGULF A NUCLEAR WEAPON OR WEAPONS?

If there was no concentrated firefighting effort, it is probable that the explosive contents of a nuclear weapon and/or their components would burn and/or detonate and a release of radioactive and toxic materials would occur.

It should be noted here that if the missile propellant were to also be involved in a fire it would burn at temperatures of two thousand to four thousand degrees celcius until the propellant is spent. This is hot enough to incinerate steel and the majority of components inside any nuclear weapon.

The two components of a nuclear weapon which constitute the major hazard in an accident are the high explosive; and the fissile nuclear material. The greatest danger to these major components in an accident is fire. Depending on the type of weapon the high explosive surrounding the fissile core could burn and explode in a severe ship fire.

According to official US military manuals, if fire were to engulf

a nuclear weapon firefighters would have only five minutes to extinguish it. If this could not be done, and it seems unlikely that in such circumstances it could, then the fire must be controlled and allowed to burn out.

Assuming no nuclear explosion, the radiological hazard associated with an accident arrives from the release of radioactive contaminants by burning or chemical high explosive detonation of the nuclear weapon. Contaminants released to the atmosphere would include plutonium, uranium, tritium, lithium, thorium, beryllium as well as quantities of lead and plastic.

HOW WIDESPREAD WOULD CONTAMINATION BE FROM A NUCLEAR WEAPONS ACCIDENT?

Wind velocity and other meteorological conditions, the height of the cloud or plume containing the radioactive material, and terrain all influence the extent to which contamination may be transported from the immediate vicinity of the accident site.

A report by the General Accounting Office using data from a specifically designed Atmospheric Release Advisory Capability computer to evaluate weather conditions, type of accident and other conditions, revealed the following estimate:

a) 0.45 Sq Kms - evacuation recommended
b) 11.41 Sq Kms - sheltering recommended, evacuation should be considered
c) 134.71 Sq Kms - general public annual whole body dose exceeded, consider sheltering.

The Drell Report itself concluded that in the event of a detonation of the High Explosive (HE) in a typical nuclear bomb or warhead an area of approximately 100 square kilometres downwind could be contaminated. They also estimated that the cost of cleaning up such contamination would be upwards of $500 million.

In independent studies of the effects of fire on nuclear weapons, it is estimated that 'significant radiological impact could, under the most unfavorable accident conditions, occur up to approximately 200kms (122 miles) from the accident site'.

Clearly, radioactive materials if released in a nuclear weapons accident would cause severe environmental damage over a very large area.

This damage would be long-lived because many of the radioactive materials in nuclear weapons have "half lives" of thousands of years and, unless removed, will continue to contaminate an accident area for a long time after any accident.

HOW WIDESPREAD WOULD CONTAMINATION BE FROM A NUCLEAR REACTOR ACCIDENT?

The consequences of a nuclear reactor accident depend on the severity of the accident; the type and quantity of radioactive material released to the environment, and the length of time over which the release takes place. The number of people exposed to the resulting radioactivity and the dosage they receive largely depends on the prevailing weather conditions; how close they are

to the accident; how quickly countermeasures are introduced to protect the public and how effective they are.

The Royal Navy estimate that even in the worst imaginable nuclear reactor accident radioactive materials would spread no further than ten kilometres from the scene. Their emergency planning zone for the most likely accident is only 550 metres and does not take local populations into account.

However, in another study by W. Jackson Davies, Ph.D., he considered the likely consequences of a major 100 MegaWatt naval nuclear reactor accident in Sydney and Freemantle, Australia.

It was found that the Federal limits for exposure to radiation was exceeded by approximately five hundred to ten thousand out to twenty kilometres from the site. Normal background levels of radiation would be exceeded by eighty thousand to five million times out to as far as seventy kilometres from the scene of the accident.

This study estimated up to 914 short term casualties (on the first day) in an area up to 45 kilometres from an accident. In the long term this level of radiological release would cause up to 1,718 additional cancer casualties, one year after after the accident occurred. For every year after that there could be as many as 659 additional casualties.

Naval nuclear reactor accident response plans exist, but they are not prepared to respond to a severe accident and are likely to be of little value in such an event. Planning weaknesses include official radiological release estimates which do not bear close scrutiny; no detailed planning for the distribution of potassium iodate tablets to the public (a vital protective measure to prevent take up of radioactive iodine) have been undertaken; and plans for monitoring a radioactive release to the environment and overall control procedures to deal with any accident have not been explained in detail.

Nuclear weapons accident response plans do not publicly exist. What information that can be gleaned from past exercises designed to test these plans, do not instill confidence that a nuclear weapons accident can be adequately dealt with.

There are no known response plans to deal with the combined effects of a potential missile/warhead plus reactor accident onboard a Polaris or Trident submarine.

ROUTINE OPERATIONS

As mentioned previously warheads and missiles are routinely serviced. Submarine nuclear reactors also require maintenance.

Inspection, maintenance and repair of submarine nuclear reactor systems result in radiation doses to workers and nuclear waste. Fuel rods when spent are sent for storage or reprocessing to Sellafield. Liquid radioactive waste is routinely discharged into the marine environment. Solid radioactive waste is either stored on site or sent to the national disposal site at Drigg.

END OF OPERATIONAL LIFE

The disposal of nuclear reactors when they have reached the end of their operational life present a further problem.

There are already seven nuclear powered submarines awaiting disposal in this country. The MoD has no policy to dispose of them. Worldwide more than 250 nuclear powered submarines will need to de disposed of over the next twenty years.

This is yet another radioactive waste problem left for future generations to cope with.

William Peden, June 1992

THE EFFECT ON HEALTH OF NUCLEAR MILITARISATION

Introduction

People argue that Trident can be justified on two grounds. Firstly that its possession is a deterrence. It is not my job here today to examine that proposition in detail but I would have thought the events of the Gulf war and more recently the dispute between the Ukraine and Russia following the dissolution of the Soviet Union would give the lie to that assertion. The second reason which is put forward and which is related to the first is that these weapons of mass destruction promote security. Indeed, nothing could be further from the truth. These weapons which have been designed to be used as first strike weapons increase no-one's security but rather, under the cloak of terror, increase divisions, facilitate exploitation and create enemy images, rather than responding to any real threat.

Moreover we are told that the risks and hazards of manufacturing, testing and storing these weapons of mass destruction are minimal. This is not true and this paper will explore the evidence that there are numerous hazards to health alone. These various hazards include the following:-

1 Risks from cancer and leukemia to children living near nuclear processing and military facilities.
2 Risks to workers dealing with plutonium.
3 Risks to Uranium miners and workers dealing with radioactive waste.
4 Risks to submariners using nuclear materials.
5 Transport risks.
6 Nuclear tests.
7 Opportunity Costs - in the developed and developing world.
8 Psychological trauma.

Populations around nuclear facilities

Today I wish to examine some of these major risks in detail. I am afraid I will not have time to cover risks from transport and psychological trauma. The risk which has probably caused the most controversy amongst the general public in Britain are the findings about the health of children around nuclear installations. In England and Wales for the period 1961-1980 it has been reported [1] that there was an excess of cases of leukaemia around nuclear installations compared with control areas [2]. Apart from Sellafield, the installations areas showed an excess registered incidence of between 10-20% but around Aldermaston, Burghfield and Harwell, where the nuclear arms research programme is carried out, there was found to be a 64% increase of leukaemia among under five year olds and a 24% increase in cancer in the same age group in a ten kilometre radius of these plants [3].

There is no doubt there is a problem in Britain. Certainly the level of discharges is higher in Sellafield than at Marcoule or La Hague [2].

The variation in Britain may be due to intermittent leaks of radiation. This could either be discharges into water, or into the air. Work in the USA suggests that background radiation is associated with increased cancer and leukaemia [4]. Similar work reported by Kneale and Stewart has also shown that background radiation is the most important cause of juvenile neoplasms [5]. The same authorities have estimated that only 7% of these cases were associated with x-rays in utero. Other sources include natural radon and unnaturally occurring radiation from nuclear facilities. Around Dounreay, where an increase of cases has been shown, the only significant finding was the use of beaches near the plant by the child [6]. In this case, the mechanism may be ingestion of radioactive waste polluting the sea. It is possible that the underlying association is not due to radiation but this seems to be an unlikely hypothesis, although there are some inconsistencies [7].

On the other hand the increase in childhood leukaemia and cancer could be related to exposures to nuclear radiation affecting the child from another route. For example, Gardiner has done further research into the cases near Sellafield and has shown that the probable explanation is an exposure of the father to radiation before the child was conceived [8]. Indeed, there appeared to be an 8 fold risk if the father had been exposed to 10 msv or more in the six months before conception.

There is also some indirect evidence that it is possible that an increase in early deaths from infection are a side effect of the child "incubating" cancer or leukaemia. There may also be an interactive effect between the risk of cancer and certain infections, as Knox and his fellow workers have shown in cases of child leukaemia and lymphoma in Great Britain.

What can Local Authorities do about this situation? In fact a great deal. It is one of the functions of the local authority to monitor radiation in the environment and many local authorities are now part of a national independent network. Such a monitoring system will only function effectively if all aspects of the environment are monitored. It is most important to monitor water as well as air. If, for example, there is an intermittent discharge of radioactive material into the Thames from a facility such as Aldermaston [a not unlikely hypothesis], this will only be detected if this type of pollution is identified as a hazard and the equipment and procedures used by the local authority are designed to evaluate such a situation. The source of the hazard may not be in the host local authority's area, indeed this pattern will frequently be the case. Imagination, initiative and cooperation between authorities are required to identify a hazard of this nature. That highlights the second point. This monitoring network must be independent of central government control and its findings must be open to scrutiny by the public especially by the peace and environmental movements.

Workers in the Nuclear Industry

So there appear to be risks to workers in nuclear plants in terms of an increase in risk to their children but there are also risks to the workers themselves. A study of Hanford workers in the USA [9] engaged in the manufacture of radioactive substances, many to be used in nuclear weapons, clearly showed an excess of cancer in the workers. These radiosensitive cancers included lung, alimentary tract and thyroid and bone marrow cancers. The effect was more clearly established in age groups below 25 years and above 44 years.

Dupree and others have also reported on the risks to workers in a uranium processing facility [10]. The rate for laryngeal cancer was increased by more than four times, while circulatory and heart disease, respiratory disease and pneumonia were all increased.

There are also substantial risks to uranium miners. The main risk apart from respiratory diseases associated with mining is a markedly increased incidence of lung cancer [11,12].

It is not only the miners who are at risk. A study in Nigeria of workers who had been callously and negligently exposed to radioactive waste demonstrated that these workers had received significant doses of radioactivity. As a result many months later they had changes in their blood which were typical of an exposure to radiation [13].

Submariners in nuclear submarines

These findings have led to suppositions that submariners in nuclear submarines may be exposed to hazardous levels of radiation. The evidence here is not conclusive but there could be an increase in congenital malformations in the offspring of submariners on nuclear submarines. There also may be an increase in certain types of cancer.

The control of radioactive contamination in the work place is the responsibility of the trade unions and the radiological protection board. Much progress has been made in this field but the perception of risk has changed with an increasing appreciation of the incidence of cancer and genetic abnormalities [14]. It was only recently agreed, following the long term evaluation of health risks, that the standards should be tightened.

Testing of Nuclear Weapons

Now we should look at the more important hazards in terms of the numbers involved. One of the biggest direct health hazards arises from the nuclear tests which have been done and are continuing to be done to develop weapon systems such as Trident. These tests are not done in this country. Indeed, the nuclear powers have all pursued a policy where tests are carried out in the homelands of minority people whether these be Navaho Indians, Kazaks, Australian aborigines, or Micronesians. There is a substantial body of evidence that nuclear tests affect the health of people in the surrounding community.

A commission set up by the USSR government in 1988, discovered that about 10,000 people had been exposed to increased radiation and an increase in chromosomal abnormalities was to be found amongst them in the community near the Semi-Pala: tinsk testing ground. The commission expected that not only an increase in cancer would take place in the future but also an increase in congenital abnormalities [15].

Not surprisingly in the USA in Utah a similar picture is found. There, tens of thousands are thought to have been exposed to both beta and gamma radiation [16,17,18]. We know from other studies that both are hazardous. At the direction of the US Congress in the late eighties, various studies are examining the incidence of leukaemia and thyroid disease [19]. In the Pacific, there has been an increase in congenital abnormalities, with the occurrence of the so-called jelly fish babies.

The hazards of testing are much greater it seems than the hazards which arise from the manufacture of nuclear weapons. However, some would say that these hazards have been controlled by underground testing; there is some truth in this. The radioactive contamination of the air in the quantities which occurred in the earlier tests no longer takes place. However, we do not know what the long term effect of tests has on the structure and ecology of our planet. It could be very serious indeed. The only answer to this is to have a comprehensive test ban treaty amongst all nuclear powers which would eventually eradicate all nuclear weapons. Both the French, the Russians and the Chinese have said they are willing to sign such a treaty, however, there is no progress made because of the attitude of the British and American governments. We need a vociferous national campaign to publicise this disgraceful situation and to support the international campaign mainly being waged in the USA, the CIS, Japan and France. This campaign should not be seen as an alternative to the campaign against Trident but rather as an essential ingredient of that campaign. To achieve this objective, the peace movement needs the support of your organisation to inform people about the situation.

Nuclear Power Stations : the health effects of accidents

This brings me on to the next element in this equation. Plutonium for nuclear weapons is mainly produced in that type of nuclear power station which breeds plutonium. Therefore, the link between nuclear power and nuclear arms is much closer than most people realise. The nuclear arms race was dependent on nuclear power and most countries who wish to acquire nuclear weapons have developed, or are developing their nuclear power industry. It is for that reason that the U.N. blew up the nuclear facilities of Iraq; an action which is now so tragically affecting the health and well being of the people of that country.

There are many states now who have developed a nuclear capacity. They include Pakistan, India, Brazil and Israel to name but a few of the many involved. Indeed, Mordechai Vanannu has now been kept in solitary confinement for years for informing the world of Israel's nuclear capacity which now is estimated to amount to 200 nuclear weapons. Therefore, there is a close link, especially in Britain and similar countries between the nuclear power industry and the nuclear weapons industry. The nuclear processing industry has also been created to provide plutonium for Trident and similar weapons. It is therefore of some interest to us to look at the risks of nuclear power accidents.

I know you have some data presented to you earlier from Chernobyl. I will therefore not go into this in any great detail today, although I am willing to answer questions if I can. However, suffice to say that in Byelorussia there has been an increase in genetic abnormalities, leukaemia, and some cancer [20]. Amongst the children alone, there have now been 104 cases of thyroid cancer registered in the past few years, when in normal times the numbers would have been counted on the fingers of one hand. The Byelorussians have also identified a major increase in the incidence of genetic changes in the blood of pregnant women. The evidence points to a substantial increase in congenital genetic abnormalities in the contaminated zones [21]. The expected rise in cancer amongst adults will probably start to take place in 4-10 years time.

It is important to note that the conclusions of the International Atomic Energy Agency that there are no detrimental effects on the health of people in the contaminated zones are discredited in many scientific circles and should be universally treated with scepticism. They were based on small, unrepresentative non-random samples. In many of the analyses there was fewer than 1,000 cases and indeed in some instances less than 100. Outlying results were ignored in some analyses and the criteria for control areas were most unorthodox to put it charitably.

The effect on Western Europe of Chernobyl was not marked [22] although there has been some concern that there was a retardation in the fall of infant mortality in several countries in Europe. In Scotland, around Dounreay, there was an associated rise in cases of Downs syndrome which has not yet been explained [23]. Of course, there was profound ecological damage in Byelorussia [20], the Bryansk region of Russia and in the north of Sweden as well as in the area surrounding the power station.

There was one good result of this accident; it proved as no other event could have done that the damage from nuclear war would not respect national boundaries, political ideologies or neutrality. Nuclear war would always be a global catastrophe. But the price of this knowledge will be paid for by the suffering of the children of Byelorussia, Russia and the Ukraine, as the price of the knowledge of the link between nuclear weapons and nuclear power in the developing world has been paid for by the suffering of the children of Iraq. If you wish to develop positive peace making please help the children from these countries. If you want to have any information about how your authority could help as a positive act of peace making, please see me after this talk, or contact me later.

Militarisation, the Debt Burden and the Developing World

However, it would be a falsehood if you regarded the peace time risks to health from nuclear weapons as mainly related to nuclear radiation. In fact this is not the case. The main risks to health come from the transfer of resources from health and social programmes to nuclear weapons. It has been shown that the level of infant mortality is closely related to military spending when all other indices are equal. Once more we find it is the children who suffer. I will not explore the economics of this in any depth as later speakers will be addressing these questions. However I would like you to consider the effect that the nuclear arms race has had on the developing world and the continuing effect that it will have in the future. When this is examined it is clear that it not a question of hundreds, or thousands, or tens of thousands being affected as in the previous examples but in fact millions, mainly children, who have died and will die as a result of militarisation. Does this sound a gross exaggeration?.It is not but let me explain.

In 1987, the world military expenditure at constant prices was about 2.5 times the level of 1960, whereas the GNP per capita had only risen by 0.6. Although military expenditure as a proportion of GNP was high in the developing world, the vast majority of this expenditure occurred in the developed world. Ruth Sivaard also estimates that the military expenditures in the developed countries over the period 1960-1986 at 12.9 trillion dollars absorbed more than their net gain in product which was only 7.2 trillion dollars [24]. The level of resources dedicated to military purposes has been enormous since 1980 and the costs have been astronomical but the costs were not borne equally between the then Soviet Union and the United States.

As far as the west was concerned, the resource shift required to pay for militarisation has not on the whole been met by the developed countries but rather by the developing countries. Susan George quoted ILO estimates that almost three out of ten people in the developing world have experienced stagnation, or a reduction in their incomes since 1960 [25]. The poor of the developing countries have been forced to pay for western militarisation and the children of those countries have died in their millions.

The transfer of resources was achieved by Reagan raising the interest rates on development loans in the eighties to a horrific 20% in 1981. According to Chris Pattern, when he was a Minister, the debt burden from this strategy has produced a debt burden which is now over 1,000 million dollars [26], although many put it higher. Susan George has estimated that$334 billion have been transferred through debt management alone from the South to the North since 1982. This figure must have increased markedly since her analysis was published. What effect did this have on health? Well, UNICEFs estimate is that half a million children a year have died as a result of this debt. Countries in Africa and South America have been impoverished and the Soviet Union has been ruined in its deluded attempt to maintain parity in the development and deployment of nuclear weapons. In that country, there are now few pharmaceutical products, children and the old are greatly at risk from the effects on health of galloping inflation.

There are, of course, other causes for a failure to develop in the countries of the South but nuclear militarisation dependent as it was and is on the terrible exploitation and oppression mediated by the debt burden must be one of the most important. Having suffered so much from the East/West Cold War, the poor countries of the South are now finding that its bitter fruits are now being ranged against them. Trident will in future be targetted at the developing world. Its threat is being used to maintain the power of the North. Let us have no illusions, this is not a New World Order but the re-emergence of the imperialism of former centuries in all its brutality and rapacity. In order to halt this terrible process we must unite with people in the developing world to struggle for a just world, an ecologically sound world and a peaceful world.

Mary Brennan May 1992

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STATEMENT BY BILL SPEIRS, STUC DEPUTY GENERAL SECRETARY TO NUCLEAR FREE ZONES CONFERENCE, 10 JUNE, 1992

Chairperson, Colleagues

Trident has many costs - financial costs, economic costs, social costs, environmental costs - some of which I will refer to in the course of my contribution: but I do not wish to speak without saying a few words about the moral cost of the Trident programme.

Some of the moral cost can be put into figures, for example, when we compare the derisory level of UK aid to the developing world, with the £33 billion which Trident will cost over the programme's lifetime, if lifetime is an appropriate word. It doesn't need an order to fire for Trident to cost lives. But there is also the issue of the morality of holding such weapons of immense destruction, and being prepared to use them: it debases our civic and political life. It also debases our lives as individuals: most of us here on Clydeside don't think about it too often, but there is no doubt that the submarine bases down river, and the nightmare stockpile of NATO nuclear warheads buried in the beautiful, poisoned hillsides of Glen Douglas, cast a shadow over us.

And for workers, trade unionists and trade unions, there is a moral cost. Trident is designed, built and deployed by workers selling their labour power, and they need the protection of trade unions as much as any other group of workers. It has largely been the trade unions and shop stewards from the armaments industries, who have consistently fought to put the issue of arms conversion and alternative production on the agenda, often in the face of great management and media hostility. It is, indeed, ironic that in their most recent round of "peace dividend" redundancies, Barr & Stroud in Glasgow - makers of Trident periscopes - cleared out most of the shop stewards' committee who for years had warned of the need for diversification. Ironic, but not surprising.

But having said all that, there is, still, a moral cost to be paid by trade unions and trade unionists for their involvement in the manufacture of weapons of mass destruction.

I make these points in order to emphasise that, in spelling out some other ways in which the money spent on Trident might be used, I am not - the Scottish TUC is not - treating the matter as a straightforward cost-benefit analysis. We would oppose Trident even if scrapping it didn't return a single penny to the public purse.

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Let us turn, then, to the cash cost of Trident. This is, as we know, an area of some controversy. The most recent Government estimate, produced by the Ministry of Defence in February 1991, is £10.518 billion. This figure, however, does not include expenditure on items vital to the Trident programme, but which might also be used for other purposes; it does not include the running costs of the fleet, from commissioning to withdrawal; and it does not include the costs of decommissioning and disposal.

I am indebted to Greenpeace for the work which they have put into calculating the additional costs, published in their recent document "the rising cost of Trident". Their calculations, detailed in tables 1, 2 and 3 supplied to delegates, show a real cost of £33.085 billion. The estimate, it should be emphasised, is a conservative one. For example, it does not include Trident warhead research and development carried out at the Atomic Weapons Establishment, Aldermaston, prior to 1988, because of the absence of hard information. Again, Greenpeace's costings for decommissioning only include defuelling and 30 years of storage afloat, the approach being adopted currently with HMS Dreadnought, the only UK nuclear powered submarine which has been decommissioned so far. As they point out, the costs of disposing of the radioactive hulks of the Trident submarines after decommissioning are impossible to calculate, since the Government has yet to decide how this is to be done. It is also impossible to calculate on current knowledge the cost of dismantling Trident's warheads and storing the radioactive materials from within them.

"Ah but" some may argue "even if these sums are inordinately high, the money has already been spent and it is pointless talking about making savings through cancellation of Trident". This approach is based on a series of false premises, the most ridiculous of which is the premise that because the submarines and associated weaponry have already been ordered, they have to be operated for the full original projected lifetime, whether or not this makes military, economic or moral sense.

Cancellation of the Trident programme could save up to £17 billion over the projected lifetime of the programme, at 1991/92 prices. Even cancelling only the fourth Trident submarine would result in possible savings of around £1.3 billion. These would be accounted for by running costs of £408 million; three refits at £158 million each; £19 million in decommissioning costs and the Government's figures for savings (which do not include the above costs) of £400 million. In the lifetime of the current Government, around £250 million would be saved in the costs of the submarine's construction, plus £150 million for the equipment which it will require.

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Much more significant savings could be made if the whole Trident programme were to be immediately cancelled. The breakdown of the savings, and again I acknowledge the work done by Greenpeace in providing much of this information, is as follows:

* The running costs of a four submarine Trident force amount to £380 million per year for 30 years, a total of £11.415 billion.

* Refitting costs would be around £158 million for each one. A total of 12 refits for the four submarine force would amount to £1.896 billion.

* Within the programme budget, there are large elements of contingency to provide for any overspend, totalling almost £2.65 billion (1991 figures).

* The orders for American missiles are placed on a yearly basis, and the Government has made it clear that there is no monetary penalty for not buying more. The Government's own figures indicate that in 1991 there was a remaining £553 million in the missile budget.

* Savings on decommissioning would amount to £77 million.

The above savings total almost £17 billion. Even within the lifetime of the current Government, cancellation of the Trident programme could secure savings of over £3.6 billion, through the Government's own acknowledged savings from cancelling the fourth Trident submarine (£400 million); unallocated monies in the missile budget (£553 million); contingencies unspent (£2.649 billion); and the running costs the first submarine, HMS Vanguard, from 1995 - 1997 (the latest date for the next General Election).

"But", you may say "surely there would be costs associated with cancelling the programme - for example, the costs of unemployment benefit to those who would otherwise be employed running the Trident programme"? Well, leaving aside the fact that the job creation impact of Trident has been greatly hyped, cancelling the programme would only result in unemployment costs, if the money saved was not put to any other purpose. It would certainly be the strongly-held view of the STUC, and I am certain of every sensible citizen, that the monies saved should be put to socially-useful purposes, which would - amongst other things - have a job creating impact. So what could we spend the money on?

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First of all, I would argue that in the event of the cancellation of the Trident programme, the resources released should not simply be used to fund existing expenditure programmes, and reduce or stabilise taxation levels. The money involved is public expenditure already budgetted for, and should be redirected for the public good. Given the way in which Whitehall operates irrespective of which Government is in power, I suppose that it would be naive and unrealistic to expect it, but I think it would be a very useful exercise to initiate a nation-wide debate on how the monies released by the cancellation of Trident could best be used. It is in the interests of perhaps stimulating such a debate, and not to provide any definitive shopping list, that I put to you a series of figures relating to expenditure programmes. Before outlining them, can I first of all apologise for the high proportion which relate directly to Scotland or Scottish local authorities: this is partly because they are the figures most readily available to me, but also because they illustrate, I think, the kind of impact which the sums of money we are discussing could have on specific communities. I am not suggesting that all the money released by the cancellation of Trident should be spent in Scotland, although having had the dubious privilege of acting as the base for its Polaris predecessor might entitle us to a strong bid!

The following examples, then, may be of interest:

* Strathclyde Regional Council is the biggest local authority in Europe, providing education, roads, social work, police, etc. for half of Scotland's population. Its annual budget is around £1 billion. Just one-tenth of the savings from Trident could provide a 10% improvement in spending on Strathclyde services for 17 years. To put it into more concrete terms, £1.6 billion, or 9.5% of the Trident savings, could enable the number of local authority nursery places in the Region to be trebled for 20 years.

* The budget for the health service in Scotland in 1991/92 is £3.6 billion. The savings on Trident could pay for the whole Scottish Health Service for almost 5 years, or - more helpfully - fund District General Hospitals at a cost of £32.5 million; a Cat scanner at £500,000; optical lazers at £50,000; kidney dialysis machines at £13,000; a staff nurse at £14,648 per annum; a ward sister at £19,334 per annum; a domestic worker at £7,648 per annum; or a physiotherapist at £15,970 per annum. The Government's promotion of NHS Trusts has produced a range of costs for various surgical and medical procedures. Based on these figures, even using Trust Hospitals, just one-thousandth of the Trident savings - £17 million - would pay for 6,800 gall bladder operations at a cost £2,500 each. Another one-thousandth of the savings would pay for almost twice as many operations to relieve glaucoma.

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* A wide range of economists have pointed out that if Scotland and the North of England are to have any chance of benefitting from the completion of the single market, then a high-speed rail link from the Channel Tunnel will have to be built. Using the costs of the French TGV, this would amount to around £4 billion, or less than 25% of the savings achieved from Trident's cancellation - and that is before any savings through improved environmental impact are taken into account.

* Staying with railways, £124 million - or .73% of the savings from Trident - would meet the capital costs of electrifying the railway from Glasgow to Aberdeen via Edinburgh. You can identify rail links in your own area, I am sure, which would benefit from electrification or other forms of upgrading.

* Again, to give some idea of the kind of one-off boost which the release of Trident monies could give, the Convention of Scottish Local Authorities estimates that the gap between Scottish local authority spending plans, and Scottish Office consent levels in the current period is in the order of £1.28 billion, or just under the amount which would be saved by cancelling the fourth Trident submarine. This figure would enable Scottish local authorities to proceed with their spending plans on everything from road building to care and maintenance of schools and housing development throughout Scotland.

* Staying with housing, despite the efforts of the local authority and others, the City in which this Conference is taking place still has massive housing problems. A few years ago, a powerful Committee, chaired by Sir Robert Grieve, mounted an in-depth investigation into Glasgow's housing condition and estimated that £3 billion was required urgently, just to put the housing stock in a reasonable state of repair. The funds which would be released during the lifetime of the present Government by the cancellation of the Trident programme, would be, as we have seen, approximately £3.63 billion. Investing money in putting an end to damp, unhealthy housing is surely preferable to investing in very unhealthy weapons of mass destruction.

The list could be continued indefinitely. The point I am trying to make is that there are plenty of jobs needing done in this country, with which the money saved by the cancellation of the Trident programme could greatly assist. It would also be appropriate, I think, to inject into the debate around what could be done with this money, a consideration of what proportion might be devoted to assistance to the developing world, since the "smart" weaponry of advanced industrialised nations, such as Britain, has done precious little to assist them in the past. A tiny fraction of the monies saved by cancelling Trident would go a long way to improving Britain's abysmal record on Third World aid.

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I would like to throw in one other suggestion, even though I know it is being dealt with elsewhere on the Agenda. I would simply like to say that the level of expertise and skill which has been built up by those working in the arms industry in this country is immense. It is a tragedy that human ingenuity and ability has been devoted to such unproductive and dangerous ends. But it would also be a tragedy if, the skills having been developed, we were not able to find ways of using those abilities for socially-useful purposes, and I would certainly argue that a proportion of the resources saved by the cancellation of the Trident programme should be dedicated to ensuring that diversification and conversion programmes are speedily developed and implemented.

In this contribution, I have tried in a limited way to indicate the kind of costs involved in the development and deployment of Trident, and the opportunities which are being foregone through the dedication of scarce resources to such an unnecessary and immoral project. There are other costs which I do not have time to go into in detail, not least the environmental costs associated with the manufacture, transport and deployment of nuclear weapons, the damage done to the environment surrounding nuclear bases, and the unknown impact of some of the new technologies associated with the communications and other systems required by strategic nuclear submarine fleets.

I hope that this outline has been helpful to the discussion, in part through the information which I have tried to provide. To be honest, though, I think the most constructive thing that most of us could be doing right now is to simply concentrate on forcing the whole debate about the costs of Trident and how that expenditure might otherwise be used on to the political agenda. It is frankly and indictment of our political system that an issue of this magnitude should have been removed from the whole arena of political debate. I can only imagine that future generations will wonder in blank amazement at how such a thing could be.

TABLE 1: TRIDENT COSTS NOT INCLUDED IN GOVERNMENT ESTIMATES (1991/92 PRICES)

	Not Included (£ million)
SUBMARINES (LESS WEAPON SYSTEMS EQUIPMENT)	
Development of PWR 2 Nuclear Propulsion Plant	535
Lifetime (30 years) Running Costs	11,415
12 Refits for the 4-boat Fleet at £158 Million Each	1,896
Decommissioning Costs	77
WEAPON SYSTEM EQUIPMENT INCLUDING TACTICAL SYSTEMS	
VLF Communications Improvements	33
SHORE CONSTRUCTION	
Faslane Works	397
Clyde Submarine Base Externals (Roads & Services)	3
Coulport Works	1
Rosyth Works	285
Works Elsewhere	2
WARHEAD, MISCELLANEOUS AND UNALLOCATED CONTINGENCY	
Aldermaston Works	1,431
Trident's Share of AWE Running Costs from 1980 to 2030	6,492
TOTAL	**22,567**

TABLE 2: THE OFFICIAL BUDGET FOR TRIDENT (1991/92 PRICES)

	(£ million)
Submarines (Less Weapon Systems Equipment)	3,786
Weapon System Equipment Including Tactical Systems	2,104
Shore Construction	1,157
Warhead, Miscellaneous and Unallocated Contingency	2,524
Missiles	947
TOTAL	**10,518**

If the totals in Tables 1 and 2 are added together, as in Table 3 below, the true total cost of Trident is £33,085 million.

TABLE 3: THE TRUE COST OF TRIDENT - THE GREENPEACE TRIDENT BUDGET (1991/92 PRICES)

	(£ million)
Submarines (Less Weapon Systems Equipment)	17,709
Weapon Systems Equipment Including Tactical Systems	2,137
Shore Construction	1,845
Warhead, Miscellaneous and Unallocated Contingency	10,447
Missiles	947
TOTAL	**33,085**

CONVERSION A MISSED OPPORTUNITY

SUSAN WILLETT

THE COST OF TRIDENT CONFERENCE

GLASGOW JUNE 1992

The dissolution of the Warsaw pact and the disintegration of the Soviet empire, have brought to an end one of the most costly wars in the history of mankind, namely the Cold War. With the easing of East-West tension the strategic environment in Europe has fundementally altered, forcing a major reappraisal of military strategies and encouraging significant cuts in military spending among western allies and the Soviet Union. According to SIPRI figures world military expenditure declined by 4% between 1990-1991 (SIPRI 1991).

The downward trend in global military spending has given rise to much optimism about the possibility of a sizeable "peace dividend" which could be used to provide a much needed boost to the world economy to overcome the problems of recession and growing unemployment. While speculation exists about the potential size of the peace dividend, the mechanisms for resource transfer and the objectives of the conversion process, lie at the centre of a controversy about the optimal use of the peace dividend (Dunne and Willett 1992).

At the heart of existing proposals is the argument that military expenditure has had a detrimental effect on the economic performance of high military spenders and that, therefore, any savings made through cuts in defence expenditure should be used to redress economic imbalances, now that the Cold War is over (Yudkin and Black 1990). By understanding of

Table 1

Some Key Military Expenditure Indicators, 1978 and 1988 by Categories of Countries

		Military expenditure (constant 1988 US $)	Military expenditure per capita	Military expenditure (as a% share of world total)	Military expenditure (% share of GDP)	Military expenditure (% share of GCE)	Military expenditure per soldier
World	1978	854.3	100.0	5.4	19.8	32.3	198
	1988	1043.4	100.0	5.0	18.3	36.3	202
Developed Countries	1978	195.3	22.9	6.9	23.1	11.9	60
	1988	167.1	16.2	4.3	18.6	9.2	42
NATO	1978	317.1	37.1	4.1	14.3	59.8	557
	1988	467.3	45.2	4.8	15.4	88.8	763
WTO	1978	316.8	37.1	11.3	43.8	60.8	856
	1988	358.6	34.7	11.0	36.4	67.9	898
OPEC	1978	88.4	10.3	12.1	12.5	58.9	264
	1988	51.2	4.9	6.6	13.5	20.2	115

Source: US Arms Control and Disarmament Agency (ACDA) 1.166

the way in which military spending distorts economic performance we are able to formulate policies aimed at restructuring the economy - away from goals driven by the demands of the Cold War - towards broader social and economic goals. Following this theme the first part of this paper briefly examines the the economic impact of Cold War military spending. While the second half critically appraises existing conversion proposals.

The Military Burden

Europe including the former Soviet Union, account's for over 50% of world military spending, estimated at $960bn in 1990-91 (SIPRI 1991). The US, alone, contributes one third of world military expenditure, with a budget of almost $300bn. These huge burdens were largely amassed during the rearmament period of the late 1970's and early 1980's when military expenditures increased in real terms in nearly all NATO and Warsaw Pact countries (Table 1).

Econometric cross-country studies have show that high levels of military spending as a share of GDP are inversely correlated with rates of economic growth (Dunne and Smith 1990). The economic consequences of high military spending are most graphically illustrated in the economic crisis and disintegration in the former Soviet Union, which maintained levels of defence spending of 10%-20% of GDP, during the height of the Cold War. Western economies have also been adversely affected, the loss of technological dynamism and the competitive decline of the US and UK economies vis a vis their main competitors Germany and Japan, have been attributed to prolonged periods of high military spending (Dunne and Smith 1990). Kaldor and Walker (1988) argue that this is because the absorbtion of scarce industrial and technological resources into the non-productive defence sector systematically undermined innovativeness and competition in civil markets.

Table II

Performance in Manufacturing Trade

	Export /Import Ratios			Export Shares		
	1965	1975	1985	1965	1975	1985
OECD	1.29	1.36	1.12	100	100	100
US	1.55	1.38	0.6	21.0	17.6	16.6
UK	1.78	1.29	0.9	12.5	8.9	7.5
France	1.4	1.31	1.12	8.4	9.5	7.9
Sweden	0.9	1.09	1.25	3.2	3.3	2.6
Itlay	1.92	1.72	1.47	6.4	6.9	7.3
FRG	1.71	1.89	1.69	18.4	19.2	17.5
Japan	4.22	4.58	4.25	8.9	12.8	18.1

Source OECD

The performance in manufacturing trade is arguably the best indicator of an advanced industrial nations competitive performance. What is striking in the last two decades are the dramatic changes in the patterns of world trade in manufactured goods which can be seen in Table 2. In the 1960s the UK and US both had significant manufacturing trade surpluses but by the mid 1980's this had been reversed and by 1990 both countries had substantial trade deficits. During the same period Japan with a healthy trade surplus four times the size of imports, transformed this into an enormous surplus in absolute terms by 1990. This is because Japan and Germany have consistently out performed the UK and US in civil innovation due to the priority afforded civil R&D in national resource allocation. The R&D policies of the latter countries have tended towards "diffusion orientation", or a "bottom up" approach to technical innovation, designed to respond flexibly to market signals. In contrast, US and UK policies have consistently prioritised "mission orientated" goals in which military market requirements have been accorded preference. Table 3 illustrates the percentage of national resources allocated to military R&D spending.

Kennedy (1983) has argued that poor innovative performance is not so much a function of high military R&D spending but due to the lack of resources made available for civil R&D investment. While this argument has certain validity, it overlooks the effect that government subsidization through military R&D and procurement practices, exert on corporate strategies and hence the innovative performance of firms. Since the defence sector in both the UK and US represent the commanding heights of manufacturing, exports and high technology, government support and promotion of these industries and technologies being strongly influenced by military interests, clearly has significant implications for the nations innovative performance. In fact, the incorporation of high technology firms into the defence market, has led to the evolution of a corporate culture which is risk averse, defence dependent and

Table Trends in Defence R&D as a percentage of GDP in 6 OECD countries 1967-88.

	1967	1975	1985	1988
United States	1.01	0.63	0.85	0.83
Japan	0.01	0.01	0.02	n.a.
France	0.54	0.35	0.46	0.52
Germany	0.21	0.14	0.14	0.13
Italy	0.02	0.01	0.08	0.08
United Kingdom	0.60	0.64	0.67	0.51

Source: OECD

unresponsive to civil market changes (ACOST 1989).

The claim that the civil economy has benefited from high military R&D spending, through spin-off appears to have little foundation. The 1989 ACOST report into defence R&D found that only 20% of military R&D expenditure was likely to have civil applicability. Furthermore, it found that UK firms have great difficulty in technologically bridging defence and civil market requirements even though the majority operate within both spheres. The emphasis on product innovation that military technology policies tend to reinforce has prevented attention being focused on what lies at the heart of the new industrial and technological paradigm namely process innovation, with its linkages back into design and forward into marketing and distribution.

The dominant techno-economic paradigm (Perez 1985), based on information and communication technologies (ICT), has emerged from within the civil economy, moreover, its development, has been centred on Japan which has orientated its industrial and R&D policies almost exclusively towards improving its international competitiveness in commercial high value added markets.

The emergence of the ITC revolution in the late 1970's, coincided with a period of heavy expansion of military expenditure within NATO countries, so that the resources in the United States and Europe were directed towards meeting military demand at a critical time of dynamic innovation (Kaldor and Walker 1988). Examining the trade data on the electronics industry which encompasses IT, provides a good indicator of the dynamism and innovativeness of each nations electronics industry/information technology industries. (Table 4) Essentially high military spenders failed to capture civilian markets, largely because of the

Table iv

Performance in Electronics Trade

	Export/Import Ratios			Export Shares %		
	1965	1975	1985	1865	1975	1985
OECD	1.26	1.22	1.02	100	100	100
US	1.08	1.42	0.54	23.3	24.1	19.0
UK	1.06	1.04	0.60	10.2	8.2	5.9
France	1.11	0.95	0.71	7.3	6.6	4.5
Sweden	0.98	1.43	1.10	3.7	4.2	2.4
Italy	0.93	1.11	.73	5.8	4.8	3.4
FRG	1.47	1.45	.98	15.5	15.0	9.5
Japan	11.32	5.88	13.90	13.0	20.9	42.4

Source: OECD

inadequacy of investment in civilian electronic innovations.

During the Cold War, the economic price of sustaining high military spending was justified on the grounds of meeting national security needs. Under such conditions technological and industrial priorities were defined by the demands of the arms race. But the end of the Cold War and the relative decline in military spending, creates the possibility of redefining the economic and technological priorities of the high military spenders, by using the peace dividend to redress the economic distortions created by high levels of defence spending. The important question in this context is what such priorities should be.

Conversion

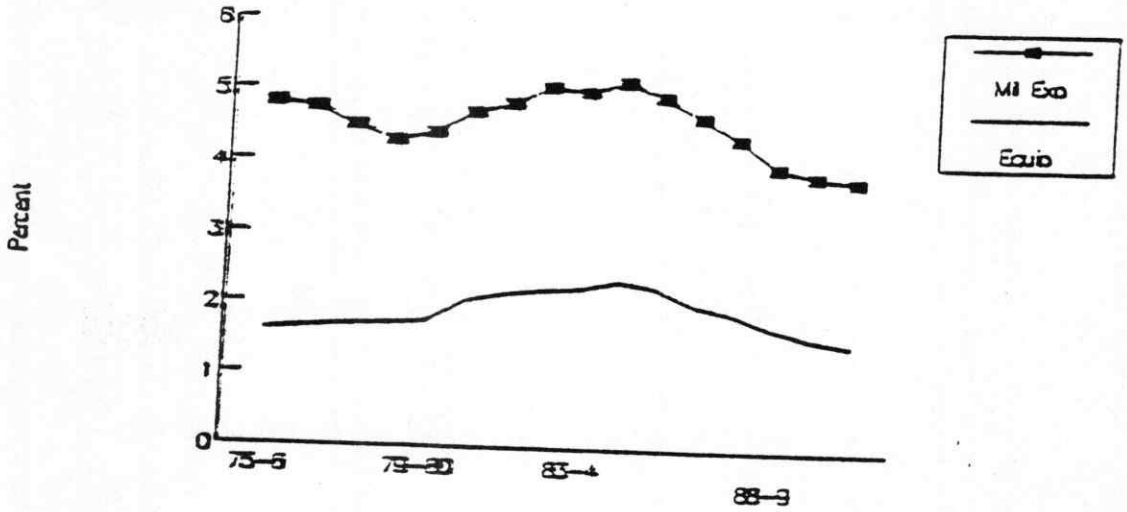
Defence cuts although desirable, are not without their problems. Between 1979-89 125,000 jobs were lost in the defence industry. Since the Options for Change announcement in July 1990 the pace of job loss has escalated, a further 35,000 workers have lost their jobs between June 1990 and July 1991. In certain defence dependent localities the direct and indirect impact of defence plant closures has caused considerable economic hardship. The prospect of further job loss and plant closures has increased pressure on the government to adopt adjustment policies to ameliorate the worst excesses of defence expenditure cuts. The plethora of conversion studies gives testimony to this trend.

Conversion, is understood as the transformation of military resources into civil activities and production. It is by no means a new phenomena - during World War Two conversion from the civil to the military and then vice versa was a widespread occurrence - however, the conditions which favoured conversion in the past no longer exist. Dumas (1989) has pointed out that military and civil production have widely diverged since World War 11 and while

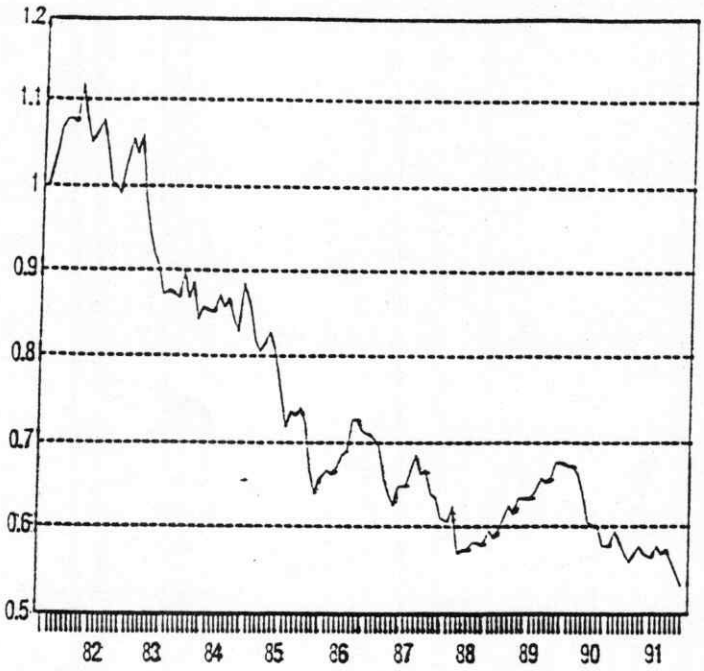
Figure 1.

Shares in GDP

Military and Equipment Spending UK.

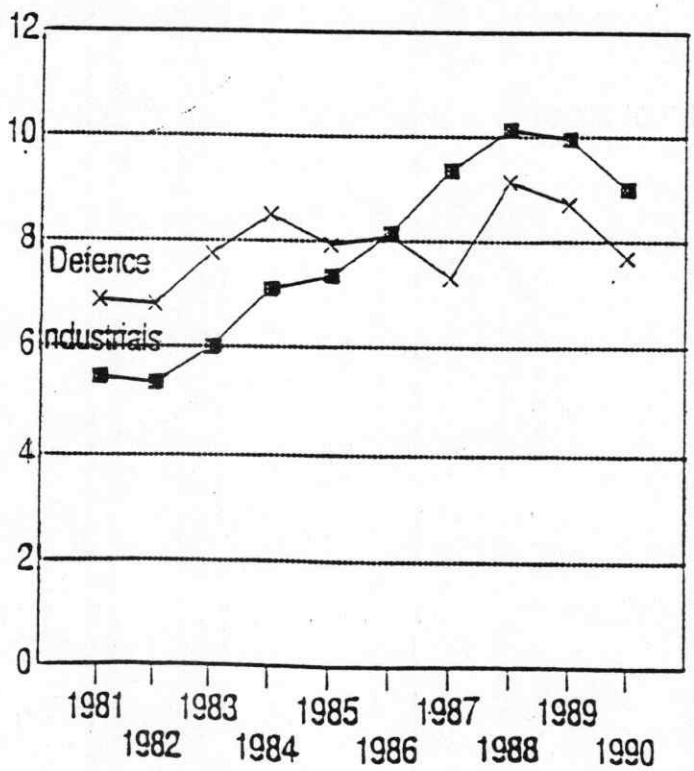


Relative to FT All



Profits/Sales

1981-1989



in the past military production generated a number of significant spin-offs into the civil economy, the present norm is the reverse. In addition, there are now a whole generation of scientists and engineers who have worked solely on military products, isolated from the competitive discipline of market forces, vital to civil innovation.

In the 1970s and 1980s the advocates of conversion/diversification were largely concerned with winning the moral and political arguments for disarmament. The conversion of defence facilities was proposed as a means of gaining political support for disarmament by overcoming the negative economic consequences of defence expenditure cuts particularly labour loss and skill displacement. However, such proposals were characterised by a priori assumptions and advocacy and limited by the special concerns of pacificism, Labourism, or companies and regions seeking to support to alleviate the effects of cuts (Lovering 1992). As such conversion was a marginal political issue that recieved little serious consideration by the powers that be.

By the early 1990s, with disarmament underway and significant cuts in defence expenditure being implemented and the defence industry was in visible decline (See Figure 1). The idea of conversion received greater political legitimacy, but in so doing has become a more complex concept, encompassing a multiplicity of meanings. Willett (1990), Southwood (1990) and Cronberg (1992) have attempted to classify the different approaches to conversion. For our purposes three major strands can be identified: laissez-faire, plant based and macro economic.

Laissez-faire policy

The governments view on conversion stresses the role of market forces in reallocating resources between defence and civil sectors. The market has proved itself to be an extremely useful social mechanism for resource allocation, but from Adam Smith onwards economists have pointed out that the market cannot solve all economic problems. The phenomenon of "market failure" in relation to the environment, income distribution, homelessness and unemployment is by now well documented. The limited evidence of defence firms successfully diversifying, confirms the significant barriers to exit from the defence market and implies that market forces alone will not guarantee that scarce technological resources tied up in defence production will automatically find civil applications. In the absence of adjustment mechanisms to facilitate the transfer of technology from military to civilian production the UK's technology base is set to contract significantly. Rationalisation and redundancies will become more widespread in an industry which is already undergoing reorganisation and restructuring. In the end there is a limit to the scale of contraction of an industry beyond which the critical mass of key labour, particularly research and development teams, can be sustained. If UK companies lose their R&D capacity they are likely to be reduced to the status of subcontractors in the emerging transnational arms industry or be vulnerable to takeover and merger.

Plant based conversion

This is the traditional "swords into ploughshares "strategy which is concerned with the transformation of resources which have already been accumulated by the military - namely defence production facilities, skills and scientific and technical knowledge and in some instances military products and components. The essential element here is the re-use of existing resources for civil purposes. Emphasis is placed on maintaining strategic

technologies, retaining skills, meeting unmet social needs through the provision of government markets. However, to date, all practical attempts at converting defence facilities in the UK have failed. Advocates of plant based conversion argue that failure is more to do with the lack of government support than any intrinsic problem with conversion planning. However, the noble aspirations of conversion, should not veil a realistic assessment of a conversion plans business potential and feasibility. So far the "technical fixes" designed to maintain employment in defence plants have fallen short of a realistic assessment of market opportunities or availability of investment capital.

Unless new markets and venture capital can be identified and accessed, entry into existing markets is highly risky because competing firms are well up the learning curve and already have the advantage of scale economies. In addition the guarantee of government markets have been less than forthcoming from a government committed to reducing state intervention in markets and industry. In any case, in future European governments will be unable to guarantee domestic markets as it will contravene EC legislation on preferential purchasing.

Another problem with plant based conversion is that the capital and labour endowments of major defence contractors are rarely appropriate for volume commercial production. Defence production is essentially a handicraft based production system orientated towards customised products built to the rigid specifications of one customer. Production runs are short and products are highly R&D intensive. R&D accounts for 30% of unit costs of weapon systems, in contrast to 1% in commercial products. Because, the government guarantees markets and profits, the production and labour processes within defence plants are often archaic and unsuitable for production for commercial markets.

Other barriers to conversion for include: inexperience in commercial marketing, emphasis on product rather than process technologies, the specific hierarchy of skills, a management and technology culture isolated by commercial considerations and structured by the armaments procurement process which emphasises large scale systems integration.

Kaldor (1991) argues that a supply-side approach to plant based conversion is likely to replace the military industrial complex with programmes that will reproduce the characteristics of defence production ie social-industrial complexes or eco-industrial complexes - in other words grandiose alternative energy or socially useful product programmes. Evidence of this occured in the US at the end of the Vietnam war when US defence firms attempted to diversify (Kaldor 1982). Plant based conversion tends to reproduce existing patterns of industrial and technological production rather than transform them.

Lower down the defence production hierarchy those contractors which produce generic technologies, mainly subcontractors, which have dual use applications are unlikely to need to convert their production processes or products, for this group of contractors the crucial issue is for alternative markets for their inputs, which is dependent on healthy demand from civil industries. In this context demand stimulus is far more important than supply side intervention.

Macro-economic adjustment

The macro-economic approach to conversion focuses on the evidence of the negative relation between military spending and economic development. Melman (1974), Smith (1977) are pioneering examples. While there is still some debate, as discussed in Dunne (1991), it is

generally accepted that military spending represents an economic burden and that reducing it can lead to improved economic performance. This school of thought argue that equivalent levels of investment in the civil sector creates more employment than in the military sector. Therefore the transfer of defence savings to investment in the civil economy would not only create jobs for those displaced by military expenditure cuts, but also generate more employment opportunities than previously. See Anderson, Bischak and Oden (1990).At the core of this approach is the focus on macro-economic adjustment policies.

In the UK this approach has recently been advovcated by Dunne and Smith (1991) argues that given appropriate adjustment policies to maintain overall levels of demand and investment, a relatively painless transition to higher levels of output and increased employment in the civil sector could be achieved through the transfer of the peace dividend to other areas of public spending such as education, health and construction.

They suggest that a defence expenditure cut of 50% over the coming decade, (See Tables 5&6) some £11bn in current prices, would result in the loss of 200,000 defence jobs, but the transfer of these resources to other areas of public expenditure could generate as many as 600,000 jobs, resulting in a net gain of 400,000 jobs. (See Table 7)There are, however, a number of limitations to this approach;

Their assessment of the likely scale of defence cuts appears somewhat optimistic. Since 1986 defence expenditure in the UK has been declining by an average of 2% per annum, in line with international trends. The 1991 Statement on the Defence Estimates suggests that this trend is likely to continue for the forseable future which implies a 20% reduction in defence expenditure in real terms over the rest of the decade. This level of cuts would amount to a

Table 5 . Government Expenditure In Disarmament Scenarios, 1985 £m

	1992	1993	1996	2000
Defence	17176	15751	12145	8588
NHS (Central)	19036	19729	21662	23947
Other central	13236	13785	15361	17318
Education (local)	14118	14633	16224	18653
Other local	16360	16956	18617	20581
Total	79927	80854	84009	89087
Social capital formation (excluding housing)	7815	8044	8035	8350
Total	87742	88898	92044	97437

Table 6. Simulation - Percentage Difference From Base

	Compensated			Uncompensated		
	1993	1996	2000	1993	1996	2000
Consumers expend	0.22	1.73	5.39	-0.31	1.97	-4.41
Govt. Consumption	-0.21	-1.31	-2.79	-1.87	-6.99	-12.13
Investment	0.25	1.58	4.27	-0.3	-1.77	-3.64
Exports (G&S)	-0.02	-0.25	-0.79	-0.01	0.06	0.69
Imports (ge)	0.09	0.99	3.21	-0.50	-2.34	-4.39
GDP factor cost	0.10	0.63	1.84	-0.45	-2.03	-3.64
B of P (pp)	-0.04	-0.40	-1.36	0.16	0.93	2.17
PSBR (pp)	-0.08	-0.48	-1.27	-0.16	-0.35	-0.39
Unemployment (m)	-0.05	-0.22	-0.52	0.06	0.25	0.46

1. G&S = goods and services
2. pp = percentage point
3. The compensated results are for the simulation where the reduction in military expenditure is reallocated proportionately to other categories of government current and capital expenditure. For the uncompensated simulation there was no reallocation.

Table 7. Public Sector Employment (thousands)

	Levels 1992	Difference from Base 1993	1996	2000
Defence	419	-36.5	-126.4	-210.7
NHS (Central)	1413	29.7	102.4	169.8
Other central	590	12.6	44.8	76.3
Education	1709	36.5	131.4	233.2
Other local	1380	29.2	102.2	171.5
Total	5511	71.6	254.4	440.0

1 The employment changes in the Table are computed as being in the same proportion of the changes in expenditure.

Table 8. The Industrial Impact of the Cut in Military Spending with Compensation:

Percentage Difference From Base

	Output			Employment		
	1993	1996	2000	1993	1996	2000
1 Agriculture etc.	.18	1.04	2.62	1.0	5.6	13.5
2 Coal & Coke	.05	.38	1.06	.1	.3	.7
3 Mineral Oil & N Gas	.00	.00	.00	.0	.0	.0
4 Petroleum products	-.06	-.02	.41	.0	.0	.0
5 Electricity etc.	.07	.52	1.56	.1	.7	1.8
6 Public Gas Supply	.11	.63	1.77	.1	.5	1.3
7 Water Supply	.05	.40	1.31	.0	.2	.7
8 Minerals & Ores nes	-.01	.07	.25	.0	.0	.1
9 Iron & Steel	-.21	-1.17	-3.12	-.2	-.9	-2.3
10 Non-ferrous Metals	-.13	-.46	-.83	-.0	-.2	-.3
11 Non-metal Min. Pr.	.10	.76	2.01	.2	1.5	3.9
12 Chemicals & MM Fibre	.04	-.30	-1.69	.1	-1.0	-5.0
13 Metal Goods nes	-.06	-.04	.09	-.2	-.1	.2
14 Mech. Engineering	-.27	-.97	-1.92	-2.1	-7.4	-13.6
15 Electronics	-.50	-.65	1.96	-2.1	-2.9	9.0
16 Elect. Engineering	-.02	.37	2.03	-.1	.9	4.8
17 Motor vehicles	-.05	.21	.64	-.1	.5	1.3
18 Ships & Other Vessel	-2.83	-9.64	-15.43	-1.7	-5.0	-6.5
19 Aerospace Equipment	-3.30	-10.92	-17.10	-4.2	-12.5	-17.0
20 Other vehicles	.05	.28	.18	.0	.1	.0
21 Instr. Engineering	.01	-.24	-.98	.0	-.2	-.9
22 Manufactured food	.14	.87	2.13	.6	3.7	8.6
23 Alcoholic Drinks	.08	.57	1.54	.1	.5	1.2
24 Tobacco	.08	.61	1.78	.0	.1	.3
25 Textiles	.04	.15	-.10	.1	.4	-.2
26 Clothing & Footwear	.02	.02	-.80	.1	.1	-2.4
27 Timber & Furniture	.22	1.73	5.19	.7	5.5	16.3
28 Paper & Board	.04	.40	1.18	.1	.6	1.8
29 Books etc.	.04	.50	1.61	.2	1.7	5.4
30 Rubber & Plastic Pr.	.02	.48	1.72	.1	1.1	4.0
31 Other Manufactures	.09	.53	1.39	.1	.5	1.3
32 Construction	.20	1.37	4.17	3.2	22.7	66.6
33 Distribution etc.	.14	1.25	4.04	5.5	50.1	157.3
34 Hotels & Catering	.31	2.50	7.93	4.4	36.9	120.0
35 Rail Transport	-.01	.73	3.05	.0	1.0	3.8
36 Other Land Transport	.10	.88	2.75	.6	5.3	16.2
37 Air Transport	.11	.99	3.09	.1	.6	1.9
38 Sea & Other Trans	-.05	.07	.70	-.1	.2	1.8
39 Communications	.12	.92	2.79	.6	4.6	14.8
40 Banking & Finance	.15	1.09	3.25	1.1	7.6	22.6
41 Insurance	.17	1.33	3.84	.6	4.5	13.4
42 Business Services	.09	.74	2.19	2.0	16.5	51.9
43 Miscell. Services	.23	1.22	3.19	6.2	36.3	110.2
44 Unallocated	-.20	-1.37	-4.10	.0	.0	.0
Total	.02	.52	1.96	16.9	180.4	608.5

1. The simulation results in this table are for a halving of military expenditure by the year 2000 with the expenditure reallocated to other categories of government current and capital expenditure.

total of some £4.4bn (current prices), considerably less than that anticipated by the authors. Moreover given the present governments priorities any savings, at least in the short term, are likely to be absorbed by the costs of troop relocation, the retraining of military personnel for civilian employment, the rehousing of troops and families brought back from Germany and for a new round of equipment procurement for the newly restructured forces, particularly the rapid deployment forces. Therefore, the scale of resources released which could be allocated to other areas of public expenditure are likely to be minimal at least in the foreseeable future.

Essentially, the choice about the size of the peace dividend and how it is to be used is a political choice. The present government is unlikely to perceive it as an opportunity to regenerate the manufacturing base as this would contradict their commitment to laissez-faire policies. In the longer term the present government is far more likely to use any savings to redress the budget deficit or to provide tax cuts.

A second problem with this approach is that it assumes that defence contractors are able to adjust to market forces without government support, thus overlooking the considerable barriers to exit from defence production and into civil high value added markets.

Thirdly, there is little substitutability of defence workers skills with the sort of employment that increases in health and education spending are likely to generate. By any economic criteria a further reduction in the UK's high technology base and the subsequent dislocation of highly trained engineers must be perceived as an economic loss, even if there is a net gain in employment as these new jobs are likely to be low paid and low skilled.

From the point of view of economic efficiency and social utility a more constructive use of the peace dividend would be the transfer of resources to broader economic, industrial and technological goals. Conversion here implies a general shift in national priorities. The question then arises about what these priorities should be?

A starting point is the recognition of "market failure"in advanced capitalist societies in meeting basic human and environmental needs, and the urgent requirement of shifting industrial, technological and scientific resources away from military defined objectives and instead targeting "national needs" like industrial renewal, environmental restoration, sustainable agriculture and renewable energies. Such a national needs policy, although initiated by the government should operate in partnership with industry, finance and local and regional authorities, workers and consumers.

An industrial policy driven by national needs would encompass a broad based initiative aimed at improving the full range of manufacturing industries including those that produce goods needed for dealing with the pressing social and environmental problems confronting contemporary society. In this way a number of fledgling industries like solar cells or recyclable plastics would be targeted. But so should selected basic manufacturing industries such as the extractive and service industries, most of which receive little government R&D support but which are important to a balanced economy. If basic industries such as steel and textiles , for example, were targeted for R&D investment to develop new products and processes they could once again become competitive in world markets. The economic successes of the Third Italy, and the Basque regions have given much credence to strategies of regional regeneration through the application of process innovations to mature industries. See Cooke (1990)

At the same time that mature industries are being revived, several "strategic" high-tech industries - microelectronics, computers, telecommunications, advanced materials, robotics and numerical controls - should also be targeted as they are crucial to the performance of other industrial sectors. These industries would no longer be dominated by military objectives, R&D policies directed towards these sectors would instead reflect commercial as well as social objectives.

While technological competitiveness is important for economic performance technological development should be aimed at goals such as improving the quality of life, increasing environmental protection and energy and material saving technologies. Such goals are not necessarily incompatible with the idea of competition, as these new technologies may well become the cutting edge of world technological competition in the not too distant future. But this will not occur automatically. it will require active regulatory policies for the environment linked to new industrial and R&D objectives such as the restructuring the energy industry away from dependence on fossil fuels to sustainable energy systems, improving public transportation systems, energy efficiency in buildings, water treatment plants, the recycling of waste materials etc.

The mechanisms available to government to encourage such developments include direct, subsidies as well as incentives, for industries to conduct basic research, improve technology transfer, support job training and education, environmental regulation. If the government were to use the peace dividend to meet national needs the economic returns would offset the short term dislocations caused by defence spending cuts. However, bringing a country's

industrial and technology policies in line with its national needs, requires more than just drawing up a shopping list of social needs and then shifting funds from defence towards other public expenditure programmes. More fundamentally the country requires a new framework for guiding R&D policies, scientific and technological priorities and relationship between the private and public sectors. Such a framework would provide a filter for selecting critical industries and technologies that would receive R&D and other forms of government assistance.

R&D programmes targeted at high-tech performance in computing, advanced materials and optoelectronics for example could be designed to complement technology initiatives in steel processing , public transport, renewable energy systems, environmental monitoring and pollution control. At the same time superconductors and ceramics which are at present being developed largely under military programmes have potential application in fuel efficient engines, cutting tools, power turbines and many consumer items.

Specific mechanisms targeted at the declining defence sector such as retraining, start-up incentives, tax breaks, civil R&D and investment programmes could be used to restructure capital and labour away from the defence industrial base and into more dynamic and innovative forms of production and labour processes, thus creating a radical break with the pervasive culture of the defence industrial base. The use of such mechanisms need not be prohibitively expensive and offer positive benefits to the whole of society in the long run.

Undoubtedly the demise of the defence sector is very disruptive at the micro-level in defence

dependent communities, the national transfer of resources would have to address the regional imbalances and dislocation. Local and regional planning authorities would need to be empowered to aid regional development programmes which address the totality of a local economy and not just the traditionally insulated defence sector.

In this context the peace dividend and economic conversion can be viewed as a lever to help restructure the economy aware from its Cold War mould, but this is a political choice and only likely to be successful if carried out in the context of buoyant markets led by consumer demand or social and environmental needs, and should not be viewed as an end in itself. Without the political will to commit national resources to clearly stated economic and social objectives, it is unlikely that there will be a conversion process let alone a tangible peace dividend.

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THE COST OF TRIDENT

Local Authority Implications and Policy Proposals

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1. Introduction

The origin of nuclear free local authority work lay in the early '80s collective opposition to nuclear weapons. This policy position has been taken by over 170 local authorities who recognise the calamity nuclear war would bring to their towns and cities and who rejected as a deception what some Home Office officials have come to describe as "armageddon planning" - civil defence - or plans to continue local authority functions after nuclear attack.

This concern about nuclear weapons and war was eclipsed by nuclear power following the Chernobyl disaster, which both demonstrated the enormous consequences of a reactor meltdown, and opened the last chapter of the Soviet Union by the intolerable strain it placed on relations between Moscow, Kiev and Minsk. The 'Cold War' now seems a very distant memory, but the daily hazards associated with nuclear weapons production, maintenance and deployment, summarised in this paper, continue to endanger those civilians and service personnel who operate them and those communities near nuclear sites and transportation routes. The UK Trident programme together with proposed UK tactical nuclear weapons' modernisation, looks set to continue this trend.

2. Local Authority Environmental Policy

For these reasons the National Steering Committee (NSC) for nuclear free local authorities has recommended that nuclear weapon hazards be recognised

as part of local authority environmental policy. The NSC has proposed a model text for inclusion in local authority "Environmental Charters":

> "Amongst the dangers facing the environment, the possibility of nuclear war is undoubtedly the gravest. The accidental or deliberate use of nuclear weapons could destroy the planet's ecology, impact significantly on its climate, and kill and maim millions of people. The Council will therefore continue to work closely with those local authorities, peace and environmental groups striving for a nuclear weapon free future. In particular the Council will continue to promote research and public understanding of the environmental hazards associated with the production, transport, deployment and use of nuclear weapons and their components."

Trident has the potential to deliver 76,800Kt of destruction (equivalent to 5,486 Hiroshimas). The human and environmental consequences of this scale of destruction do not require elaboration. Regardless of intention, Trident poses a daily hazard through the normal processes of production, maintenance and deployment as well as an accident hazard, and it is important to remember that these hazards are imposed on local communities not in defence of the realm, but, as Rogers has argued, for the political leverage and status Trident is believed to confer on the Government.

If the purpose of public expenditure on defence were to raise an effective fighting force then, as Arkin showed, Trident would have been dropped a long time ago.

3.Local Authorities Informing and Representing Communities

It is very significant that, even at this late stage in the Trident programme, the Parliamentary Defence Committee felt compelled to report (HC 337 1992 para.5):

"...the justification for Trident, the number of warheads to be deployed and the relationship of the scale of the strategic deterrent to that deployed by any potential enemy are once again legitimate political and military issues..."

Trident is a legitimate matter for public debate and as such, local authorities have a clear role - to be a democratically elected voice on behalf of their communities and to provide information to their communities to raise the level of awareness and the quality of personal and collective decision making. This is particularly important on issues which arouse intense public concern or are shrouded in secrecy - as is often the case with nuclear issues generally. This task has been made more complicated by the introduction of legislation restricting the provision of information, but local authorities should not be deterred. **The NSC has produced detailed legal guidance which sets out how authorities can justifiably publish material on relevant nuclear issues.**

NSC ACTION: To prepare model information materials about Trident for local authority use.

4. <u>The Local Authority Role in Developing Sustainable Local Economies</u>

Rogers drew attention to how, through the early 1980s the proportion of public spending on defence increased. This is to be contrasted with reductions in the proportion of public expenditure received by local authorities to provide statutory services - education, housing and welfare.

There is clearly an opportunity cost associated with any expenditure. Whilst for Trident (at £33,000 million life cycle cost) part of that opportunity cost may well be borne by past and future weapons programmes, the resources devoted to defence and taken from public services cannot reasonably be said to be unconnected decisions. This has impacted on local economies reducing the role of local authorities as employers and purchasers of local goods and services and reducing infrastructural

investment. **The impact of defence spending nationally on public expenditure as a whole, and resources available to local communities in particular is another reason why local authorities have a legitimate interest in the development of national policy.**

In the late 80s and early 90s public spending on defence itself has started to fall leading to cuts in defence related employment. Local authorities which have local economies heavily dependent on defence expenditure have begun to consider what steps they can take to diversify their local employment base. **The NSC has been anxious to assist this process developing firstly a newsletter for local authorities with information about different local authority responses to defence cuts, and more recently seeking to establish, and secure funding for, a development officer post within Glasgow's Economic Development Unit.** These are small practical initiatives prompted by an unwillingness to date on the part of national Government to help local authorities affected by defence industry restructuring and base closures.

NSC ACTION: To continue to collate and disseminate information on local authority initiatives to diversify local economies away from defence dependence.

Clearly, any local authority initiative cannot alone impact significantly on declining defence employment. Willetts rightly identifies a need for a national programme, with government, local authorities, finance, industry and the labour force working together to meet basic human and environmental need.

It is timely, in the context of the Brazil 'Earth Summit' for the Government to consider how projects of the kind identified by Willetts e.g environmental restoration, sustainable agriculture and renewable energies, can be encouraged locally, nationally and internationally. To do this would not only help to secure a habitable environment, but also help to remove the causes of future potential conflict for which Trident is hopelessly ill suited to prevent.

5.Local Authorities: developing sustainable towns and cities and contributing to peace

Rogers draws our attention to the Government view that Trident is required to meet unforeseen threats in a world which it considers as becoming increasingly unstable. Brennan also touched on a likely cause of future conflict - economic inequality between countries and between global regions. Government fear of future instability is no doubt well founded, but its response through Trident betrays a lack of understanding of the likely causes and what is required to prevent it.

At the 1991 AGM and Conference of the nuclear free local authorities, Dr Gwyn Prins, Director of the Global Security Programme at Cambridge University identified threats to peace in the 1990s and what local actions local authorities could encourage. Prins identified nationalism, racial intolerance, economic inequality, resource scarcity, migration and environmental degradation as likely causes of war. Nationalism and racism in Europe, economic inequality between North and South, debt and population migration caused by desertification are increasing trends for which **Prins urged local authorities to use their resources to promote public understanding "...and not simply to collect rubbish."**

Prins further remarked:

> "The single most important contribution that any single individual can make to the reduction of greenhouse gases is to take all possible steps to reduce their consumption of power by increasing the efficiency with which it is used. Local authorities could, if they wished, link their energy efficiency information campaigns directly to questions of peace and security in the environmental sense. Equally, other areas of "ordinary" local authority action are directly related to environmental security. In particular steps taken to reduce the use of motor cars by facilitating better public transport, better facilities for pedestrians and cyclists, work towards the same end."

In these different ways local authorities can help promote a positive response to identified future dangers in a way in which Trident and nuclear

deterrence do not. Additionally, however, the NSC and local authorities have, and will continue to respond to the specific and immediate hazards posed by Trident and the infrastructure necessary to build and sustain it.

6. Nuclear Weapon Infrastructure

Around Sellafield, Cumbria, Aldermaston and Burghfield in Berkshire increased incidence of childhood leukaemia have been identified. These diseases which possibly result from one or more as yet unidentified factor(s) seem most plausibly explained by the proximity of nuclear plants and the routine or accidental discharges to air and water of wastes contaminated with radioactive particles and then taken up by the body, or genetic damage to radiation workers later inherited by their children.

Trident warhead production will contribute to this continuing hazard into the future. Local authorities have an important role in, and coordinate their environmental monitoring of, low level radiation in the environment with a view to detecting any fluctuations in levels, but this in itself is not sufficient to provide protection to communities nearby nuclear sites.

In an article for Sanity ('Hidden Facts' November 1989) David Lowry, Director of the European Proliferation Information Centre, referred to the then recent revelations about the "crumbling and chaotic" state of the seventeen nuclear weapon production plants in the United States. Slowly the full extent of the crumbling and chaotic state of nuclear weapons production in the former Soviet Union is being revealed and this begs the question, **what is the true condition of contemporaneous UK nuclear weapon sites at AWE Aldermaston and Llanishen, RO Burghfield and Sellafield?**

Details of both chemical and radiotoxic contamination at US and former Soviet sites is now known but little is known of conditions at UK plants. New European law to be incorporated into UK legislation about public access to environmental information is unlikely to help since the Ministry of

Defence can be expected to claim exemption from disclosure on the grounds of 'Crown Immunity' or 'national security'. Failure by Government to adequately implement another European Directive entitling the public to information is referred to below.

NSC ACTION: To consider whether research should be commissioned on the environmental impact of the UK nuclear weapon infrastructure.

What is known is that the production of a single kilogram of plutonium for a nuclear warhead generates over one thousand litres of liquid high level radioactive waste, over 200,000 kilograms of intermediate level waste and almost 10 million litres of contaminated cooling water (Renner in Brown et.al. State of the World 1991 p137 Pub. Norton, New York). This radioactive legacy will be left for future generations to manage together with wastes arising from decommissioning of current and future (Trident) submarines.

The NSC has previously called on the Government to publish complete inventories of waste arisings from civil (indigenous and imported) and military nuclear programmes. The Government should also apportion and publish nuclear waste management costs associated with both civil and military programmes.

7. Nuclear Reactor and Weapons Accident Hazards

Reactors

In the Bulletin of the Atomic Scientists July/August 1989 Arkin and Handler detail 50 nuclear weapons and 8 nuclear reactors lost at sea. These weapons and reactors if not already doing so, will over time release their radioactive inventories to the environment. These are routine hazards associated with deployment and operation at sea.

At Dounreay, Highland Region, a new Pressurised Water Reactor is under development to power the Trident Fleet. Very little is known about this

new PWR propulsion system. However, at an earlier conference in March this year, organised by the NSC, ex UKAEA nuclear scientist, Dr Don Arnott outlined a scenario in which a PWR reactor could undergo a 'Chernobyl type' 'prompt critical explosion' - **a nuclear explosion** - as follows:

> "...if under-borated water enters a PWR core even with all control rods fully inserted the potential nuclear energy release would be four times that of Chernobyl. Support for this view comes from a French report which shows that too low a concentration of Boron can lead to a runaway reaction in the core (reaching) 160-180 times normal reactor power levels."

On the basis of what little is known about the Trident PWR such a scenario cannot be ruled out and the implications of such a possibility should be considered by all parties with a role to play in accident contingency planning, particularly in view of current assurances within Navy promulgated port safety plans that "It is impossible for a reactor accident to result in an atomic bomb type explosion..."

Whilst a PWR propulsion system is very small in comparison to a civil nuclear reactor, Peden in his presentation has drawn attention to the unusual combination of reactor, warhead and missile propellant in close proximity. How these hazards would interact if any one of them should be involved in a major accident is not known.

> NSC ACTION: To seek to clarify whether a nuclear explosion within the Trident PWR propulsion system is theoretically possible and whether the Ministry of Defence has considered what consequences may arise from an accident affecting a combination of Trident reactor, warheads and missile propellant.

Current emergency planning for Navy nuclear reactor accidents is based on a 'design base accident' from which evacuation and food and milk restriction zones are extrapolated out to 550 meters and 9km respectively. The adequacy of this basis for emergency planning must be questionable, not only because of the above remarks, but also because of findings by John Large, Consulting Engineer, during an investigation of Soviet emergency

planning practice commissioned by Greenpeace International. Large summarised his findings as follows:

> "The Murmansk (naval base) Emergency Plan provides a number of reactor and associated plant and fuel storage accident scenarios and, importantly, includes nomination of a very serious reactivity excursion accident that would not be considered credible in the West. This reactivity excursion accident results in very serious health consequences within the concentrated population of the city of Murmansk, together with additional health consequences extending as far as 1000km from the accident site.
>
> The average anticipated dose for individuals within the 65,000 Murmansk group is reckoned to be as high as 1Sv. This is the level at which irreversible physical changes (long term health damage) are acknowledged to commence.
>
> Symptoms could include: onset of nausea, coughing and vomiting, blood cell changes, flushing of the skin. Of the higher-band exposure group (26,000), it can be expected that at least 30% will die in the short or medium term...
>
> ...Although there are deficiencies in the Murmansk plan, particularly in equipment resource and organisation, the plan boldly recognises the possibility of a severe accident and the ensuing massive consequences."

After the Hinkley Point Planning Inquiry for Hinkley 'C' PWR, the Inquiry Inspector recommended planning guidance be issued to the emergency services and local authorities for a beyond design base accident scenario. It is time for the Navy to do the same.

> NSC ACTION: To ask the MoD in view of the above findings what radiological emergency scenarios it considers should be planned for upon deployment of Trident and whether it will consider issuing guidance to civil emergency services and local authorities for a beyond design base Navy nuclear reactor accident.

Weapons

In March 1988 a study by Dr. W. Jackson Davies entitled Nuclear Accident Aboard a Naval Vessel Homeported at Staten Island, New York (Quantitative

Analysis of a Hypothetical Accident Scenario) evaluated the consequences of an accident involving incineration of a single nuclear weapon containing 5Kg of plutonium in a 3 hour shipboard fire and found that aerosolized plutonium from such a fire could remain in concentrations above US Federal limits out to 100km of the accident site. A principal recommendation from this study was that far more detailed environmental impact assessment was needed for possible nuclear weapon accidents including analyses of terrestrial and aquatic impact as well as potential implications for the water supply. Peden has outlined the hazards associated with nuclear weapons in general and the Trident system in particular earlier today.

Clearly there is a need for detailed environmental impact assessments for both weapons and reactors so local authorities can make their own informed judgement about the tolerability of risks and have a realistic basis upon which to develop contingency plans. To date the MoD have resisted such proposals. The infrastructural developments at Faslane, described as the biggest construction project in Europe, has never been subject to any environmental impact assessment. The Government is also resisting application of a European Directive about public information to military nuclear activities.

Currently the NSC is engaged in a campaign to ensure adequate implementation of European Directive 89/618 about the provision of public information prior to and in the event of nuclear accidents. People who could be affected by a nuclear accident arising from Trident's weapons or the reactor system are not being informed about the risks and this means the Government is breaking European Law. Amongst other things, the Law requires that certain information must be given to everyone who could be affected by an accident, whether it is in the production, transport or use of Trident's weapons or reactor. The information must set out:

- the medical effects of radioactivity

- the accidents currently planned for

- what could happen in such emergencies

- how the authorities would act to protect the public and

- what the public should do in such a situation.

This information should have been made available by the end of November 1991. The Government maintains that the Law does not apply to the military use of radioactive materials but this contradicts lawyers at the European Commission and the French Government.

8. Local Authority responses to Nuclear Weapon Transportation

Peden has set out the basic hazards identified in connection with the movement of nuclear weapons. Local authorities for many years now have been anxious to be provided with hazard information to enable contingency planning on a realistic basis. In 1988, 41 local authorities contributed towards commissioning research by Large and Associates, Consulting Engineers. The project was managed by the NSC which published the research findings in June 1990. The Large study remains the most comprehensive independent analysis of nuclear weapons transportation practice and accident consequences in the UK. It prompted the NSC to call for:

- an open review of weapons transportation policy

- a review of security classified information (since much of that which was withheld in the UK was publicly available in the US)

- sharing of information about accident consequences between the emergency services and local authorities on an equal basis

- publication of detailed contingency planning guidance on an unclassified basis

- opening MoD training programmes on nuclear weapon accidents to the emergency services and local authorities on an equal basis

- review and publish liaison arrangements for accident response between the MoD, emergency services and local authorities

Some local authority associations also took up the NSC's recommendations which, over time have begun to produce small, but possibly significant shifts in Government policy on the disclosure of information. More local authority access to MoD training has been achieved; draft guidance for firefighters responding to nuclear weapon accidents has been issued by the Home Office for consultation; and local authorities have been told to expect from the MoD a 'package of guidance'.

These are small steps towards improving measures for public safety but in themselves are not enough to ensure it. Only by eliminating the hazard will that be achieved.

9. Summary and Conclusions

This paper has reviewed the case for local authorities to inform their citizens and represent local opinion about Trident and its implications. It has reviewed the need to reduce local economic dependence on defence projects and considered the opportunity costs for local authorities of the Trident programme. Some positive practical steps which local authorities can take to improve the quality of their own environment whilst contributing to conditions internationally which will enable future peace have been identified. The many ways in which Trident will be a continuation of military nuclear hazards to communities around production, maintenance, deployment sites and near transportation routes has been discussed.

These are principal concerns for local authorities, but not the only concerns. Local authorities have an interest in the maintenance and strengthening of international regimes to prevent the horizontal proliferation of nuclear weapons. The NSC supports a comprehensive nuclear test ban. Arguably Trident encourages both proliferation and nuclear

weapon testing. The NSC also supports initiatives to achieve a ruling in the International Court of Justice outlawing nuclear weapons. The NSC legal adviser has produced information material about the illegality of nuclear weapons.

For the future the National Steering Committee of the Nuclear Free Local Authorities, whilst remaining committed to the elimination of all nuclear weapons, will within its legal powers continue to seek to secure better quality information about the Trident programme to assess its impact on the environment and public safety locally, nationally and internationally. It will continue to work with its supporting authorities and public interest groups concerned about Trident. It will consider the specific proposals contained within this paper and others arising from conference debate in the context of its overall work programme.

SK. 1 June 1992.

SPEAKERS' BIOGRAPHICAL DETAILS

BIOGRAPHICAL DETAILS

William M Arkin is Director of Military Research for Greenpeace International in Washington, DC. He specialises in military affairs, and is currently focusing on the Gulf War and modern warfare and the future of nuclear weapons.

Mr Arkin has authored or co-authored 9 books on military and nuclear issues, numerous articles and monographs. He is co-editor of the standard four-volume encyclopaedia of nuclear weapons, "The Nuclear Weapons Databook", prepared by the Natural Resources Defence Council (Harper & Row). He is a former member of the Editorial Board of "The Bulletin of the Atomic Scientists" and is currently a contributing editor.

Mr Arkin is the author or co-author of: "Research Guide to Current Military and Strategic Affairs" (1981); "SIOP: The Secret US Plan for Nuclear War" (with Peter Pringle) (1983); "Nuclear Weapons Databook, Volume I: US Nuclear Forces and Capabilities" (with Thomas B Cochran and Milton M Hoenig) (1984); "Nuclear Battlefields: Global Links in the Arms Race" (with Richard W Fieldhouse) (1985); "Nuclear Weapons Databook, Volume II: US Nuclear Warhead Production" (with Cochran, Hoenig and Robert S Norris) (1987); "Nuclear Weapons Databook, Volume III: US Nuclear Warhead Facility Profiles" (1987); "Nuclear Weapons Databook, Volume IV: Soviet Nuclear Weapons" (with Cochran, Norris and Jeffrey I Sands) (1989); and "Encyclopaedia of the US Military" (with Joshua Handler, Julia A Morrissey and Jacquelyn Walsh). His books have been translated into Chinese, German, Russian, Spanish and Japanese.

Mr Arkin conceived the Greenpeace "Nuclear Free Seas" campaign in 1986, a major force in maritime security and naval arms control. He is the editor of the "Neptune Papers" monograph series, which are produced to further denuclearisation of the oceans. He is author of "The Nuclear Arms Race at Sea" Neptune Paper 1 and co-author of "Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory", Neptune Paper 2 (with Joshua Handler) (1988); "Naval Accidents 1945-1988", Neptune Paper 3 (with Joshua Handler) (1989); "Naval Safety 1989: The Year of the Accident", Neptune Paper 4 (with Handler and Amy Wickenheiser); "Nuclear Warships and Naval Nuclear Weapons 1990: A Complete Inventory", Neptune Paper 5 (with Handler); and "US Naval Nuclear Weapons in Sweden", Neptune Paper 6 (with Handler and Hans M Kristensen)

From 1981-89, he was a Fellow of the Institute for Policy Studies in Washington and Director of its National Security Program. Mr Arkin was in the US Army from 1974-78 and served as an intelligence analyst in West Berlin. He was an analyst at the Centre for Defence Information in Washington from 1980-81. He was a member of the first private delegation to observe Soviet nuclear weapons as part of the NRDC-Soviet Academy of Sciences "Black Sea" experiment (June 1989), and was one of the first civilians to visit a Soviet nuclear weapons storage bunker in former East Germany (June 1991).

During the Gulf War, Mr Arkin headed the Greenpeace team evaluating war, producing 39 situation reports. After the war, Mr Arkin co-authored "On Impact - Modern Warfare and the Environment: A Case of the Gulf War" (with Damian Durrant and Marianne Cherni) (May 1991), the first comprehensive look at the war's human and environmental effects. He travelled to Iraq in August-September 1991 as a military adviser to the Harvard Study Team on civilian casualties. In preparing a bomb damage assessment of the air war, he

Stewart Kemp is Principal Policy and Research Officer for the National Steering Committee, Nuclear Free Local Authorities. Previous appointments include Deputy Chief Emergency Planning Officer to the Greater Manchester Fire and Civil Defence Authority and District Emergency Planning Officer to the South Yorkshire Fire and Civil Defence Authority. He was awarded a BA Degree (Politics and Philosophy) by the University of Sheffield in 1984 and a MSc Degree (Science and Technology Policy) by the University of Manchester in 1985. He has several published papers on emergency planning and edited Radiation Waste Management: Issues for Local Authorities Pub. Thomas Telford 1991.

William Peden has actively researched the subject of British nuclear weapons, naval reactor and nuclear weapon emergency plans since 1986 assisting in the production of "Inside Britains Bomb", the documentary by Yorkshire Television.

In 1987 he exposed the use of live radioactive materials to train servicemen in nuclear weapons accident response procedures and other details on UK response procedures to a nuclear weapons accident.

During the Gulf War he wrote two reports for BASIC, one on the effects of a direct hit on a warship carrying nuclear weapons, the other on the effect of bombing the massive amount of chemical plants associated with any industrialised nation in the Middle East.

In 1990 he authorised a critique for the Scottish nuclear free authorities on the emergency plans for naval nuclear reactor accidents in Scotland.

In 1991 co-authored the BASIC report on nuclear weapons safety.

For Greenpeace he co-authored their report on the problems of the Trident programme in 1991 and 1992 and their report on "Short Sermon" 1991, a naval nuclear reactor accident exercise.

He has acted as a consultant to the Nuclear Free local authorities on an occasional for many years formulating campaigning and information materials .... including the "Nuclear Cover Up" radioactive materials transport routes briefing paper. He is currently a consultant for the Greenpeace Disarmament Unit.

William has researched information for many journalists, television producers, MP's and individual local authorities on all of the above subjects.

Paul Rogers is a Professor of Conflict Analysis in the Department of Peace Studies at Bradford University where he has lectured since 1979. In the 1960's he studied biological sciences at Imperial College, completing his doctorate in 1968. He then lectured there and also spent 2 years working for the Overseas Development Ministry in Uganda and Kenya, developing a research interest in political aspects of international resource use. During the 1970's, he lectured in Human Ecology at Huddersfield Polytechnic and helped establish Britain's first degree course in Human Ecology.

1987 Researcher for Ann Clwyd, MP. Elected CND Vice-Chair.
1988-90 Parliamentary Officer, Royal College of Nursing.
1990- Elected CND Chair.
1991 Advisor to the Royal College of Nursing Department of Policy and Practice (working with AIDS, Breast Care, Leukemia, Cancer and Pollution Care nurses).

Marjorie Thompson has appeared on local and national radio and TV and The Times, The Guardian, The Independent and other national newspapers. Her interests outside CND include skiing, swimming, theatre and reading and writing fiction.

Sue Willett is at present a Research Fellow at the Centre for Defence Studies, Kings College, University of London where she is engaged in research on defence expenditure trends and defence industrial issues including those of defence conversion. She has a number of publications, in both the academic and non-academic press. Previously, she worked as secretary of the Greater London Conversion Council based at the Greater London Trade Union Research Centre where she engaged in a number of conversion projects.

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