UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL SCIENCE
DEPT. OF POLITICS

THESIS SUBMITTED IN PARTIAL
FULFILMENT OF REQUIREMENTS FOR THE DEGREE,
DOCTOR OF PHILOSOPHY

MITRANY'S FUNCTIONALISM, THE INTERNATIONAL ATOMIC ENERGY AGENCY, AND THE DEVELOPMENT OF SAFEGUARDS AGAINST THE PROLIFERATION OF NUCLEAR WEAPONS 1945-1975

by

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Mitrany's Functionalism is a theory of international politics which advocates the creation of inter-govermental organisations to supercede certain responsibilities of the State, and to promote the renunciation of the use of force in international relations, through demonstrating the benefits of international co-operation. This study focuses upon the pragmatic basis of Functionalism by emphasising its a-priori reliance upon the consent of, and control by, the States involved in the development of Functional co-operation. After a thorough critical examination, Mitrany's argument is reduced to five propositions concerning the foundation, control and development of inter-govermental organisations, their available sanctions and contribution to building a 'working peace system'. The case study of the I.A.E.A. establishes six criteria for the evaluation of 'safeguards' against nuclear proliferation. A study of multi-lateral diplomacy in the period 1945-57 examines the foundation of the I.A.E.A., with particular attention to the limitations placed upon the Agency's mandate. A textual analysis of the Agency's Statute and numerous 'safeguards' systems' reveals the gradual and controlled extension of the Agency's competence. The case study concludes with a critical, technical evaluation of the 'NPT safeguards'. This thesis concludes that the case study confirms the proposition relating to the foundation of inter-govermental organisations. With qualifications concerning the primary role of State goverments, the propositions relating to control and development are partly confirmed. The proposition relating to sanctions is refuted. The final proposition concerning the reduction in the use of force between States engaged in Functional co-operation is cautiously endorsed, with the suggestion that the development of inter-govermental organisations, and the reduction in the use of force between States, are mutually reinforcing processes, relying upon the political initiatives of those States participating in them.

ACKNOWLEDGEMENTS

I would like to record my thanks to those members of the I.A.E.A. Secretariat who were able to assist me in the research for this study. Both in interviews and in correspondence the officials of the Agency were on all occasions both helpful and exceedingly courteous, (especially on those occasions when I was in disagreement with their opinions!) In accordance with their wishes all materials obtained through these interviews have been cited on a non-attributable basis.

Similarly I would like to record my thanks to the staff of both the British Embassy at Vienna and the U.S. Permanent Mission to the I.A.E.A. for their assistance.

I would like to acknowledge the financial support made available to me during the conduct of this research by the Social Science Research Council, and by the Trustees of the Gilbert Murray Trust Fund.

I would like to express my gratitude to Dr. John Simpson of the Department of Politics, at the University of Southampton whose supervision of this thesis has provided invaluable direction and support. I would also like to record my indebtedness to Dr. A.J.R. Groom, and Dr. Fred Parkinson, of University College, University of London, whose teaching first inspired my interest in the subject of Functionalism and International Relations.

On a personal note I would like to record my gratitude to my father Alan William Imber and my mother Marjory Edith Imber (1921-1977) for their constant encouragement.

Finally, I would like to thank Mrs. Elizabeth Kerr of Balmullo, Fife, for her preparation of the typescript.

CHAPTER ONE

Functionalism and International Co-operation

1.1. Introduction, The Functional Approach and the Study of International Relations

The Functionalist approach[1] to international organisation is most intimately associated with the work of David Mitrany, (1888-1975). Born in Romania, Mitrany emigrated to the U.K. in 1912. He pursued a varied career as a student of sociology at the L.S.E., a research worker for the Carnegie Endowment, a journalist on the staff of the Manchester Guardian, and consultant on political affairs to Lever Brothers. Mitrany was appointed to an academic post at Princeton in 1932 and during World War Two he worked for the British Foreign Office. It was in his capacity as a member of the F.O.'s "Foreign Research and Press Service," an intelligence committee considering the planning of the post-war recovery, that Mitrany wrote his seminal contribution to the study of international organisation, A Working Peace System.[2]

This thesis will examine the Functional approach with reference to a case study of the International Atomic Energy Agency. In particular, this will consider the I.A.E.A.'s responsibility to develop and apply a system of controls, or safeguards, to the supply of any technical assistance, and bi-lateral aid, involving the use of fissile nuclear materials. The purpose of these safeguards is to detect and hence to deter any attempt to transfer nuclear materials from civilian to military purposes. Later, as will be shown, under the

Non-Proliferation Treaty 1968, the application of safeguards was extended beyond technical assistance to include all nuclear facilities in the signatory States.

In view of the technical complexity of the safeguards question, and the analytical complexity of the relationship between Functionalism, technological innovation and the maintenance of peaceful international relations, this thesis will leave any further discussion of the I.A.E.A. and safeguards until Chapter Two. Rather, Chapter One will be restricted to a full introduction, statement, analysis and criticism of the Functional approach.

Mitrany's works will be the subject of detailed exposition, analysis and criticism in the subsequent sections of this Chapter. To assist in this it is first necessary to discuss the origins of Functionalism as an approach to the study of international relations. This will serve two purposes. Firstly, Functionalism cannot be understood without making reference to the contemporary intellectual milieu in which Mitrany worked. Secondly, it is necessary to address, as succinctly as possible, the methodological issues arising from the status of the Functional approach in the theoretical literature of international relations. Both issues may be addressed by examining the so far tentative use of the term "the Functional approach."

Groom and Taylor describe Functionalism as "... an approach rather than a tightly-knit theory ...".[3] In particular they refer to

> "the quality of functionalism as a focus of discussion, or a tendency in thinking, rather than as a determinate body of propositions."[4]

Mitrany writing in 1975 characterised Functionalism as

> "a concept which is not summed up in an imperative prescription for a social or political ultimate, but expresses no more than the political application of the outlook and mutuality of humanism."[5]

Taylor accurately describes Mitrany's style in the observation that the Functionalists

> "argue outwards from their units drawing metaphors from their environment, creating a chain of perception and insights which are linked together more by feeling for the common elements than by a necessary logical connection, they argue from the small scale to the large."[6]

In a particularly interesting research note, Tooze observes that Functionalism is "manifestly not...and has no pretensions to be, a 'theory' in the strict social science sense."[7] Indeed, Mitrany himself concedes that Functionalism "cannot, and does not seek to predict policy."[8] This, as will be shown, is a somewhat disingenuous position for Mitrany to adopt. The strong normative overtones of his argument are frequently presciptive , a point enthusiastically emphasised by Taylor.[9] Furthermore, Mitrany's prose-style occasionally shades from prescription into a variety of exhortation barely distinguished from prediction.[10]

To consider the theoretical status of the Functional approach, in particular with respect to 'strict social science,' Functionalism must be located within the intellectual context of the 1930's.

Mitrany wrote from within the Liberal and peculiarly British Fabian tradition. Strong affinities can be detected between Mitrany's essays and the works of contemporaries such as Robert Cecil, Norman Angell and Leonard Woolf.[11] However, there is a clear distinction to be made between Mitrany, and those writers who are clearly identified with the so-called idealist or moralist tradition so fiercely criticised by Carr, Morganthau and others.[12] It will be shown that

Mitrany made a radical departure from the frequently puerile quasi-pacifism of the idealists. Furthermore, certain mis-attributions linking the two have obscured the considerable political acumen which a close examination of Mitrany's work reveals.[13]

This thesis does not attempt an intellectual history of Functionalism. This has been most admirably undertaken by Parkinson, Haas, Taylor, Groom and others.[14] However, to consider the theoretical standing of Functionalism it is necessary to briefly consider its pre-1930's genesis.

The liberal free trade doctrine upon which the nineteenth century industrialisation of Western Europe was based, and in particular which inspired the Anglo-Scottish school of economists, was pledged to remove all natural and unnatural barriers to commercial intercourse. Unnatural in this context referred to those impediments to trade established by both private monopolies and State intervention. Functionalism is firmly rooted in this Benthamite, utilitarian tradition, as may be seen in the nineteenth century origins of public international unions, the forerunners of the post-1945 Special Agencies, of which the I.A.E.A. is one.[15]

This utilitarian approach not only embraced the management of natural resources, and technological innovations such as posts, telegraphs and other forms of international communication and transport.[16] It also included a broad commitment to humanitarian and moral improvement. This is evidenced in the measures taken to establish international Standards and Conventions on the regulation of public health and the control of contagious diseases. Also, to suppress those criminal activities such as piracy, and trafficking in drugs and prostitution, which flourished in the absence of an international legal regime to suppress them.[17] By combining the utilitarian and humanitarian perspectives Mitrany argued that the development of functional international organisations might also serve a higher purpose, namely that governments might renounce the use of force in international relations without jeopardising the security of their citizens.

Mitrany was not a pacifist. However, his analysis of the causes and costs of war closely paralleled the writings of Leonard Woolf and Norman Angell and others in the inter-war Fabian school.[19] A fuller discussion of these writers' arguments and Mitrany's relation to them will be offered in the next section of this Chapter. The purpose of introducing them at this stage is to illustrate the milieu of contemporary ideas in which Mitrany formulated his own analysis.

These authors advanced a social and behaviourist interpretation of the phenomenon of war. They rejected the cynical interpretation that the causes of war lay in an immutable and evil human nature. Also, and consistently, they rejected the romantic interpretation that the means to prevent war lay within any immutable disposition towards human goodness. Both the Fabians and Mitrany considered that statesmen and diplomats were victims of the structure of the international system which induced certain lamentable patterns of behaviour on the part of those people participating within it. Mitrany criticised this structure in a similar manner to his critique of the responsibilities or functions of the State. In the same way that the State was revealed as an increasingly inadequate institution to secure the economic and social well-being of its citizens, Mitrany suggested an international system comprising sovereign, territorial States was an inadequate structure to secure peaceful relations between its members. Mitrany's critique of the international anarchy was of course not original.[20] However, it was his proposal for the creation of international organisations, rather than for instance collective security , compulsory arbitration or similar devices , which distinguishes his work. To Mitrany, transforming the international anarchy in which the use of force was a legitimate and regularly used instrument of state policy could not be achieved by countervailing coalitions nor by voluntary submission to law, and least of all by appeal to world opinion . Rather, the possibility of changing state policies rested upon providing sufficient incentives to national governments for them to revise their guarded and limited understanding of the national interest.[21] If it could be demonstrated that

international co-operation provided mutual benefits, then, by appealing to both utilitarian calculation and humanitarian concern, the rigid structure of state-sovereignty could be broken down. The international system would thus be transformed by the emergence of new centres of power, namely functional, international organisations.

The eclecticism of Mitrany's sources and the rhetorical and ideological style of their presentation provide good grounds for those comments by Taylor, Tooze and others, which criticise Functionalism's status as a theory by their criteria of strict social science. Mitrany's arguments use elements of historical and legal analysis. The former is frequently invoked in literary metaphor.[22] Furthermore Mitrany himself expressed a scornful disregard for "behavioural" and "scientific" approaches to the study of international relations.[23] In other words, his arguments use in large part "... explicit reliance upon the exercise of judgement," which, as Bull has established is central to the so-called "traditional" school of international relations.[24]

As neither Mitrany himself nor his critics place Functionalism within the "scientific" school it is not intended here to debate the respective claims of these two approaches.[25] However, it is now possible to consider the merits of Functionalism, if it is conceded that the "traditional school" can share in the claim to possess theoretical credentials. Frankel, McClelland, Lieber and others would indeed argue that the characteristics and uses of theory in international relations transcend the rivalries of these two schools.[26]

Functionalism offers a lucid analysis of a fundamental dilemma faced by the authorities of the territorial state. The capacity of each state to serve its citizens is impaired by the very sovereignty and territorial boundaries which define the scope of that authority. The needs and demands of the citizen cannot be satisfied without some diminuition in the sovereign rights of the State, yet the State ceases to fulfil its raison d'être if it concedes to another authority the right to satisfy the welfare of its citizens. This would seem to require an unprecedented act of self-abnegation.

In the description and analysis of this dilemma Functionalism clearly fulfils three most basic roles of theory in international relations. Functionalism provides a framework for the analysis of empirical data. It therefore encourages the process of speculative thought and so orients knowledge in furtherance of future studies. In addition to these three criteria, Functionalism identifies recurrent phenomena and patterns of behaviour, the basis of all systematic generalisation. More intriguingly, the search for recurrent patterns should illuminate non-recurrent phenomena, that is to say that the refutation or qualification of theoretical propositions is in itself more valuable than the mere accumulation of confirming evidence.[27]

Functionalism thus satisfies five widely agreed criteria for theoretical knowledge. To these it might be added that Functionalism is, less fashionably, a normative doctrine. Also, as has been shown, it is prescriptive , if not strictly predictive as to the likelihood that its recommendations may be adopted.

Functionalism does not satisfy Rapoport's most exacting requirement that a theory

> "... is a collection of derived theorems tested in the process of predicting events from observed conditions."[28]

However, the "lower" form of theory, that

> "... aims only at subjective understanding... an intuitive organisation of perception..."[29]

need not be without rigour. The technique used here to both analyse and then to test Mitrany's Functionalism will firstly make explicit the assumptions upon which the approach rests. Secondly it will reduce the argument to its sequential component parts. Thirdly, each of these will be reduced to propositions against which the findings of the case-study may be compared. Mindful of the gains of contrary evidence it is noted that the partial, or entire refutation of these propositions may offer greater insight into the nature of Functionalism.

Alternatively where this study finds evidence to support Mitrany's argument, the need for qualifications will also serve to highlight certain shortcomings.

Finally, although it is hoped that the theoretical status of Functionalism has been established in the foregoing, to avoid unnecessary semantic confusion, and to conform with Mitrany's own modest usage, this study will continue to refer to Functionalism as an 'approach' to international relations and the particular problems of creating international organisations.

Thus in the next sections of this Chapter the Functionalist approach will be presented in its most explicit form drawn from Mitrany's various essays. Thereafter, a critique of Mitrany's scheme will serve to clarify most contentions and ambiguous arguments raised therein. Finally, Mitrany's arguments will be recapitulated in the form of five key propositions.

1.2. Mitrany's Argument

Drawn from many sources, the argument that David Mitrany advances for the functional approach may be presented in five parts. For the purpose of this examination they may be treated as a chronological sequence. Before proceeding to a detailed analysis of each stage, the five part argument may be summarised as follows. First, domestic governments recognize that specific responsibilities that they currently discharge or may in future be called upon to meet, will be more effectively performed through international co-operation. Secondly, an international organisation, relevant to this responsibility must be established, and a grant of powers and resources, that is, an effective, although specific, grant of sovereignty, made to it. Thirdly, Mitrany's argument suggests that through the progressive implementation of that organisation's original mandate, its powers will be enhanced vis-à-vis the residual right of the Member States. This enhancement will be measurable with respect to the creation of treaty law and agreements conferring upon the organisation the right to undertake activities previously reserved to the State; to take ownership of resources or to manage their use, and

to set standards and procedures for the management of such resources, binding upon the members.

Fourthly, Mitrany argued that international organisations should be properly endowed with effective sanctions. Without the ability to withhold benefits or to impose penalties upon States breaking the rules promulgated by the organisation, the authority of international organisations would lack substance and credibility.

Fifthly, Mitrany argued that the successful growth of functional international organisations, fulfilling many of the welfare responsibilities previously reserved to the State, would create positive incentives for States to maintain the peace. Mitrany believed that the provision of improved welfare and economic opportunities through international co-operation would create strong ties between States, based upon enlightened self-interest, which would encourage peaceful relations between those States engaged in Functional co-operation.

The first stage in Mitrany's argument is to suggest that there are certain responsibilities of domestic government which might be more effectively discharged by international co-operation than by purely national provision. There are, in effect, three categories of such responsibility when viewed from an international perspective. Firstly, the provision of what might be termed public goods among many States. Secondly, the provision of shared goods between a smaller number, possibly even bi-laterally. Thirdly, there is the responsibility to regulate national technological developments which may disturb the security of other states.

At the most pragmatic level there are those responsibilities which, by quantitative economic criteria, can be performed at lower cost and greater efficiency by co-operative means. In this category transport, posts and tele-communications provide good examples. By providing these services through an international organisation which can regulate membership and the conditions upon which services are provided, the collectivity of States may reduce the free-rider problem.[30] By definition no 'pure' public-good can be without free-riders. (A classic example is that the provision of a

light-house will benefit the pirate ship as well as the merchantman). However, the more nearly universal the system of co-operation, and hence the more widely spread the financial provisions for the construction or provision of public goods, so may the free rider problem be more nearly eliminated. Reducing costs will reinforce the co-operative ethic by encouraging each State to participate rather than attempt to take a free-ride on the benefits provided by others.

A second, and closely related category of responsibility, suitable for functional co-operation, is in the creation of facilities, quite literally beyond the physical capacity of any one State to provide. The example of river basin improvement has been mentioned in respect of the Rhine Commission. Currently, the continuation of work on the Indus River project by India and Pakistan, despite the 1971 war and rumoured nuclear-arms acquisition race since 1974, is an example of this kind of co-operation. Also, throughout the fifteen-year confrontation between Zambia and Rhodesia after U.D.I. in 1965, the Kariba Dam was still operated by the two countries jointly.

This shared goods category is distinct from the public goods category in that the benefits of the former only accrue to those participating. Therefore, it is not possible for a state outside the scope of that particular co-operative venture to gain from it. This eliminates the free rider problem which might otherwise deter provision of the goods. The caveat that must be applied to these two categories is that the benefits derived from such co-operative ventures must be superior to the benefits obtainable by resort to the use of force. Certain more powerful States may well be able to establish control over sufficient resources to bring the production of desired shared goods under their exclusive territorial jurisdiction. In these circumstances Mitrany's argument appeals to the cost-benefit comparison. That is to say that, even in the Hobbesian world if benefits may be obtained without use of force it is preferable to co-operate than to confront, and so avoid an unnecessary expenditure of resources. However, the major thrust of Mitrany's argument is towards suggesting the uniqueness of those goods, shared or

public , which are only attainable by co-operation. That is, to identify activities which by their intrinsic nature, technological, economic or otherwise, are beyond the scope of national, territorial provision. Herein lies the continuity within the development of the responsibilities of international organisations. From the regulation of contagious disease, drug trafficking, piracy and prostitution, so the foundation of the Universal Postal Union, (1874) and International Telegraphic Union (1865) extended the functional approach into high technology. Mitrany makes reference to the new technologies of sea-bed and space exploration as being suitable cases for future functional organisation.[31] These may be considered additional to the more typically functional activities of the World Health Organisation, the Food and Agricultural Organisation, and the regulatory activities of the Intergovernmental Maritime Consultative Organisation and International Civil Aviation Organisation.

The third category of government responsibility which may be considered suitable for functional provision is in regulating those activities which if reserved exclusively to one State, will undermine international confidence in the peaceful intentions of that State. As Mitrany expressed it in his 1932 Progress of International Government

> "We have reached a point in communal life where the material forces at our disposal threaten to escape our control and to warp the very civilisation that they were meant to enhance."[32]

Subsequently, in 1971, Mitrany made specific reference to the threat of nuclear proliferation as an example of this ambivalent potential of technological innovation. Furthermore, he described the proposal for a Non-Proliferation Treaty with technical assistance guarantees for States renouncing the acquisition of nuclear weapons, as a

> "... strictly functional answer to the problem of nuclear control."[33]

We are here concerned with a public or shared good of a rather different nature from the tangible products of international

co-operation in the realms of medicine or social infrastructure. Certainly in the case of the atomic energy industry there is a tangible product of co-operation. This is evidenced in the provision of technical assistance for economic development. However, as will be shown with respect to the development of safeguards , the depth of the Functional approach lies in the provision of a comprehensive regulatory regime. By this means not only is the functional responsibility directed towards the provision of a public good, it is also concerned to uphold the integrity of the assistance provided, by making allowance for the manner in which each recipient utilises the aid so provided.

The second stage of Mitrany's argument is to establish the specific criteria upon which the appropriate international organisations may be founded.

> "The functional approach emphasises the common index of need. Very many such needs cut across national boundaries, not a few are universal, and an effective beginning for building up an international community of interest could be made by setting up joint agencies for dealing with these common needs."[34]

Mitrany defines such international organisations as;

> "... institutions called into being by agreement between several or more Governments, in order to benefit mutually by continuous co-operative action along specific lines, or by the continuous regulation of certain international activities."[35]

Mitrany further characterises such organisations as

> "executive agencies with autonomous tasks and powers."[36]

That is to say autonomous of the Member States, yet executing their agreed and duly assigned mandate. By this means a specific and realistic step is taken towards establishing a form of international co-operation which is in no way dependent upon any prior commitment to co-operation in other fields. In so doing Mitrany argues that;

> "... by linking authority to a specific activity to break away from the traditional link between authority and territory."[37]

He continues;

> "By entrusting an authority with a certain task, carrying with it command over requisite powers and means, a slice of sovereignty is transferred from the old authority to the new; and the accumulation of such partial transfers over time brings about a translation of the true seat of authority."[38]

Throughout his argument Mitrany is extremely careful to establish that at all times the "partial transfers" mentioned above, are only possible with the willing consent of each State involved. Mitrany's characterisation of international organisations as "... executive agencies ..." with "... autonomous ..." tasks and powers has been noted. Elsewhere he proposes;

> "to transfer strictly limited parts of that sovereignty to international agencies entrusted with specific and carefully defined activities."[39]

and continues;

> "... To such willing transfers of sovereignty - or abridgement of national sovereignty - there is no limit except that set by our political maturity."[40]

Lest any ambiguity should attend the suggestion that international organisations shall only acquire powers by consent, Mitrany explicitly argues that the limits of functional co-operation are set by the overriding need to;

> "bind together those interests which are common, where they are common, and to the extent to which they are common."[41]

This subject shall be more fully examined in the next section of this thesis in which the principal critiques of Mitrany's argument will be examined.

What has been suggested in the foregoing is an essentially static phenomenon, descriptive of the legal basis upon which functional organisations may be established. The third stage in Mitrany's argument is the dynamic process whereby those initial powers are actually translated into programmes of international co-operation.

As has been shown immediately above, Mitrany clearly indicates that the initiative for this process rests with the State authorities concerned. Some authors have characterised this dynamic element in the development of the international organisation's responsibilities as "task-expansion".[42] This refers to the identification of a trend towards the transfer of increasingly significant powers to the international organisation concerned, vis-à-vis the residual rights of the Member States. However, problems arise in further defining so-called "task-expansion."

The several functions of the international organisation may be reduced to its component parts, activities, or tasks.

Sewell defines 'tasks' as ...

> "... international organisation assignments accorded by explicit decision of the member governments or assumed by the thrust of international organisation officials."[43]

Task-expansion may therefore be defined as the successful development of those component activities which, combined, constitute the functional responsibilities of the organisation. By emphasising in this definition the importance of successful development, task-expansion is being used as an ex post facto description of a successful political process to implement international organisation mandates. By this means it is hoped to avoid the potentially teleological, and almost mystical, use of "task expansion" as both a process and an objective. This would appear to be present in Haas's usage. As Cox himself asks;

> "... is a real task expansion in progress or is it rather an inflation of expectations which may be followed by disillusionment from lack of performance?"[45]

The answer to this problem is to restrict use of the term, task expansion, to the circumstances of its adjudged ex post facto attainment. This is consistent with Sewell's definition of organisational "tasks" being "assignments accorded by explicit decision of the member governments."

Only thereafter does Sewell make the quite separate suggestion, which is unsupported by Mitrany, that these tasks may also be "assumed by the thrust of international organisation officials."[46] Clearly the distinction being made here depends entirely upon the interpretation that is made of the organisations autonomy. A distinction can be made in Mitrany's argument between the political-constitutional foundation of the proposed organisation, and its technical - operational activity.

In the scheme described above, the former may be seen to lie within the discretion of the Member States. The latter, operational element, is vested in the governing body of the organisation. However as will be shown in discussion of Haas, Claude, Sewell et al, and as will be examined in detail in the Statutory basis of the I.A.E.A., the government of these organisations is clearly vested in a Board of Governors composed of State representatives. This is not to deny the international civil servants employed within each organisation scope for initiative in developing the programmes of their agency. Rather, it is to emphasise that Sewell's "task-expansion" can only occur within the bounds set by Mitrany's "strictly limited" transfer of sovereignty for the pursuit of "specific and carefully defined activities."[47]

Authority without sanctions to enforce rules and impose penalties is no real authority. Rather it is merely an appeal to good conduct. Thus, despite the voluntaristic basis of functional co-operation suggested above, Mitrany also argued that international organisations must be endowed with some form of sanctions. He suggests that

> "... they could be used very properly and effectively as the first line of action against

> those who are causing trouble. They could apply such preventive sanctions more effectively than if this were to wait upon the agreement and action of a number of separate governments; and they could do so as part of their practical duties, and therefore with less of the political reactions caused by political action."[48]

Clearly aware of the failures of the League of Nations in response to the Italian invasion of Abyssinia, Mitrany was careful to avoid suggesting sanctions of the type attempted then. Economic sanctions under the discretionary control of States may be victim to self-interested laxity. Nonetheless, Mitrany's scheme is highly ambiguous and subject to criticism. Firstly, it must be assumed that he intended these sanctions to fall under the autonomous scope of the organisation's technical-operational activity. However, for that very reason it must be considered unlikely that the Member States would consent to establishing an agency with such powers. Therefore it must be assumed that the sanctions available under the technical-operational autonomy of the agency would be slight. This will of course be examined later in this thesis with particular reference to the I.A.E.A. A second objection to this scheme for functional sanctions is a logical flaw derived from the nature of functional co-operation established in the preceeding stages of Mitrany's argument. If functional co-operation is held to depend upon the collaboration of all participants, how can sanctions avoid damaging all participants? It would be a perverse, and hence unrealistic, scheme which by cutting off the individual nose served only to spite the collective face. The basis of such sanctions can therefore only be to inflict differential damage. That is, to inflict greater costs upon the ostracised State than the expulsion of that State can bring upon the work of the organisation from which it is expelled.

The fifth stage in Mitrany's argument concerns the creation of incentives for States to abjure the use of force in the conduct of international relations. In one sense this may be viewed as a product or outcome of the four stages set out above. However, this

begs a certain methodological question concerning Mitrany's argument that structural changes in the organisation of the international system can induce behavioural changes on the part of the system's participants.

Mitrany argues that structural change, that is, the foundation and growth of international organisations, will produce a behavioural change, namely, a reduction in the use of force between States. However, it might be objected that, on the contrary, the foundation of functional organisations requires, a priori, an acceptance by States of the inadmissibility of the use of force. The fuller explanation of this paradox is more appropriately discussed in the next section of this Chapter where the several tautological and teleological elements in the functionalist argument will be examined together. At this stage it need be noted that from Mitrany's argument it has been established that the initial decision to proceed towards a Functional solution, is in itself a political decision. Furthermore it is a political decision taken upon the basis of identifying a single, specific instance in which it is possible and desirable for States to co-operate. This does not therefore pre-suppose amicable relations between States outside that specific shared interest.

Mitrany's argument that the successful Functional organisation of services will reduce the use of force between participants, is based upon an appreciation of enlightened self-interest. If State authorities come to increasingly rely upon the technical and welfare services of functional organisations, in order to satisfy the aspirations of their citizens, then each government will become vulnerable to the dislocation of those services, in so far as it wishes to fulfil domestic political objectives. This dislocation may derive from the consequences of any one member attempting to use force to secure exclusive national control over the resources being used collectively. Alternatively, dislocation may be imposed upon an individual member in the form of those sanctions referred to above. In either case each individual State is therefore provided with a strong incentive to maintain solidarity with its fellows and maintain the provision of Functional services.

Mitrany bases his argument upon a re-definition of the concept of security. Rather than restricting his use of the term to mean, conventionally, military security, derived from the deterrent capability of an equivalence, or superiority of arms , he extends it to refer to the social security of economic welfare. He makes a distinction between so-called "positive security" and "negative security."[49] The unfortunate, tendentious, vocabulary need not concern this exposition . The analytical distinction to be made is between his categorisation of "negative security" to mean security based upon the use of force, monopolised by the State, and "positive security", by which he refers to the social-welfare benefits derived from co-operation. The first is a fixed, or zero-sum concept. The latter is a variable or mixed-sum concept. That is to say that one State's possession of the resources of territory or military capability can only be increased by reducing those available to other States; or by establishing superiority over others. This competitive view of security is "the struggle for power" in its social-Darwinist and familiar Morgenthau like form.[50] "Positive security" is variable-sum in the sense that the increased security of one State is not acquired at the cost of denying or overawing another, for it derives from enlarging the cake rather than taking a larger slice . On the contrary, the security of all is enhanced.

In a seminal passage from A Working Peace System he argues that the distinction he suggests would reveal;

> "not a peace that would keep the nations quietly apart but a peace that would bring them actively together, not the old static and strategic view but a social view of peace. One might say that we must put our faith not in a protected peace but in a working peace; it would be nothing more or less than the idea and aspiration of social security taken in its widest range."[51]

Mitrany does not go so far as to suggest that "positive security" may provide an entirely adequate alternative scheme. Neither does he deny the necessity for each State to maintain military forces. In this Mitrany may be distinguished from several contemporary writers such

as Angell, Arnold Forster and Woolf, who advanced an otherwise very similar analysis of the limitations inherent in an exclusively military concept of security.[52]

Mitrany considers the maintenance of military forces to be "... something indispensible but also as something incapable by itself of achieving the peaceful growth of international society."[53] Specifically, writing in 1943, he advocated the formation of regional military security pacts, and their subordination to the directives of the U.N. Security Council.[54] With hindsight such a scheme may appear wholely inadequate, but it was advanced as something conceivable at the zenith of Grand Alliance expectations.

Mitrany's analysis of the costs of war is therefore essentially rationalist and utilitarian. In this he followed Angell's most significant contribution, The Great Illusion (1911).[55] The illusion to which Angell referred was the belief that the national interest, measurable in Gross Domestic Product, could be improved by war between advanced industrial societies. With terrible accuracy Angell predicted the economic and human costs of war conducted by attrition, evidenced not only in the actual conduct of the Great War, but also in the self-defeating pursuit of traditional 'zero-sum' vengeance which followed it. An example may be seen in the consequences upon employment both in Germany and the U.K. of imposing reparations payments in cash and kind; consequences which were subsequently analysed by Keynes in his explanation of the post war depression.[56]

Mitrany's The End of Morality in War, draws particular attention to the de-humanising consequences of increasing reliance upon technically sophisticated weapons systems. He cites the deliberate destruction of civilian resources, and, ultimately, the civilian hostage-taking upon which M.A.D. nuclear weapons strategies are based.[57]

These may be taken to illustrate the argument that even if at times the potential gains from co-operation may appear nebulous, the costs of resort to the use of force are inexorably rising. This is due

to both the sophistication of military technology, and the consequent brutalisation of moral scruples concerning their use.

In arguing that Mitrany's stand is that of the utilitarian rather than the moralist-pacifist it is essential to conceive of Functionalism as a choice between alternatives. He does not argue that successful Functionalism will make war impossible between States, although he does suggest that vigorous sanctions will make it more difficult. His argument is more simple and realistic, that if the benefits of co-operation may be improved, and, due to technological advances, the costs of war made greater, then the choice between the alternatives will lead governments increasingly to favour co-operative solutions.

1.3. Critique

1.3.1. Functionalism and Ideology

It is appropriate to introduce this evaluation of the Functionalist argument with some clarification of the explicitly ideological basis of Mitrany's writing. Firstly this fulfils the requirement of the behaviouralists' claim that in the absence of such a statement much of the traditionalist literature rests upon implicit ideology disguised as common sense.[58] Secondly, a clarification of this kind serves to introduce, and hopefully to answer, a substantial criticism made of Mitrany's argument; that it rests upon an overly simple assumption that a separation can be effected between politics and the non-controversial fields of Functionalist endeavour.[59] Thereafter this evaluation will consider some of the other criticisms made of Functionalism, drawing particular attention to those controversies highlighted in the presentation above. These concern the presumed ability of State authorities to transfer sovereignty to functionally specific international organisations; the relationship between idealism and national interest in State policy with regard to such organisations, and finally, to certain arguments concerning determinism and teleology which are advanced by some critics.[60]

Mitrany's argument is steeped in the liberal - democratic tradition. In the words of one critic, it is

> "... firmly rooted in nineteenth century rationalism and radicalism with its background of growing material prosperity and the eradication of social evils."[61]

In Mitrany's own words, Functionalism rests upon ...

> "... the most characteristic idea of the liberal democratic philosophy, which leaves the individual free to enter into a variety of relationships, religious, political and professional, social and cultural each of which may take him into different directions and dimensions, some of them of international range."[62]

Most precisely Mitrany may be considered as a "New Deal" Democrat, to whom Roosevelt's administration, and in particular the creation of the Tennessee Valley Authority, provided an inspired and sustaining example.[63]

Mitrany's identification with the liberal rather socialist tendency in the promotion of social welfare, is further evidenced in his latter-day condemnations of state-planning of the nationalist and socialist variety; also his criticisms of the alienation of popular democratic control over national administrations and bureaucracy.[64] At this juncture it might be suggested that such developments are predictable within the logic of Functionalism. Mitrany for his own part protected himself against such a suggestion by putting forward a formal institutional model for the democratic control of Functional organisations. This will be more appropriately discussed below in the second section of this critique. A prior question concerns the implications of Mitrany's explicit liberalism. Can the Functional argument set out above offer any scope for encouraging international co-operation among the great, and increasing, majority of the world's one hundred and fifty plus, independent States which do not honour the code of European liberalism?

The liberal perspective does not necessarily restrict

co-operation between States solely to those sharing that system of government. It does however suggest that it will only be possible to pursue co-operation between States with different political ideologies to the extent that certain values and objectives will be common among them. Functionalism can therefore only appeal beyond the liberal - democracies, conventionally the O.E.C.D. region , by its identification with actual, or most crucially, declaratory, universal values.

At this stage it would be helpful, and would perpetrate no great injustice to the development of the argument, to exclude a certain category of State from the discussion. Although a disheartening variety of regimes in the authoritarian tradition have come to power in the Third World since 1947, a very small minority of such regimes, for example Amin's Uganda, Pol Pot's Democratic Kampuchea (sic.) and Macias Nguema's Equatorial Guinea , have sunk to near-Nazi levels of organised, dehumanised brutality. In these countries it would be quite pointless to seek evidence of any sincere commitment to the values of Welfarism and Developmentalism which it is possible to identify as common values among the liberal, communist and various charismatic-authoritarian regimes comprising the remainder of the world's States. Welfarism may be taken to refer to the basic humanitarianism which, as noted above, provided the initial inspiration for the foundation of nineteenth century public international unions. Then the concerns were to establish an effective legal regime to counter piracy, and the drugs trade, and to establish rudimentary controls upon the spread of contagious diseases. The contemporary field of 'welfarism' embraces the work of the major U.N. Special Agencies.

The World Health Organisation, Food and Agricultural Organisation, and U.N.E.S.C.O. as well as other U.N. bodies, the U.N. High Commission for Refugees, and U.N. Relief and Works Agency, are all concerned to promote basic standards of nutrition, health care and literacy, as well as to furnish specific aid for disaster relief.[65]

Developmentalism, or simply economic development, refers to the universally declared objective of raising measurable standards of economic performance in the so-called Third World of Africa, Asia and Latin America. As with Welfarism, the pursuit of economic development involves both the traditional Specialised Agencies, such as the I.M.F. and the International Bank for Reconstruction and Development (I.B.R.D.), U.N.I.D.O., and the I.L.O. and the second generation of multi-lateral, standing conference diplomacy, as represented by U.N.C.T.A.D., the Regional Economic Commissions and the greatly expanded role of the G.A.T.T. [66]

The claim that these two objectives may be derived from universal values, is based upon near-universal membership of the relevant U.N. Agencies, and through the contributions made by those members to technical assistance provisions. A closer analysis of the funding of these organisations might well reveal that the commitment of many members is more declaratory than substantial. It may also reveal that considerations of national interest are crucial in promoting certain Welfarist and Developmentalist programmes. [67]

However, it must be emphasised that these considerations do not repudiate the Functionalist element. The politics of the lowest common denominator is not incompatible with the search for universal values ; furthermore, it is Functional in the pragmatic, Mitranian sense. Welfarism and Developmentalism therefore constitute the lowest common denominator of interests, by which it is possible for Functionalism's explicit liberalism to be endorsed by non-liberal States. As will be demonstrated below, this does not preclude an assymetry of commitment by different States, particularly in regard to non-governmental organisation participation . Before then, understanding the liberal basis of Functionalism will assist a further clarification of the second major critical issue, the separability of Functionalism and politics.

1.3.2. Functionalism and the Separability Problem

Claude, in his critique of Mitrany, draws attention to what he terms the 'assumption of separability-priority.' [68] By this he means

the assumption that potential Functional issues may be separated from political issues, and thereafter given priority over the political. Claude appears to make a self-fulfilling distinction between Functional, meaning consensual and above politics ; and politics, meaning the pursuit of sectional interests through the manipulation of power. In this Claude, and later Haas, would appear to be attributing to Mitrany a more naive distinction than he himself actually made.

The interpretation of Mitrany's argument that is being advanced here is that the basis of Functionalism is voluntary in the initial decision to co-operate. That is to say that it is a political decision, an exercise of sovereign rights by the government of each State. The element of ambiguity arises in the interpretation that is made of what constitutes politics . It is suggested here that Mitrany's argument utilises two different meanings of politics. First there is the constitutional - legal and formal sense. Secondly, and this becomes crucial in Haas's critique, there is the more vulgar Lasswell tradition; politics is 'who gets what, when, and how?'

Mitrany declares in his 1975 Retrospect and Prospect, that,

> "Everything is 'politics' in the realm of public action."[69]

Also, that in relation to the conduct of policy making;

> "'Politics' would remain as now the debate for deciding grand policy and priorities in general and for the guidance and co-ordination of functional activities in particular."[70]

It is clearly impossible to expect Claude, Haas et al. to consider this explicit clarification made by Mitrany in 1975. However such a distinction is implicit in the liberal tradition, evidenced in earlier works. Furthermore, as will be shown below Mitrany's widely scattered writings do contain, in fragments, a five-part institutional framework to regulate the very distinction that Claude suggests between the constitutional and Lasswellian traditions.

What is really at issue is not the separability of Functionalism

from politics , but a particular aspect of this problem. More precisely the basis of Claude's scepticism concerns the separability of power from welfare.

Claude argues;

> "Functionalism proposes not to squelch (sic) but to utilize national selfishness."[71]

> "... it asks government not to give up the sovereignty that belongs to their people but to acquire benefits for their peoples which were hitherto unavailable, not to reduce their power to defend their citizens but to expand their competence to serve them."[71]

J.P. Sewell suggests that Functionalism rests upon the necessity of inducing State authorities to offer mutual concessions to secure mutual gains.[72] Or, as Cox so succinctly notes, Functionalism ...

> "... promises something of the realism of Machiavelli in the service of the ethically commendable goals of peace with social progress."[73]

It may therefore be suggested that as with the separability of Functionalism and politics, the separation of welfare and power is a matter of relative emphasis. As Mitrany observed ...

> "... it is better to put the stress on welfare and to use power for the purpose of creating and controlling organisations based upon welfare needs, than to subordinate welfare to the requirements of power."[75]

Just how Mitrany believed that this could be effected is the subject of the next section.

1.3.3. Functionalism and the Control of International Organisations

Mitrany's writing contains a series of distinct proposals for the regulation of Functional organisations. These concern not only regulation by State authorities, but also proposals for elementary

democratic accountability, involving the creation of representative assemblies and a role for non-governmental organisations.

Mitrany addresses the "habitual assumption" that international action must have some overall political authority above it. He asserts that "... it is the central view of the Functionalist approach that such an authority is not essential for our greatest and real immediate needs."[76]

Instead, the five part scheme he suggests, although diffusing the sources of influence under rubrics of advice and consultation, places the locus of power firmly within the hands of the Member States of each organisation.

First, Mitrany suggests that the national governments chiefly interested in each organisation should make specific agreements between themselves concerning the scope of functional co-operation. He suggests that such an agreement would contain a grant of "... requisite powers and resources."[77] Secondly, any new initiatives, or reconsideration of existing arrangements could be undertaken "... only in council by all of the governments concerned."[78] These two principles are conventionally enshrined in respectively the Statute, and General Assembly, common to all Specialised Agencies. There is a suggestion of a unanimity requirement in the second of Mitrany's forms of control. As will be shown, this is contradictory to other of Mitrany's ideas. The inconsistency will be discussed shortly.

Thirdly, Mitrany suggests that the creation of,

> "... some body of a representative kind...elected by proportional representation from the assemblies of the Member States ... would watch over the policies of several joint agencies."[79]

However, this assembly would serve only "... as an expression of the mind and will of public opinion." Therefore, "... it would not actually prescribe policy, as this might turn out to be at odds with the policy of governments."[80] In order to press any particular line

of action, this would have to be pursued through the policy making process of each Member State. Mitrany refers to the principle of "functional parliaments" drawing membership from expert opinion which might use knowledge and direct interest on behalf of the community at large. An example of such a "functional parliament" would be the tripartite participation of government, employers and Trades Unions in the Governing Body of the International Labour Organisation.[81]

Mitrany rejects the creation of any supra-national parliamentary body. Rather, he suggests as a fourth form of control, the use of non-governmental organisations "... for the development of an informed international opinion in certain fields."[82] He proposes that non-governmental organisations would be involved in a two-way flow of representation and consultation between the public, and the functional organisations concerned. In this, Mitrany clearly overestimates the extent to which all governments are prepared to tolerate the "... development of informed international opinion ..." among non-governmental and, by implication, transnational associations of their citizens. The example of the I.L.O. is indeed an unfortunate one, this organisation having been troubled for many years by the legitimacy of independent Trades Unions' representation, from firstly, corporatist Italy, and subsequently the U.S.S.R. and other East European communist States.[83]

Therefore Mitrany's scheme would appear to rely very heavily upon the degree to which the representatives of the Member States' national assemblies could advance the 'universal' elements of welfarism and developmentalism. The I.L.O. remains the only one of the U.N. Specialised Agencies to have introduced this rudimentary 'parliamentary' element. However, the development of close relations and professional collaboration between intergovernmental agencies and non-governmental organisations is substantial and expanding. This has has occurred by granting consultative status to non-governmental organisations in the U.N.[84] This also occurs through the development of what Groom and Judge call "networks," a phenomenon also discussed

by Keohane and Nye. That is, regular, multi-lateral meetings and joint programmes.[85]

In the fifth of his proposals Mitrany addresses the central issue of encouraging Member States to forgo certain of their traditional rights of sovereign equality in favour of a pragmatic interpretation of self-interest, which he refers to as "functional equality."

In the development of the international political system since the Treaty of Westphalia, state equality has become established as a formal principle in international law. However, Mitrany argues that whereas equality before the law for the individual citizen stands as a guarantor of a liberal and democratic order, sovereign equality for all States obstructs the attainment of those benefits only fully realisable through Functional co-operation. Functionalism is based upon the pursuit of common interests between States, but not all of those interests need be common to all States, the problem therefore is

> "to find an arrangement which would show a measurable and acceptable relation between authority and responsibility, which would exclude no participant arbitrarily from a share in authority, while bringing that share into relation not to sheer power but to the weight of responsibility carried by the several members."[86]

In the same way that the citizens of democratic countries do not object to a specific and revokable increase in the powers of the executive in times of war or catastrophe, so, Mitrany argues, smaller States would not object to the executive powers of functional international organisations departing from the principles of sovereign equality in order to obtain specific benefits.

> "Instead of the legal fiction of equality there would thus be an evident and factual inequality in certain spheres springing from real differences in capacity and interest with regard to some specific function but also limited to that function."[87]

The dignity of the State need in no way be offended by such an arrangement; Mitrany continues,

> "... it is not the State that would be placed in a position of general inferiority, but only a particular service in so far as it was actively inferior. The position of inferiority would be factual and partial as it would be changeable."[88]

In this way each State is free to choose between the gains of retaining, undiluted, the advantages of traditional sovereign equality or embracing the advantages of a Functional or "working equality."[89] In this sense the five part system of control that Mitrany outlines combines several competing principles which Claude identifies in previous schemes to regulate international organisation.

> "... the equalitarianism of traditional international law, the majoratarianism of democratic philosophy and the elitism of European great power diplomacy have been transferred to the sphere of international organisation to serve as competing elements in shaping the approach to international decision-making."[90]

Functionalism draws from all three of these traditions, yet one basic right of the State remains undiminished, both in principle, and in the constitutional practice of the U.N. Special Agencies. The State may withdraw from membership of any functionally specific international organisation. Participation can only proceed upon the basis of consent, in this sense, the burden of proof lies with the organisation to demonstrate its utility to the Member States.

This scheme concerns the regulation of international organisations by the governments of the Member States. Mitrany also recognised that some element of co-ordination between functional agencies may be necessary. He proposed that with a related group of agencies, such as those concerned with transport, telecommunications or basic health, it might be necessary to establish "... a superior executive agency" to arbitrate upon disputes between different agencies. In an ambitious proposal he also suggested the major investment decisions of the functional agencies might be co-ordinated to encourage orderly international financial affairs.[91]

In this context it is worth recording that A Working Peace System was written at the time that planning for the post war recovery was being actively considered in the U.S. and U.K. The Bretton Woods Conference of 1944 was later to consider the Keynes Plan to establish, in effect, an international central bank. Also it was widely anticipated that an International Trade Organisation would be established at the core of the U.N. system. The same spirit of Congressional protectionism which ensured the adoption of Harry Dexter Wright's less ambitious proposals over the Keynes Plan also destroyed the creation of an I.T.O.[92] Mitrany's suggestion of Keynesian style counter-cyclical budgeting applied to the international system illustrates well both the originality and in this instance the over-ambitious optimism of the approach.

1.3.4. Functionalism and Determinism

A fourth, major path of criticism, particularly associated with Haas, Sewell, and Pentland concerns those elements of teleology and determinism which characterize Mitrany's work. Also, and this is the core of Haas's critique, the suggestion is made that Mitrany's scheme lacks a sufficiently rigorous theory of change whereby the objective conditions of the international system may be transformed in accordance with Functionalist expectations.[93]

Haas identifies an over reliance upon an implicitly teleological process of technological self-determination. It is as if Mitrany relies upon a self-evidential 'force of events' to provide the impetus for Functionalist progress,[94] a process that Pentland describes as "... rather dubious, deterministic social organicism ...".[95] At first sight the record would support these observations;

> "The functional dimensions as we have seen determine themselves. In a like manner the function determines its appropriate organs. It also reveals through practice the nature of the action required under the given conditions, and in that way the powers needed by the respective authority. The function one might say, determines the executive instrument

> suitable for its proper activity, and by the same process provides a need for the reform of the instrument at every stage."[96]

However, the preceding account has established the liberal and voluntary basis of Functionalist initiatives. It would be inconsistent for Mitrany to abandon these principles in favour of investing his faith in some deterministic process to carry Functional initiatives to their fruition. It would be more consistent to suggest that Mitrany's evident enthusiasm for technological innovation is more appropriately an optimistic expectation of future developments. If the Functionalist objective; the working peace system, could be created by the force of technological innovation, and reveal an imminent community of international co-operation, there would be no need of the elaborate critique of stubborn sovereignty discussed above.

As Pentland notes,

> "In explaining the dynamics of change the functionalists tend to shift back and forth between faith in an inexorable impersonal technological self-determination and exhortations about the needs for new attitudes and political will...they seem torn between the fear of determinism and the desire for a potent theoretical tool."[97]

Mitrany is by no means alone in confronting the problems posed by attempting to regulate, by political means, a rapid and exogenous transformation of technology. The problem is as old as the industrial revolution itself.

In one recent and popular approach, Toffler goes so far as to propose the creation of "social future assemblies" comprising technical experts. Williams offers a wide ranging comparison of 'optimistic' and 'pessimistic' approaches to the problem.[98] The dilemma that Pentland identifies may be clarified, and evidence of Mitrany's optimistic rather than deterministic response can be seen in Mitrany's interpretation of democracy.

Sewell identifies a concept of "felt needs" underlying the "human element" of the Functionalist approach.[99] He means that the "needs" identified as suitable for Functionalist solution, are the common-sense needs of the population for material and social progress. This concept of "needs" is present in the social welfare objectives of the governments which participate in the work of Functional organisations, and, although imperfectly, it is present in the system of control, including "functional parliaments" and non-governmental organisations discussed above. The source of Mitrany's theory of change lies clearly in the popular demand for the satisfaction of social welfare aspirations. In the parliamentary democracies this is expressed through the election of governments pledged to pursue such policies, if necessary through international co-operation. Whilst even in authoritarian States, both fascist corporatism, and communist collectivism, have in their various ways espoused the pursuit of these goals, with reference to the popular will, which Talmon has characterised as "totalitarian democracy." [100]

This is related to Haas's fundamental yet ultimately misplaced criticism of the Functional approach. In particular he belabours Mitrany's supposed inattention to interest group politics. Haas argues that the only viable alternative to a teleological faith in the force of events promoting Functionalist change, is to demonstrate a theory of change based upon "learning". To Haas this means demonstrating a response to the promotion of "interests" defined as "... every group-backed demand that enters the market place of political competition."[101] Haas attributes to the Functionalists the proposition that;

> "... conflicts can be creatively transcended without self conscious sacrifice."[102]

This, misplaced, attribution then leads Haas to demonstrate that Functionalism must rely upon some transcendental process to promote the resolution of conflict between States. Haas then duly explores Satyagraha, and other Ghandian approaches to "creative transcendence."[103]

Functionalism certainly bases its objectives upon the identification of interests which transcend the traditional national interests of the Member State participants in international organisations. However, as has hopefully been demonstrated in the foregoing account, it cannot be suggested that these interests are anything other than 'group backed demands that enter the market place of political competition.' Furthermore, it has been demonstrated that in no way is their translation into programmes of international co-operation expected to be achieved by the creative transcendence of conflict without self conscious sacrifice. In Mitrany's scheme the resolution of conflicts of interests between groups is to be achieved within the elaborate framework of democratic participation discussed above. The resolution of conflicts arising between States is to be achieved through the framework of consultation and negotiation, also established to control the activities of each functional international organisation. In this, as has also been shown, each State retains the right, and the sanction, of withdrawal if it is judged by the authorities that the diminution of 'traditional' sovereignty exceeds the benefits of continued membership.

The seminal quotation from Mitrany's work which affirms this interpretation may be appropriately used to conclude this Section.

> "The essential principle is that activities would be selected and specifically organised separately, each according to its nature, to the conditions under which it has to operate, and to the needs of the moment ..."

Only in this way would it be possible to proceed towards ...

> "... binding together those interests which are common, where they are common, and to the extent to which they are common."[104]

1.4. Propositions for Research

The preceding parts of this Chapter have attempted to introduce, analyse and clarify the bases of Mitrany's Functionalist approach. It

should now be possible to restate, succinctly and plainly, the five parts of Mitrany's argument. This, in the form of propositions which may be qualified or refuted in accordance with those objectives of research discussed at 1.2 .In Chapter Two a set of technical criteria, pertaining to the development of I.A.E.A. safeguards, will be suggested, by which it will be possible to evaluate the particular case study made in this thesis.

1. The basis of functional co-operation may be said to rest upon the following proposition.

> "Functionalism proposes that it is possible to identify responsibilities of national government in the field of welfare and technical administration that can be more efficiently organised through inter-governmental co-operation."

2. It is furthermore suggested that this opportunity for inter-governmental co-operation can be best promoted by the foundation of a particular variety of international organisation.

> "Functionalism proposes the foundation of inter-governmental organisations each mandated to undertake the specific, and limited responsibilities assigned to it by the express instruction of the Member governments. Provision will be made for consultative status for non-governmental organisations and for parliamentary representatives of the Member States. The mandate will also bestow upon the organisation limited powers of executive discretion in respect of technical administration."

3. The initial grant of powers contained in the organisation's mandate does not imply their immediate implementation. Indeed, the implementation of these powers, as concrete programmes of international co-operation, is the objective of the organisation's development. Implementation of this mandate involves, fundamentally, the extension of the organisation's political authority, vis-à-vis that of the Member States.

> "The authority of the organisation will be extended by the Member States consenting to be bound by such rules and operating procedures as may be adopted by the organisation in furtherance of its mandate."

4. Membership of each functional inter-governmental organisation is voluntary. However, in order to uphold the authority of the organisation among its members, the organisation needs to be able to impose sanctions on rule-breaking members.

> "Functionalism proposes that each international organisation be endowed with enforceable sanctions by which means those Member States which act in breach of the rules and procedures of the organisation may be penalised. These sanctions will take the form of debarring the State from the benefits of membership."

5. Finally, with regard to the objective of encouraging the development of peaceful relations between States,

> "Functionalism proposes that the successful implementation of each organisation's mandate will create positive incentives for each Member State to refrain from the threat or use of force in the conduct of relations with other Member States."

Footnotes to Chapter One

1. The term "approach" is used here to avoid premature discussion of the status of Functionalism as a theory of international relations.

2. Mitrany, D. A Working Peace System; An argument for the Functional Development of International Organisation, London, R.I.I.A., 1943.
First published as a Chatham House paper, this essay was reprinted in 1966 as one of several essays in a volume of the same name; A Working Peace System; Chicago, Quadrangle, 1966.
A second volume of collected essays, including some previously unpublished, was published as The Functional Theory of Politics; London, Martin Robertson/L.S.E., 1975.
Other works by David Mitrany which illustrate the development of his approach include the following, where reprinted in one of the above collections, the works below are indicated thus "(and 1966)" or "(and 1975)". In subsequent references to these many essays each will be indicated when possible by its location in one of the two volumes above (in most cases the only place currently in print).
'The Progress of International Government; London, Allan & Unwin, 1933 (and 1975 pp 85-104)
Territorial, ideological or functional international organisation; Foreign Office Paper 1941 (unpublished) (and 1975 pp105-122)
"The Functional Approach to World Organisation"; International Affairs, London, Vol. 24, No. 3, 1948. pp.350-361.
"An Advance in Democratic Representation" International Associations; Brussels, March 1954 (and 1966 pp121-126)
"The Prospect for European Integration; Federal or Functional" Journal of Common Market Studies, Vol. IV, No. 2, December 1965 pp. 119-149. (and 1966).
"The Making of the Functional Theory" 1969 unpublished, (and 1975 pp 3-46.)
"The Functional Approach in Historical Perspective" International Affairs, London, Vol. 47, No. 3, July 1971. pp.533-543.
"The End of Morality in War" International Relations, London, Vol. IV, No. 4, November 1973, (and 1975, pp.231-238).

3. See Groom, A.J., and Taylor, P., Functionalism, London, London University Press, 1975, p.1.
See also Taylor's "Introduction" to Mitrany, op.cit. 1975, pp. ix-xxv.
Also Taylor, P. and Groom, A.J., International Organisation, London, Frances Pinter, 1978, Ch. 1. pp.11-27.
A particularly good general critique of Mitrany's work may be found in Claude, I. Jnr; Swords Into Ploughshares, New York, Randson House, 1964, 3rd Ed. Ch. 17. pp.344-368
More specialised critiques are introduced below, see footnotes 14, also 42.

4. Groom and Taylor, op.cit., 1975, p.2.

5. Mitrany, D., "Retrospect and Prospect" from op.cit., 1975, p.262.

6. Taylor, P., International Co-operation Today, London, Elek, 1971, p.59.

7. Tooze, R., "The Progress of International Functionalism", British Journal of International Studies, Vol. 3, No. 2, 1977, p.210.

8. Mitrany, D., op.cit., 1975, p.262.

9. ibid. pp. xx-xxiv.

10. This point is pursued by Pentland, C. International Theory and European Integration; London, Faber, 1973, p.79. See also below, notes 93 and 95.

11. See in particular
Woolf, L., International Government, London, Allen & Unwin, 1916.
Also his (ed) Intelligent Man's Way to Prevent War; London, Gollancz, 1933, especially his introduction, also the essay by Lord Robert Cecil.
Also, Angell, N., The International Anarchy; London, Heinemann, 1912.
And his "Educational and Psychological Factors" from Woolf (ed) op.cit. 1933.

12. Carr, E.H., The Twenty Years' Crisis 1919-1939; London, Macmillan, 1945 (and 1968).
Morganthau, H., Politics Among Nations; New York, Knopf, 4th ed. 1967, esp. pp.3-39.
Other exemplars of this approach include
Niebuhr, R., Moral Man and Immoral Society; New York, Scribner's, 1947.
And from a U.K. perspective Schwarzenberger, G., Power Politics; London, Stevens, Third ed. 1964.

13. It is significant that Hans Morganthau felt able to contribute a constructive "Introduction" to Mitrany's A Working Peace System, 1966 edition.

14. Fred Parkinson's The Philosophy of International Relations; Beverly Hills, Calif., Sage 1977, is a particularly illuminating text on the French and Anglo-Scottish roots of Functionalism, see Ch. 6. pp.91-110.
See also Haas, E., Beyond the Nation State; Stanford, U.P. 1964, Ch. 1-3.pp.3-85 discussed below at Chapter 1.4.4. of this thesis.
See also Taylor and Groom, op.cit., 1978, Ch.11.pp236-252.
Also Pentland, C., op.cit. 1973, and Harrison, R. Europe in Question; London, Allen & Unwin, 1974.

15. Correctly speaking the I.A.E.A. is an autonomous Agency . The significance of this, and an introduction to the Agency, linking its work to the Functional approach will be made in Chapter Two.

16. For example the Universal Postal Union founded in 1874 and the International Telegraphic Union of 1865.
See Bowett, D.W., The Law of International Institutions; London, Stevens, 1964.

17. ibid. pp.2-5.

18. supra footnote 11.

19. For further discussion of this see Waltz, K., Man, The State and War; New York, Columbia, U.P., 1959, Chs. 1-3, pp.1-79.

20. See Angell, N., op.cit., 1911.

21. The concept of "national interest" has of course been the subject of intensive critisism, most notably by Rosenau. However, its validity was wholly accepted by Mitrany and so it is his usage which is liable to criticism. The debate concerning the validity or otherwise of the concept may be followed in Rosenau, J. "National Interest" from The International Encyclopedia of the Social Sciences" New York, Macmillan, 1968, Vol. 11, pps.34-40.
Also Frankel, J. National Interest; London, Pall Mall Press, 1970.
And his Contemporary International Theory and the Behaviour of States; London, O.U.P. 1973, at p.77. Frankel defines 'national interest' as "the most widely used and generally intelligible shorthand description of all purposive elements in foreign policy."

22. This is most strikingly illustrated in Mitrany's reference to the perils of nuclear proliferation. He wrote in his "Epilogue" that, "our nuclear prowess may be putting Olympian thunderbolts within reach of political Calibans." op.cit. 1975, p.268.

23. Mitrany, D., "A Political Theory for the New Society" from Groom & Taylor, op.cit., 1975, p.26.

24. See Bull, H., "International Theory, The Case for the Classical Approach" originally pub. in World Politics, vol 18, (3), pp.361-377. Reprinted with other essay in reply in Knorr, K. and Rosenau, J. Contending Approaches to International Politics; Princeton U.P. 1969, pp.20-38.
See also M. Kaplan's reply to Bull and (more illuminatingly) Vital's rejoinder to both. pp.144-157.

25. See supra footnote 24. Also Aron, R. "What is a Theory of International Relations" from Farrell, J.C. and Smith, A.P. Theory and Reality in International Relations, New York, Columbia U.P., 1967, pp.1-22.
And Dougherty, J.E., and Pflaltzgraff, R.L., Contending Theories of International Relations, New York, Lippincott, 1971,

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26. Frankel, J., op.cit., 1973.
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And Lieber, R.J., Theory and World Politics; London, Allen & Unwin, 1973, Ch. 1. pp.1-17.

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35. Mitrany, op.cit., 1933 (and 1975, p.101).

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37. ibid. p.27.

38. ibid. p.31.

39. ibid. p.95.

40. See Mitrany's revised "Introduction" to "A Working Peace System" from op.cit., 1975, p.128.

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And Haas, E., op.cit., 1964, pp.21-24, and supra footnote 14.

43. Sewell, J.P., op.cit., 1969, p.99.

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45. Cox, R., (ed), op.cit., 1969, p.29.

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47. supra, footnote 39.

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66. ibid. Also Hirsch, F., "Is There a New International Economic Order?" International Organisation, 30; 3; 1976. pp. 521-531.

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73. Sewell, J.P., op.cit., 1969, Ch. 4.

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CHAPTER TWO

Functionalism, Nuclear Energy and Safeguards

2.1. Introduction

This Chapter is designed to fulfil three purposes and is divided into three major parts accordingly. The first objective is to establish the relevance of the intended case study of I.A.E.A. safeguards to the foregoing exposition on Functionalism. In so doing it will soon become apparent that only the most rudimentary definition of safeguards can be offered without some greater understanding of the technical basis of the nuclear fuel-cycle . Therefore, the second part of this chapter will present a summary of the salient technical factors essential to a proper understanding of safeguards—related issues. This will identify the stages of the fuel-cycle at which the diversion of materials to the manufacture of nuclear-weapons is most attractive. These are the stages at which the materials most suitable for weapons manufacture may be removed from the fuel-cycle with both the least risk of detection, and the least risk of physical injury to the perpetrators. This will suggest priorities for the application of safeguards procedures.

Thereafter, a more detailed discussion of safeguards will link together the two preceding parts of the chapter. This third part will conclude with a statement of technical criteria for the effective operation of a safeguards system by an international organisation, taking account of those technical and political issues raised in the preceeding discussion.

In subsequent chapters the development and operation of the I.A.E.A.'s various safeguards systems will be compared to these criteria. This will permit an evaluation of both the achievements and shortcomings of the Agency in this field. These criteria are, in effect, operational standards. The extent to which they are fulfilled or

otherwise , provides the empirical evidence by which it will be then possible to assess the validity of those propositions pertaining to Functionalism stated in Chapter One.

2.2. Functionalism and Nuclear Safeguards

The International Atomic Energy Agency (I.A.E.A.) was founded in 1957. The Agency's headquarters are at Vienna, Austria. Its objective, according to its Statute, is to,

> "... accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world."[1]

The Agency is also bound to

> "... ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."[2]

Thus the Agency is entrusted with a dual mandate to both promote and to regulate the development of atomic energy. The principle means of regulation employed to maintain the distinction between civilian and military uses is the application of safeguards.[3] Safeguards are a system of accountancy and physical controls such as chemical analysis, inspections and surveillance, designed to monitor the flow of all nuclear materials through the nuclear fuel cycle. The objective of safeguards is to detect any unauthorised movement of nuclear materials, and hence deter the likelihood of such attempts by increasing the risks of "timely detection."[4]

Although ultimately derived from the Statute of the Agency, more specifically the application of safeguards arises from the conditions which the Agency applies to its technical assistance programmes. The Agency may also be requested by a supplier-State to apply safeguards to a bi-lateral fuel supply agreement, whether part of an aid programme or a commercial undertaking. Since 1968 the Agency has also been responsible for the application of

safeguards under the Treaty on the Non-Proliferation of Nuclear Weapons, or NPT. The NPT requires safeguards to be applied to all nuclear facilities and materials in those non-nuclear weapons states which are party to the Treaty.[5]

Considered purely as a technical problem it is quite possible for safeguards to be designed and applied by the authorities of each sovereign-State. However, nuclear safeguards can be considered as a responsibility or function of government more suitably discharged by a Functional, international organisation.

The suggestion that the Functional approach may offer a suitable means to regulate the nuclear energy industry is based upon two related factors. The first of these is the ambiguous potential of the industry for both peaceful and military application which has been noted in reference to the Statute. To this may be added the fact that the highly sophisticated nature of nuclear technology, and its North American and European origins, inevitably raise the need for some degree of international co-operation. That is to say, the development of the nuclear energy industry beyond a small elite of countries, must depend upon either the provision of technical assistance, or the encouragement of trade. When these two factors are combined it becomes apparent that the provision of aid and trade facilities must in turn depend upon the potential supplier States having confidence that the recipients will preserve their development of nuclear energy for exclusively peaceful purposes. The sequence of argument whereby a Functional international organisation may come to be considered an appropriate instrument to regulation may therefore be stated as follows; First, States in receipt of I.A.E.A. assistance, and or bi-lateral aid or commercial supplies agree to preserve the use of such materials for exclusively peaceful purposes. Furthermore, States party to the NPT agree to renounce, unilaterally, any intention to acquire nuclear weapons.

Secondly, both categories of States agree that undertaking to adhere, in good faith, to these obligations is an insufficient guarantee

of their compliance.

Thirdly they also agree that inspection by the authorities of the supplier-State alone would be an unacceptable intrusion upon national-sovereignty. This derives partly from a traditional if intangible sense of propriety, and from very real desire to ensure unhindered commercial operations and to preserve commercial secrecy.

Therefore, the States may agree to institute among themselves an independent system of inspection and verification, administered by an international organisation in which both suppliers and recipients will be represented.

The provision of a safeguards system may therefore be considered as a public good in the form of a regulatory framework. That is to say that although the physical product is small, relative to say a hydro-electric scheme , the public benefit so derived lies in establishing a climate of confidence in which welfare and development may be pursued through co-operation. Without adequate safeguards as to the end-use of nuclear materials and facilities, both aid and trade would be inhibited to the detriment of economic growth and development. In this way, although operating in an altogether more sensitive field, I.A.E.A. safeguards may be likened to other low-key functional activities such as immunisation programmes, and international agreements on technical and safety standards.

An investigation of the I.A.E.A.'s safeguarding responsibilities must examine the process whereby the feasibility, acceptability and implementation of safeguards procedures has been achieved. A particular interest is derived from the fact that this process has been both lengthy and controversial. Proposals for some form of regulation by an international authority over the civilian uses of atomic energy were first advanced among the war-time allies in 1945, yet it was not until 1957 that the I.A.E.A. was founded.

The first I.A.E.A. safeguards agreement was negotiated in 1959, but it was not until February 1972 that the first safeguards agreement concluded under the terms of the NPT became effective.[6] Most

crucially, the argument may be advanced that the problems associated with the process of safeguards development, firstly, delayed the establishment of the I.A.E.A., secondly, partly determined its Statutory limitations, and so thirdly, slowed the development of international aid and trade in the field of nuclear energy.

An examination of the process of safeguards development, including those periods of dormant or frustrated activity will therefore enable the assumptions and arguments of the Functional approach to be tested.

2.3. The Nuclear Fuel Cycle

2.3.1. A Note on Terminology

The nuclear fuel cycle is an established concept in the technical literature.[7] However, in two senses it is an inaccurate term to apply to the process whereby nuclear materials may be creatively and peacefully utilised in the production of electrical energy. Firstly, there is no one nuclear fuel cycle, but several, depending upon the type of nuclear material used to fuel one of a variety of reactors. Common stages exist in several of these fuel cycles, to be explained shortly, and the differences between them are of crucial importance to the application of effective safeguards.

A second aspect of the nuclear fuel cycle which requires clarification is that the term, cycle, implies a closed system. That is, one in which the final stages will either return the materials to their original state, or to a form capable of re-use.[8] This is incorrect and misleading in certain respects. The term, cycle may correctly be applied to the intention to recover re-usable material from irradiated nuclear fuel elements. This can then be introduced into the manufacture of new fuel elements. However, this recycling may only be applied to a minute proportion of the total volume of material produced from commercial reactor operations.[9] The remainder, in various forms, constitutes waste products which have no subsequent use, and therefore

cannot be considered part of a cycle. Also it should be noted that the problems associated with securing an environmentally acceptable solution to the final disposal of nuclear waste remains a major obstacle to the confident pursuit of large scale nuclear energy developments. Finally, the stage in the fuel cycle at which a genuine re-cycling of materials occurs, that is in reprocessing the subsequent manufacture of uranium fuels, and the possible use of mixed-oxide fuels is, as will be shown below, the most problematical stage for the application of safeguards.

These inconsistencies having been noted, the terminology of the nuclear fuel cycle will continue to be used hereinafter so as to remain compatible with orthodox technical usage.

2.3.2. The Fuel Cycle Described

The basic structural component of all materials is the atom. The atom itself comprises two parts, the nucleus, and, orbiting around the nucleus, electrons. The nucleus in its turn is composed of two kinds of particles, neutrons and protons. The basis of nuclear energy lies in man's ability to control and to harness the energy which is released by the splitting or fission of the nucleus. Fission occurs when the nucleus is struck by the impact of a neutron from outside the atom. Fission will create two lighter elements in place of the original, and liberate additional neutrons. The total mass of these products is slightly less than that of the original nucleus. This difference in mass is converted into energy. The neutrons created by the fission process may then, upon impact with other nuclei, cause other fissions. This process is known as a chain reaction. In a nuclear reactor the chain reaction is controlled to a level which is just self-sustaining, permitting the utilisation of the heat energy which is produced. A nuclear explosion will result when the chain reaction is permitted to take the form of an uncontrolled multiplication of fissions. In a nuclear reactor the passage of neutrons is slowed by the use of a moderator such as water or graphite, inserted between the geometrical arrangement of the fuel assemblies.

In some elements, atoms may contain different numbers of neutrons and hence different masses. These are known as the various isotopes of that element. One such isotope is uranium 235 (U^{235}). This is the isotope of uranium containing ninety-two protons and one hundred and forty three neutrons in each nuclei. Uranium provides the fuel for the great majority of the world's nuclear reactors. Certain exceptions will be noted later in this section. One particular form of uranium fuelled reactor, the U.S. designed Light Water Reactor or L.W.R., has established, in its several varieties, a domination of the world's commercial reactor market over the Canadian CANDU and British MAGNOX types.[10] The L.W.R. uses highly pressurised ordinary or light water as both a moderator and coolant. In contrast to this arrangement, CANDU uses deuterium or heavy water for both purposes, whilst MAGNOX is moderated by graphite and cooled by pressurised carbon dioxide (Co_2) gas.

The outline fuel cycle discussed below will be that applicable to the L.W.R. The CANDU and MAGNOX fuel cycles will be noted immediately afterwards. Uranium is first mined from the ground in the form of mineral ore. The largest commercial reserves occur in the U.S.A., Canada, the U.S.S.R., Australia, Niger and Namibia. The uranium content is extracted from the ore, in the form of an oxide, U_3O_8. Thereafter, the uranium oxide is converted into a gaseous form, uranium hexafluoride, UF_6. This is necessary to prepare the material for the stage of enrichment. Natural uranium contains only 0.7% of the fissionable isotope U^{235}. Enrichment raises the proportion of U^{235} above the natural figure, to approximately 3%. This is still unusable in a nuclear weapon which would require 90% enrichment. The conventional technology of enrichment is that of gaseous diffusion, whereby the different isotopes of uranium may be progressively separated by their different rates of diffusion through a membrane. Contemporary developments in enrichment technology, particularly in U.K., Netherlands and the Federal Republic of Germany, utilise the technique of gaseous centrifuge. In this system the

separation of different isotopes is achieved by virtue of their different atomic weights causing them to separate under centrifugal force.[11]

After enrichment, UF^6 is again converted to oxide form in preparation for the stage of fuel fabrication. Uranium oxide pellets are assembled into fuel rods, and thereafter transported for insertion into the reactor core.

Enriched uranium oxide fuel will continue to produce useful heat energy, by fission, over a period of approximately four years under normal, commercial operating conditions. Thereafter, the depletion of the fissile U^{235}, and the creation of neutron-absorbing fission products will reduce the efficiency of the fuel charge. The fuel rods are then removed, and are stored in tanks of water to permit cooling, and the decay of certain highly radioactive, but short half-life, fission products.

Spent nuclear fuel contains a proportion of re-usable materials, comprising approximately 3% residual uranium^{235}, and 0.5% plutonium. Both are produced as consequence of normal reactor operations. It is technically possible to re-process spent fuel assemblies and so recover these potentially useful by-products. U.S. practice with L.W.R. cycles does not envisage this course of action, although there has been an expression of interest in France and Japan.[12] According to some authorities, but disputed by others, reprocessing provides a more environmentally secure treatment of residual waste products.[13]

From the point of view of safeguards against diversion, the significance of reprocessing is that the separation of plutonium at this stage makes available the most desirable form of potential weapons-manufacturing material. The operation of the reprocessing facility is problematical in so far as the plutonium content of irradiated fuel rods entering the process can only be inferred from reactor operating records. This

raises questions concerning the accuracy of safeguards procedures which will have to wait until a later Chapter to be more fully explained.

CANDU , the Canadian designed and manufactured reactor using heavy water or deuterium as its moderator , operates by using natural uranium fuel, formed into uranium metal rods. The CANDU fuel-cycle therefore omits both the UF_6 conversion and enrichment stages. A substantial difference between the CANDU and L.W.R. reactor operations is that the former may be refuelled on-load , that is without interruption to normal power generating operations. Although this offers certain advantages for authorities attempting an undetected diversion of nuclear materials, on balance the CANDU fuel-cycle is more resistant to attempted diversion than the L.W.R. cycle. Not only is the enrichment stage omitted, but the operation of the CANDU fuel-cycle produces spent fuel which is not commercially attractive for reprocessing. The high rate of burn-up leaves less than 0.3% of U^{235}. There is some dispute as to whether it would be commercially feasible to recover a worthwhile proportion of plutonium.[14] For these reasons, current Canadian practice is to store spent fuel, indefinitely, in water-pond storage.

The first generation of British designed and manufactured reactors, known as MAGNOX, are also fuelled by natural uranium, and this therefore obviates the conversion and enrichment stages of the fuel cycle. The name MAGNOX derives, perhaps confusingly, from the magnesium-oxide alloy which is used in cladding the fuel rod assembly . Current British practice is to reprocess MAGNOX fuel, both from those reactors operating in the U.K., and from the two exported to Italy and Japan in the 1960's. In view of this limited export achievement, discussion of the technical issues relevant to the diversion of nuclear materials will be restricted to the L.W.R. fuel cycle.

The first opportunity at which it would be feasible to divert nuclear materials from the L.W.R. fuel cycle is after mining and milling, in the form of U_3O_8, uranium oxide, or yellowcake.

However, to enrich this material into a form of weapons grade material would require the services of an enrichment facility specifically dedicated to that purpose. Approximately 6.5 tonnes of yellowcake would have to be passed through such a facility to yield 30 kg of 90% U^{235}, sufficient, for two small yield nuclear weapons.[15] It is both financially and technically more feasible for State authorities to attempt diversion at the enrichment stage. Using already commercially enriched, 3% U^{235}, in the form of U_3F_6 uranium-hexafluoride feedstock, only 1500 kg would be necessary to produce 30 kg of 90% U^{235}.[16] Although shrouded by both commercial and national security considerations it is thought that to effect diversion at this stage would require the modification of the cascades through which the successive diffusion operations are passed. Basically, a closed loop is created in which the progressively enriched product is returned to the cascade for repeated diffusion. Alternatively, using the U.K.-Dutch-German centrifuge technology, an enrichment facility dedicated to 90% U^{235} from 3% U^{235} feedstock would require a far smaller throughput of feedstock and a smaller physical plant than diffusion technology. However, the feasibility of constructing and operating such a plant, without detection must be considered, if not impossible, at least sufficiently problematic, to direct attention towards less conspicuous alternatives.

During the normal operation of L.W.R., plutonium is produced within the UO_2 fuel assemblies. A problem arises in that the longer the period of reactor operations a larger proportion of the highly unstable isotope Pu^{240} is created. The presence of Pu^{240} makes the manufacture of a plutonium bomb more difficult, but not impossible.[17] It would appear that authorities attempting to divert materials from the spent-fuel reprocessing would therefore prefer to interfere in the normal commercial operation of the L.W.R. cycle. By extracting the fuel assemblies short of the normal four year burn-up, the Pu^{240} contamination problem can be reduced but not eliminated. This will however raise the possibility that such suspicious behaviour will be detected. Furthermore, economic

penalties are incurred.

If it is assumed that the irradiated fuel assemblies comprise 0.8% plutonium, it would be necessary to reprocess 1.4 tonnes of uranium dioxide to produce the necessary 10 kg of plutonium.[18] After reprocessing, the separated plutonium is most vulnerable to diversion, also to theft or sabotage by terrorist or criminal associations, being stored as plutonium metal, oxide or nitrate. The re-entry of separated plutonium into the fuel cycle also creates opportunities for diversion. If mixed with uranium, mixed-oxide fuel containing up to 3% plutonium may be chemically separated to produce plutonium suitable for weapons use.

In view of this vulnerability to diversion from reprocessing, the application of safeguards is concentrated upon this stage. Also, it should be noted, although it is a separate issue from the subject of this thesis, that the weight of contemporary U.S. counter-proliferation policy is directed towards eliminating the reprocessing of L.W.R. fuel. By instituting a once-through or throw-away fuel cycle, irradiated fuel rods will be stored, indefinitely.[19] In the case of the CANDU fuel cycle, (as used by India), to obtain 10 kg of plutonium would require the diversion of 5700 kg of irradiated uranium fuel assemblies.[20] The potential diversion hazards of other, more esoteric fuel cycles, such as the Liquid Metal Fast Breeder Reactor, Thorium fuel cycles and High Temperature Gas cooled Reactors, is more appropriately discussed in the technical literature.[21] The purpose of this Chapter is better served by proceeding to discuss the concept and controversiality of safeguards.

2.4. Safeguards

2.4.1. Concept and Practice

Safeguards are a generic concept which may be applied to many fields of human activity outside the operations of the civilian nuclear energy industry. Safeguards comprise a system of physical controls and a supporting politico-legal framework designed to reduce

to an acceptable level the risks inherent in any chosen activity. The codes of practice, safety standards and environmental controls attached to all industrial activities are examples of safeguards. They act to improve the welfare of employees and the community by reducing, in fact by internalising, the social costs arising from that particular activity. The safeguards discussed herein are those applied to the civilian operations of the nuclear fuel cycle. As noted above their purpose is to minimise the opportunity for State authorities to effect the diversion of nuclear materials from civilian to military purposes. Although effective safeguarding will also serve to reduce the environmental hazards inherent in unauthorised acts of diversion, this is to be considered an entirely incidental benefit, and this thesis will not give further consideration to nuclear safety issues.

It was noted above that the involvement of a functional, international organisation in the application of safeguards, derives from a consensus of inter-governmental opinion that technical assistance and trade in nuclear materials should be reserved for peaceful purposes. (See 2.2.) Just how this consensus came to be established is more fully discussed in Chapters Three and Four. The obligation to be bound by I.A.E.A. safeguards may arise from one of four distinctive circumstances. It should be stated at the outset that membership of the I.A.E.A. alone, is not one of these. First any country in receipt of technical assistance from the Agency must enter into an agreement to submit to safeguards on all materials supplied by the Agency, for example nuclear fuel assemblies for research reactors. These are usually known as "Project Agreements".[22] Secondly a State entering into a commercial contract to supply a second state with nuclear materials may require the recipient to accept safeguards as a condition of supply. These arrangements are called "Transfer Agreements."[23] Thirdly a State may choose to make a voluntary "Unilateral Submission" of selected, or all, facilities to Agency safeguards.[24] Fourthly, and most importantly, since 1968 a wholly new category of safeguards obligation has been created under the terms of the Non Proliferation Treaty.[25] Although the parties are

required to submit all facilities and materials to I.A.E.A. safeguards, in fact; exceptions exist which will be fully discussed in Chapters Six and Seven. The NPT is therefore not only designed to uphold international confidence in the provision of technical assistance. Its central purpose is to require each sovereign State, party to the Treaty, to submit to searching examination and investigation of its own nuclear industry, even if completely self-sufficient in the provision of nuclear materials and facilities.

The actual procedures involved in applying I.A.E.A. safeguards may be briefly summarised.[26] The basis of Agency safeguards is material accountancy, supported by inspections, remote surveillance by T.V. and still camera photography, and the application of lead seals, for containment purposes, in the manner of a customs seal.

All facilities through which nuclear materials pass, are, for accounting purposes, divided into "material balance areas" (M.B.A.). These correspond to technically discrete and accessible stages in the nuclear fuel cycle. These are established by a preliminary safeguarding operation; a design review undertaken to establish the suitability of proposed facilities for the application of safeguards. An inventory of nuclear materials is then established. Thereafter all movements of material into and out of each M.B.A. must be accounted for. The accounting techniques used rely upon record keeping, substantiated by physical checks made by inspectors. They employ weighing, sampling and chemical analysis, but inspectors have only limited powers of investigative inspection in the event of suspicious circumstances. If it should occur that the level of material unaccounted for, (M.U.F.) exceeds the margins of statistical error and probability allowed in the system, that is, if the suspected diversion is of a significant quantity relative to the threshold quantity necessary for the manufacture of an explosive device, this fact is reported to the I.A.E.A. Director General. Thereafter, upon consideration by the Agency's Board of Governors, and failing a satisfactory explanation of the anomaly, the Board may initiate such sanctions as are available to it, principally reporting the act of non-

compliance to all other I.A.E.A. members and to the U.N. Security Council. Also, the Agency may suspend technical assistance and call for the return of materials supplied to date.[27]

In the final part of this Chapter a set of criteria, defining an ideal safeguards system will be presented. From this it will then be possible to analyse the strengths and weaknesses of the I.A.E.A.'s system at each stage in its development. Before that, it is necessary to identify certain preliminary problems of definition.

The novelty and political delicacy of the safeguards concept derives most basically from the need to reconcile two divergent, although hopefully not mutually exclusive conditions. For a safeguards system to be effective, that is if it is to maximise the probability of detecting any attempt to divert nuclear materials from civilian to military purposes, it must be as former U.S. Atomic Energy Commission Commissioner Henry Smyth suggests, both credible and acceptable.[28] Smyth declines to define these terms. It could be suggested that a credible safeguards system is one which is sufficiently comprehensive in its scope and rigorous in its application to command the confidence of the participant States that its objectives will be achieved. These objectives may change with successive safeguards systems depending upon the extent to which participant States will permit the Agency to operate independently.

An acceptable safeguards system must be sufficiently sensitive to the legitimate interests of the participants to ensure that no state declines to participate on the grounds of anticipating undue interference in the research and commercial operations of its nuclear industry.

The tension between these conflicting requirements may be stated thus; a system which maximises credibility may only do so at the cost of limiting its acceptability, this then acts to reduce credibility as the system lacks comprehensiveness. Alternatively, a system, lax enough to encourage fuller acceptance will not be credible, hence reducing acceptance among the diligent and sincere States which will perceive no gain from the sacrifice of sovereignty made by them.

Any attempt to manage these conflicting requirements will depend for its success upon the extent to which safeguards procedures follow the 'adversary' or 'co-operative' approach to relations between the State and the safeguarding authority.

Quester argues that "adversary inspection" is vital to establish the vigour and determination of the Agency to identify acts of diversion.[29] In other words, the Agency must approach its tasks, contrary to Anglo-Saxon legal procedures and assume, or at least suspect guilt, until innocence can be established.

In contrast, Imai, counsels the need for this approach to be tempered by "technological reasonableness."[30] This means it must minimise interference in the legitimate activities of the safeguarded State; concentrate safeguards activities on the most likely stages for diversion, and, implicitly assume a certain measure of trust in relation to the States activities. As will be shown in subsequent Chapters each of these issues has provided substantial controversies at each stage in the development of the I.A.E.A.'s responsibilities. Also, each of these matters became the subject of contention in negotiating the text of the N.P.T.

It is apparent, if only a truism, that the application of safeguards requires the co-operation of the safeguarded State. In attempting to avoid creating a situation in which States will decline to participate, it is not unnatural that safeguards will err on the side of permissiveness. It may be, as will be elaborated in Chapter Seven that current I.A.E.A. practice to assume a 95% probability of detecting acts of diversion is unsatisfactory.[31] However, for those States which have not submitted to safeguards the probability is lower. In sustaining the confidence of participants, and encouraging non-participants to consent to safeguards, there are political-legal as well as technical approaches to be considered.

The former consists of the provisions of each safeguards agreement in regard to the investigative procedures of the Agency. The latter refers to the means chosen to implement those procedures. As

will be shown, it is possible for technical solutions to eliminate or at least ameliorate difficulties arising in the conduct of the Agency's activities. Examples may be found in the use of T.V. camera surveillance to replace physical inspections by Agency personnel, and the use of containment seals in nuclear materials storage. Both serve to improve the acceptability without reducing credibility of safeguards standards.

2.4.2. Criteria for the Evaluation of Safeguards Systems

2.4.2.1. Universality

It is perhaps unrealistic to suggest the acceptance of safeguards could ever be extended to include all States in the world. However, the purpose of these criteria is to identify the ideal conditions to which the drafting of safeguards systems should aspire. It should therefore be formally stated that;

> 'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires the fullest attainable acceptance of the safeguards system by accession to and ratification of safeguards agreements among all States possessing, developing, or capable of developing nuclear activities on a scale capable of contributing to the manufacture of nuclear weapons.'

2.4.2.2. Equality

On both political and technical criteria it is a logical requirement of an ideal safeguards system that common standards be applied to all States. It is politically desirable to enhance both the acceptability of the system in the regard of all participants, and to encourage non-participants of the equality of sacrifice entailed in participation. Related to this, the credibility of safeguards is enhanced by their comprehensiveness. Different systems will give rise to different standards which in turn will make more likely the possibility of undetected diversion. Therefore;

'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires the elaboration of a unified safeguards system applying common provisions, without discrimination, to all States accepting safeguards.'

2.4.2.3. Extension through the fuel cycle

The preceding criterion establishes the necessity of uniform and comprehensive safeguards coverage. The technological concomitant of such a criterion is that the application of safeguards should extend through all stages and facilities of the fuel cycle. In principle this requires safeguards to follow nuclear materials from whatever point in the technical process is deemed appropriate, not necessarily the mining of crude uranium-ore . to a point at which it can be determined as beyond useful diversion to weapons manufacture. This occurs through the depletion of fissile content, or chemical transformation into a non-recoverable form. Furthermore, this presupposes the right and ability of the Agency to 'seek out facilities suspected to harbour clandestine operations. Therefore;

'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires the fullest possible extension of the safeguards system through all stages and facilities of the nuclear fuel cycle at which diversion may occur.'

2.4.2.4. Rigour

A safeguards system which extends to all facilities and materials in the fuel cycle is worthless if its accountancy and verification are conducted with insufficient rigour to uncover all attempted acts of diversion and, or errors and irregularities in the operation of that fuel cycle. Rigour has two dimensions; technical effectiveness, and determined pursuit of suspected diversion, the latter principally a political and legal issue. Clearly, the technical and the political are inseparable for operational effectiveness. Therefore;

'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires the fullest possible attainment of technical rigour in the application of safeguards procedures.'

2.4.2.5. Sanctions

The need for a functional international organisation to possess the right to impose penalties upon rule-breaking members has been established in Chapter One. It is useful to include the issue at this stage to ensure the comprehensiveness of the criteria being presented. Therefore;

'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires the elaboration and enforcement of effective sanctions against States which fail to uphold their agreed obligations under the terms of the safeguards system.'

2.4.2.6. Provisions for Review and Amendment

Nuclear science, and its application to civilian use in energy production is a relatively new science in which the rate of technological innovation is rapid. It is therefore possible, and indeed probable, that technical changes will produce new problems for the application of safeguards. Also, that the cumulative experience of their application will itself reveal new safeguards problems. Therefore;

'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons , requires provision to be made for the review of the safeguards systems effectiveness in anticipation of technical innovation and in response to the experience of application.'

Footnotes to Chapter Two

1. I.A.E.A.; Statute, Article II, Vienna, Septermber 1973, ed.
2. loc. cit.
3. ibid. Article XII.
4. cf. I.A.E.A., INFCIRC/153, para 28, Vienna, 1972
5. See Treaty on the Non-Proliferation of Nuclear Weapons; English text, United Nations, New York, 1968.
6. These developments are discussed in Chapters Three - Seven inclusive.
7. To the layman the technical literature on nuclear energy is frequently obscure. The summary presented below (2.3.2.) has drawn upon the following sources.

   Willrich, M. Energy and World Politics, New York; Free Press Macmillan, 1975, Ch. 2, 6.pp, 27-64, 180-212. Also International Safeguards and Nuclear Industry, Baltimore, John Hopkins, 1973, esp. Ch. 3. pp.45-69.

   Franklin, N.L., Irradiated Fuel Cycle, London; British Nuclear Fuels Ltd., 1975, Ch. 2, esp. pp.43-57.

   Congress of the United States; Office of Technology Assessment, Nuclear Proliferation and Safeguards, New York, Praeger, 1977, esp. Ch. 1, VII. pp. 3-10, 151-192.

   Two other works, written from a critical perspective, which focus particular attention upon proliferation hazards are;

   Lovins, A.B., Soft Energy Paths; London, Penguin, 1977, also Patterson, W. Nuclear Power, London, Penguin, 1976.
8. This point, although perhaps semantic is made with some vigour by Johnson, G. Whose Power to Choose, London, International Institute for Environment and Development, 1977, pp.7-8.
9. See below, Footnote 12.
10. See Wohlstetter, A. Swords from Ploughshares, Chicago, U.P. 1979, Appendix A, pp.151-217, also pp.139-141.
11. See Congress of the United States, op.cit. 1977, pp.23-24, 230, 261.
12. The advisability of recycling uranium and plutonium derived from reprocessing has been challenged from both the commercial perspective and that of proliferation hazards.
    See Speth, J.G., Tamplin, A.R. and Cochrane, T.B. "Plutonium Re-cycle the Fateful Step" Bulletin of the Atomic Scientists, Vol. XXX, No. 9, November 1974, pp.1991-1998.
    See also Wohstetter, op.cit. 1979, pp.97-99.
    Also Chayes, A. and Bennett, Lewis W. International Arrangements for Nuclear Fuel Reprocessing, Cambridge, Mass. Ballinger, 1977, Ch. 1, 2. pp.3-30.

13. See in particular Johnson, B. op.cit. 1977, pp.7-16, and Lovins, A. op.cit. 1977, pp.189-197.

14. Wohlstetter suggests that re-cycling CANDU fuel elements in this way is not an attractive proposition. See Wohlstetter, op.cit. 1979, p.11.

15. Congress of the United States Office of Technology Assessment, op. cit., 1977, p.155.

16. ibid. pp.155-156.

17. Wohlstetter, op.cit., 1979, pp.17-18, 50-55.

18. supra footnote 16.

19. This policy derives from President Carter's April 7th, 1977, statement on nuclear power policy which included the commitment that the U.S. "...will defer indefinitely commercial reprocessing and recycling of plutonium produced in the U.S. nuclear power program." See below Ch. 7, footnote 2 and see Wohlstetter, op.cit., 1979, pp.78-79.

20. supra footnote 16.

21. See in particular Congress of the United States, Office of Technology Assessment, op.cit. 1977, pp.159-169.

22. Sanders, B., Safeguards Against Nuclear Proliferation, SIPRI, Stockholm, 1975, pp.71-72.

23. ibid. also Gorove, S. "Transferring U.S. Bi-Lateral Safeguards to the I.A.E.A. The "Umbrella" Agreements, Duquesne University Law Review, V-16, No. 1, 1967-1968, p.13.

24. supra footnote 22.

25. supra footnote 5.

26. For a more elaborate technical statement see Szasz, P. "International Atomic Energy Safeguards" from Willrich, M. (ed) op.cit. 1973, pp.73-140. The thesis will of course fully explain each stage of safeguards procedures in more detail. See especially Chapters Five, Six and Seven.

27. The sanctions available to the Agency are set out in Statute Article XII C.

28. Smyth, H. "The Need for International Safeguards" from Willrich, op.cit. 1973, pp.3-21.

29. Quester, G. "The NPT and the I.A.E.A." International Organisation XXIV, 1, 1970, pp.163-180. See also Quester's "Can Proliferation Be Stopped Now" Foreign Affairs, Vol53, (1), 1974, pp.77-80.

30. Imai, R. "Nuclear Materials Safeguards and the fuel cycle industry" Nuclear Engineering International, Septe mber 1975, pp.679-681. See also Imai's "Non Proliferation A Japanese Point of View" Survival XXI, 2, 1979, pp.50-56.

31. See Sanders, B. and Rometsch, R. "Safeguards against the Use of nuclear materials for weapons" Nuclear Engineering International, September 1975, p.684.

CHAPTER THREE

Proposals for the International Control of Atomic Energy, 1945-1953

3.1. Introduction

This Chapter addresses two major issues. The first concerns the methodological and theoretical problem, identified in Chapter One, (1. 4 .)as the first proposition of the Functionalist argument. That is, to examine the evidence available that the international control of atomic energy can be identified as a problem to which Functional approach to control and organisation is relevant. Evidence to support this contention would be found in the records of international discussion and negotiation to further collaboration between States in the atomic energy field, especially in collaborative schemes advocating the precise framework of international organisation associated with Functionalism.

Accordingly, this Chapter will examine the record of multi-lateral diplomacy initiated after the Second World War, among, principally the U.S.A., the U.K., Canada and the U.S.S.R., and the proposals advanced by each for an international, political, legal and organisational structure to control the future development of the atomic sciences. The main forum for these discussions was the United Nations Atomic Energy Commission (U.N.A.E.C.).

An important feature of the negotiations conducted in the U.N.A.E.C. was that from the Soviet side, fundamental objections were raised concerning the appropriateness of various forms of control proposed by the Western allies. In other words, the methodological and definitional issues relevant to Functionalism, may be seen to have been raised from the very beginning of diplomatic negotiations.

The second major purpose of this Chapter is to establish the manner in which conflicts of interest and interpretation arising from these basic issues of definition affected the subsequent development

of the I.A.E.A. The Agency was not created as an ideal-type of international organisation. Rather, political choices made in the period 1945-1953 decisively rejected certain very ambitious proposals for international ownership and control of the atomic energy industry. However, a more constructive factor also revealed by close examination of the U.N.A.E.C. negotiations is the manner in which serious discussion of the technical and political requirements of an effective safeguards system was pursued. Both of these factors are crucial to a more complete understanding of the I.A.E.A.

3.2. Co-operation among the Western Allies

Attempts to promote the international control of atomic energy for peaceful purposes by the creation of the appropriate international laws and organisations grew directly from the wartime co-operation among the Western allies in the development of the first atomic weapons. A joint declaration made by the Heads of Government of the U.S.A., the U.K. and Canada on November 15th, 1945, set out the terms under which the three parties would consent to the dissemination of knowledge in the atomic energy field. Among these was the necessity of elaborating and enforcing safeguards against the misuse of that knowledge.[1]

The Joint Declaration discussed the possibility of international action to prevent the use of atomic energy for destructive purposes, and to promote the advance of scientific knowledge for peaceful and humanitarian ends. Furthermore it noted that

> "... no system of safeguards that can be devised will of itself provide an effective guarantee against production of atomic weapons by a nation bent on aggression"[2]

The Joint Declaration also noted that

> "... The military exploitation of atomic energy depends, in large part upon the same methods and processes as would be required for industrial uses."[3]

In view of these two factors, the Declaration placed great emphasis upon the political priority of establishing an atmosphere of reciprocal confidence between States, and noted the counterproductive consequences that would result from the premature and unsafeguarded spread of specialized information regarding the industrial application of atomic energy.

The Declaration therefore called for the creation of a commission, which, under the authority of the United Nations Organisation, could prepare recommendations for submission to the U.N. The Commission was to be briefed to make its recommendations on four matters;

> "...(a) For extending between all nations the exchange of basic scientific information for peaceful ends.
> (b) For control of atomic energy to the extent necessary to ensure its use only for peaceful purposes.
> (c) For the elimination from national armaments of atomic weapons and of all major weapons adaptable to mass destruction.
> (d) For effective safeguards by way of inspection and other means to protect complying states against the hazards of violations and evasions."[4]

Therefore, in a little over three months following the successful completion of the Manhattan Project with the detonation of atomic bombs over the Japanese cities of Hiroshima and Nagasaki, the Western allies proposed a scheme for the peaceful internationalisation of that technology based upon four principles; dissemination, control, disarmament and safeguards. The problems which were to bedevil the work of the United Nations Atomic Energy Commission, as subsequently founded, centred upon the relationship between these four principles, and the chronological sequence for their implementation.

Three crucial problems were raised given the common technological basis of both civilian and military atomic energy methods and processes, First, what form of control would be needed to maintain their practical separation? Second, if, as the Declaration noted, no system of safeguards could, alone, maintain the inviolability of peaceful atomic energy, what kind of safeguards, with what powers of

enforcement and sanctions would that system require to make the best attempt at fulfilling its seemingly limited tasks? Third, and most provocatively in the light of subsequent events, was the problem of whether atomic disarmament, by the U.S.A. should precede or follow the establishment of an internationally controlled atomic energy industry with effective and enforceable safeguards against its abuse.

3.3. The U.N.A.E.C. and The Baruch Plan

The United Nations Atomic Energy Commission was founded by the unanimous decision of the U.N. General Assembly on January 24th, 1946, by Resolution 1 (I).[5] The origins of this Resolution were in a Communique, signed by the Foreign Ministers of the U.S.A., U.K. and U.S.S.R. at Moscow on December 27th, 1945.[6] The Resolution reiterated the four principles of the November Joint Declaration, and the adherence of the U.S.S.R. to them may be attributed to the inclusion in the Resolution of a paragraph empowering the U.N. Security Council to issue directives to the Commission "...in matters affecting security..." thus permitting the exercise of the U.S.S.R.'s veto powers.[7] The reason for this was the fundamental disagreement between the Soviet and American positions on the atomic disarmament of the United States, which the Soviet government clearly anticipated would come to dominate discussion in the work of the U.N.A.E.C.

The U.S. Representative to the U.N.A.E.C. Bernard Baruch, put forward a statement of his government's position to a meeting of the Commission on June 14th, 1946 at New York City.[8] The Baruch Plan was itself largely derived from the work of the Acheson-Lilienthal Report, which in March 1946 published the findings of a Committee appointed by President Truman.[9] The conclusions of that report reiterated the warnings contained in the Joint Declaration of November 1945. The Report emphasised the essentially interchangeable nature of the military and civilian uses of atomic energy. Furthermore, it warned against the inadequacy of reliance upon safeguards alone as an effective instrument of control. As Lilienthal himself noted...:

> "...an inspection system alone would be ineffective as a protection against nations attempting to build up a secret atomic arsenal."[10]

The plan which Bernard Baruch put before the U.N.A.E.C. therefore attempted to reconcile the problems arising from the purely national development of atomic energy, by advocating the creation of an International Atomic Development Authority.

In his introductory remarks, Baruch reviewed the international political conditions that threatened to develop in the event of a failure to internationalise the control of the atomic energy industry. He expressed doubt that the terrible consequences of atomic warfare would inhibit the use of such weapons; stating that the "...terror created by weapons has never stopped man from employing them."[11] Baruch further advocated the necessity of "...immediate, swift and sure punishment for those that violate the agreements that are reached." His introduction concluded with the assertion that democratic opinion in the countries of the United Nations would not be satisfied by counter arguments invoking "...narrow sovereignty, which is today's phrase for yesterdays isolation."[12]

Baruch proposed the creation of an International Atomic Development Authority, "...to which should be entrusted all phases of the development of atomic energy."[13] The four basic proposals were that the I.A.D.A. should assume; "Managerial control or ownership of all atomic energy activities potentially dangerous to world security." The Authority would also possess the "...power to control, inspect, and license all other atomic activities;" and, have the duty to foster the beneficial uses of atomic energy. Baruch's fourth proposal, to endow the Authority with research and development responsibilities was "...intended to put the Authority in the forefront of atomic knowledge and thus enable it to comprehend and therefore to detect..." its misuse. It was his firm intention and hope that the Authority would become the world's leader in the field of atomic energy knowledge and therefore supplement its legal authority with the power of scientific leadership.[14]

Subsequent to the establishment of such a system, including the renunciation of the use of atomic weapons, and "...condign punishments..." instituted for violations of that system, Baruch stated the U.S. government's priorities and schedule for atomic disarmament. First, that the manufacture of atomic bombs be stopped, and then, that existing stockpiles be disposed of in accordance with the terms of the treaty. Thirdly, that the Authority should be in full possession of the knowledge required for the production of atomic energy. Acts which would constitute a violation of the agreement comprised; the illegal possession or use of an atomic bomb; the illegal possession of weapons - grade fissile materials; any seizure of plant or property owned or licensed by the Authority, or other wilful interference in its activities. Finally, they included the operation of "...dangerous projects..." in a manner either contrary to or in the absence of a license granted by the Authority.

Baruch, in emphasising the need for immediate and certain penalties in the event of any of these violations occurring, which he termed the search for "...enforceable sanctions - an international law with teeth in it...," went so far as to advocate the suspension of the veto powers of the five permanent members of the U.N. Security Council in relation to this one matter. In urging this exception to the principle of unanimity he noted that the time available between the discovery of a violation and the need for preventive action and punishment to be taken would be insufficient to permit extended discussion of the preferred course of action.[15]

The detailed recommendations of the Baruch Plan specifying the responsibilities of the I.A.D.A. can be summarised as follows: The Authority would establish and exercise its control through several different forms of ownership, licensing, operation, inspection and management, depending upon which particular form of control combined most successfully the principles of maximum international confidence with the minimum of interference in the private and state plans of the member countries. The Authority would obtain the fullest information possible on the extent and distribution of uranium and thorium reserves

and "...bring them under its dominion..."[16] This is a delicately ambiguous evasion of the precise matter of ownership and control. However, with contrasting bold precision, the Plan stated that "...The Authority should exercise complete managerial control of the production of fissile materials..." that it "...should control and operate all plants producing fissionable materials in dangerous quantities and must own and control the product of these plants."[17] Drawing attention to the dangers inherent in the seizure of plant and materials under the control of the Authority, the Plan called for their strategic distribution throughout the world, with a particular injunction against the centralised stockpiling of fissionable materials.

The Authority was also to be given the "...sole and exclusive right..." to conduct research in the field of the peaceful application of atomic explosives.[18] The Plan set out the conditions under which the Authority would release fissionable materials for non-explosive peaceful uses, in power reactors and medical and agricultural applications. These "...should be open to nations and their citizens under reasonable licensing agreements from the Authority."[19] The conditions provided for the 'denaturing' of fissionable materials, for the Authority to use its own discretion to decide and to enforce the distinction between dangerous and non-dangerous activities, and to require that any plant using fissionable materials with the potential for dangerous uses is not only inspected, but that its "...actual operation shall be under the management, supervision and control of the Authority."[20] Having established the principle of assigning dangerous activities to the exclusive competence of the Authority, the freedom of access to licensed plants that the inspectors require is then to be seen as a logical extension of the Authority's work in combining the promotion of peaceful research and development with the additional responsibility to detect surreptitious and illegal operations.

The Baruch Plan concluded with the recognition, on both political and technical grounds, of the need to implement the proposals for the I.A.D.A. in clearly defined stages. The U.S. government was required to "...yield, to the extent required by each stage, national control of

activities in this field to the Authority."[21]

By emphasising the problems of prevention and penalisation inherent in the creation of the I.A.D.A., Baruch was able to argue his government's case that atomic disarmament could only be implemented subsequent to the foundation of the I.A.D.A. and the transfer of relevant powers to it. The U.S. required a guarantee of security not just in relation to atomic weapons but also against the use of other weapons of mass destruction referred to in the Moscow communique of the preceding December. Therefore, the U.S. stood firm on the ground that it would not renounce its atomic weapons monopoly so long as potentially hostile states were able to develop the ability and possible intention to manufacture such weapons themselves. This is further confirmed by Baruch's reference to the need for the I.A.D.A. Charter to be brought into effect in those stages set out in the U.N. General Assembly Resolution which founded the U.N.A.E.C. This Resolution listed disarmament as paragraph (c) subsequent to the establishment of an international control system, at paragraph (b). However, since inspections and safeguards are listed as the fourth proposal, it would be an unrealistic interpretation of the call "to proceed by separate stages..."[22] to imply a strictly chronological interpretation of the four paragraphs. The Baruch Plan itself called for the establishment of international controls including developing safeguards, as pre-requisites for the exchange of scientific information. The ensuing disagreement between the U.S. and the U.S.S.R. as to whether U.S. disarmament should precede or follow the implementation of the international control system was clearly a fundamental political disagreement. It was rooted in mutual distrust, and concepts basic to traditional notions of national interest, and could not be resolved by a satisfactory technical solution being found to the other three proposals.

3.4. The Soviet Response

On June 19th, 1946, at the next full meeting of the U.N.A.E.C., Andrei Gromyko of the U.S.S.R. delegation put forward his government's proposals.[23] These centred upon the conclusion of an international convention to prohibit the manufacture or use of atomic weapons.

Article 1 of the draft International Convention, required the parties

> "(a) not to use atomic weapons in any circumstances whatsoever;
> (b) to prohibit the production and storing of weapons based on the use of atomic energy;
> (c) to destroy within three months from the day of entry into force of the present convention, all stocks of atomic energy weapons whether in a finished or unfinished condition."[24]

Further Articles provided that violation of the terms of Article 1 be considered a crime against humanity; that the Convention be of indefinite duration, and that it enter into force after approval by the U.N. Security Council, and ratification by half the signatories including all five Permanent Members of the Security Council. In other words, that contrary to the Baruch Plan, the veto powers of the five were to remain. With regard to enforcement, Article 3, proposed that within six months of the entry into force of the Convention, the parties should pass legislation providing for severe penalties for States which violated it.

Just as Baruch had argued his government's case for international control to precede atomic disarmament, Gromyko, in a carefully worded passage, argued the case for the prior necessity of disarmament. He asserted that the

> "...situation prevailing at the present time...brought about by the discovery of the means of applying atomic energy and using them for the production of atomic weapons precludes the possibility of normal scientific co-operation between the States of the world."

After making this clear reference to the American's production and successful use of atomic weapons, Gromyko continued;

> "At the very basis of the present situation which is characterised by the absence of any limitation in regard to the production and employment of atomic weapons, there are reasons which can only increase the suspicion of some countries in regard to others and give rise to political instability."[25]

This fundamental difference of opinion with the U.S. government's view effectively annulled further discussion of what system of control, and

safeguards the U.S.S.R. would be prepared to accept. The details of the Soviets' view of control and safeguards emerged later in discussion of, and amendment to, the three U.N.A.E.C. Reports adopted in the years from 1946 to 1948.

The U.N.A.E.C. itself worked in four Committees, concerned with planning, control, legal, and scientific and technical questions. These Committees, taking the Baruch Plan , and the Gromyko Proposal as their starting point, then attempted to formulate specific proposals in accordance with the Commissions terms of reference. Committee 2, discussed forms of control and safeguards.

3.5. The First U.N.A.E.C. Report

There was a clear majority of States in the U.N.A.E.C., Committee 2, more favourable to the U.S. position than to that of the U.S.S.R. Furthermore, the U.S.S.R. did not participate in certain meetings of the Committee called to draft the First Report of the Commission. It was therefore of no great surprise when, on December 30th, 1946 the Commission adopted by ten votes in favour with two abstentions the report of the Working Committee as its own report, and submitted it to the Security Council on the next day. The two abstentions were those of the U.S.S.R. and Poland.[26]

The First Report of the U.N.A.E.C. to the U.N. Security Council noted, that in answer to the question posed by Committee 2, that is, whether effective control of atomic energy was possible that

> "...we do not find any basis in the available scientific facts for supposing that effective control is not technologically feasible. Whether or not it is politically feasible is not discussed or implied in this report."[27]

The cautious grammar of the double-negative served to stress the challenge to the question of political feasibility which was clearly directed at the need for agreement between the U.S.A. and U.S.S.R. on the priorities, and sequence of implementation, necessary for effective control. The Report further noted that

> "...the development and use of atomic energy are not essentially matters of domestic concern of the individual nations, but rather have predominantly international implications and repurcussions."[28]

and;

> "...That an effective system for the control of atomic energy must be international and must be established by an enforceable multi-lateral treaty or convention which in turn must be administered and operated by an international organ or agency within the U.N. possessing adequate power."[29]

The Report, unable to reconcile the American and Soviet positions, could only make the most general recommendations on the actual powers of the proposed international system of control.

The proposed draft Convention could in effect only reiterate the terms of reference of the Commission, and offered no concrete proposals regarding ownership and control of nuclear materials and installations. Insofar as these implied a rigorous international control, the Report was implicitly closer to the U.S., than to Soviet interpretation. The Report accepted fully the Baruch Plan's insistence upon waiving the Security Council's unanimity requirements;

> "No government shall possess any right of veto over the fulfilment by the international control agency of the obligations imposed upon it by the treaty nor shall any government have the power, through the exercise of any right of veto or otherwise, to obstruct the course of control or inspection."[30]

In the Report's "Summary of Findings" the details of the safeguards system necessary for each stage of the fuel cycle were outlined. The first of these was designated "...Safeguards Necessary to Detect and Prevent Diversion From Declared Activities."[31] Concerning the mining, milling and refining of uranium and thorium, the Summary suggested; "adequate safeguards against diversion...are possible by a system of inspection, including guards similar to normal managerial operating controls," so long as, "...the Inspectorate has unrestricted access to all equipment and operations and has facilities for independent

weighing, assay and analysis."[32]

However, in enrichment plants, reactors and chemical separation plants the Report found that it was not possible to place reliance upon the method of obtaining a material balance of the various fissionable materials, which would include plutonium in the latter stages.

> "This is one of the important reasons why there must be internal control of such plants by a director or manager and why the management must be established by and be responsible to the international control agency."[33]

While;

> "Even if the material balance could be greatly improved, the inherent danger of the operation(s) would still require management by the international control agency."[34]

In the case of reactors;

> "The safeguards available to the international control agency should include licensing, and inspection, supervision, and management of the operation of the reactors. In addition close supervision of the design and construction of reactors is essential in all cases."[35]

Similarly, storage and shipment of nuclear fuel was to be managed by the control agency.

The Report then outlined proposals for safeguards to ensure the detection of clandestine activities. These included wide powers of ground and aerial survey, and for the calling of reports from national governments operating licensed facilities. The Report noted the difficulties of detection, in certain critical stages of the fuel cycle, and asserted that;

> "The detection of clandestine bomb manufacture as such is almost impossible; it is, therefore, vital that any unauthorised accumulation of essential nuclear fuels be prevented."[36]

The Report drew attention to the mainly political problem of the seizure

of materials, and to the need for international control and material accounting checks to be enforced between as well as at each stage in the fuel cycle, and to the danger inherent in unduly large stockpiling of nuclear materials.[37]

In terms of establishing the international control of atomic energy, the First Report of the U.N.A.E.C. made no progress. However it did make a number of challenging and specific proposals on the subject of safeguards against the diversion of nuclear materials from peaceful purposes. These could be applied regardless of whatever system of ownership and control could be agreed in the relationship between any U.N. Agency and the national development Agencies of the member countries.

In an attempt to concentrate the collective mind and effort of the Commission upon this more substantial issue, Committee 2 on April 10th, 1947, adopted a working paper outlining the "Principal Subjects" to be incorporated in any specific proposals for international control.[38] This paper drew attention to every phase in the development of the peaceful uses of atomic energy, and the parallel operational and developmental functions of any international agency in relation to their planning, co-ordination and direction. This review extended from the definition of terms to be used in any draft treaty or convention establishing such an agency, through to the definition of violations and application of sanctions, and finally the examination

> "...of the stages by which transition will be accomplished from conditions of national control to the final conditions of predominantly international control."[39]

This paper did not contain proposals, it simply listed the questions which had to be confronted; it offered an agenda, and, in its provocative accuracy, a manifesto, for the creation of an international organisation.

3.6. Further Soviet Proposals

On June 11th, 1947, the Soviet delegation offered its own proposals

for the creation of an International Control Commission. These greatly amended the U.N.A.E.C. Report's recommendations for Baruch-like ownership and control, proposing instead a system of limited inspection, and accordingly weaker safeguards.[40]

The Soviet proposals first reiterated Gromyko's call for a Convention on the prohibition of atomic weapons and for "strict international control", simultaneously, over all facilities "...engaged in the production of atomic materials and atomic energy." The proposed International Control Commission was to be "...established, within the framework of the Security Council." With the retention of veto powers for the five permanent members, the proposed Commission could therefore only act within limits tolerable to the U.S.S.R.[41]

The inspection and safeguards system suggested revealed the extent to which the Soviet view of international control was largely one of the verification of nationally owned and managed activities.

The proposed I.C.C. was; to only study... "...production operations to the extent necessary for the control of the use of ... atomic energy," and to observe the fulfilment of rules set by the Convention. It was to "make...recommendations to Governments on the question relating to production, stockpiling and use..." of atomic materials. Although advocating "access to any facilities" the I.C.C. required only "acquaintance" with the production methods and operation of each facility, on the basis of which "recommendations" could be made to the government of any nation.[42]

The I.C.C. was to promote basic scientific research in the peaceful uses of atomic energy, but it was accepted that States party to the Convention,

> "...must have a right to carry on unrestricted scientific research activities in the field of atomic energy, directed toward discovery of methods of its use for peaceful purposes."[43]

To illustrate how far the divergence between the American and Soviet position's had gone, the above quotation should be compared and

contrasted with Baruch's assertion that "...the Authority itself must be the world's leader in the field of atomic knowledge..." and so supplement its legal authority with the "great power inherent in the possession of leadership in knowledge."[44]

3.7. U.N.A.E.C. 2nd Report

Discussion of the Soviet proposals continued, but there was no reconciliation between them and the clear majority opinion of the other U.N.A.E.C. members. On September 11th, 1947 the Commission adopted its Second Report, this time the voting being ten in favour, with one vote against (the U.S.S.R.) and one abstention, (Poland).[45]

In the light of the Committee 2 working paper, the Report contained detailed proposals for the international control of atomic energy. These very largely adopted the Baruch Plan's reasoning with regard to the role of the proposed U.N. Agency.

The Report proposed that the Agency have the right to prohibit national research which required or produced materials of any quantity or quality determined as dangerous, by the Agency. Also, the Agency was to take over the operation of management of experimental work on power reactors at any time that "...dangerous..." materials were required.[46]

The Report further suggested that states be required to furnish the Agency with all information relevant to the location and quantity of all source materials, and that;

> "The international agency shall become the sole owner of all source material not containing other important constituents, from the time the source material is removed from its place of deposit in nature."[47]

In the case of other valuable minerals being present, the Agency was to assume ownership as soon as these were extracted from the source material, whilst in any case, further provisions prohibited the disposal or transfer of materials without the consent of the Agency.

In agreement with the state concerned, the Agency was to be further empowered to construct mills and dumps for the treatment of source materials, whilst state owned facilities were to be subject to stringent licensing requirements including inspection, accounting, guards and acceptance of the power to modify operating regulations.

The production of source materials was to be made subject to a system of annual quotas, determined by the Agency on the basis of the expected supply and demand and its distribution throughout the world, with compensation payable in the event of enforced loss of production or closure. States were further required to provide the Agency's inspectors with

> "unimpeded rights of ingress, egress and access to the extent necessary to carry out the powers and duties of the agency."[48]

With regard to the next stage in the fuel cycle, the Agency was to have the authority to determine, in each case, whether to own or operate refineries, or to lease that operation to the State, or parties within the State. Thereafter ...

> "The agency shall own, operate and manage all chemical and metalurgical plants for treating key substances."[49]

... the latter being defined as any material capable of producing nuclear fuel.

In sum; the Agency was to own all nuclear fuel, and then lease it to licensed and safeguarded facilities under national or private control, if the latter was permitted by the State, providing that no dangerous activity or facility, as defined at the discretion of the Agency, was involved. The Agency was to be empowered to require reports from each State concerning licensed activities, whilst the Agency itself was to report periodically to the Security Council.

Regarding safeguards, the principle of "unimpeded rights" covered the details of inspection procedures. The Report offered additional guidelines on maintaining good relations with the licensee, including giving notice, establishing liaison representatives and a

system of domestic and international court warrants to pursue inspections and surveys in undeclared and private places.

As a final note, and indicative of the extent to which the matter of disarmament remained unresolved, military facilities were to be in no way exempted from the provisions outlined.

3.8. Deadlock

The U.N.A.E.C. convened on May 7th, 1948 to discuss a proposal by the French, U.K. and U.S. delegations. This proposal was adopted by the Commission on May 17th, and formed the substance of the Commission's Third Report. In essense, it called for the suspension of the Commission's work, pending the resolution of the basic division of opinion within its ranks, between the majority and the U.S.S.R. To attempt to proceed without the U.S.S.R. was impossible; on both principled and realistic criteria their co-operation in the establishment of international control over atomic energy was vital.[50]

The joint Anglo-French-U.S. proposal noted that the Commission had reached an impasse; and that although in nearly two years work much had been accomplished in coming to define the essential requirements of any plan to achieve the international control of atomic energy, the Commission could not proceed to prepare a draft treaty to implement its findings in accordance with its terms of reference.

The proposal noted that;

> "The difficulties which confront the Commission were first evidenced when the plan under consideration by most of the Government members of the Commission was rejected by the Soviet Union either as a whole or in its separate parts, on the grounds that such a plan constituted an unwarranted infringement of national sovereignty. For its part the Soviet Union insisted that a convention outlawing atomic weapons and providing for the destruction of existing weapons must precede any control agreement. The majority of the Commission considered that such a convention, without safeguards, would offer no protection against non-compliance."[51]

The proposal further noted the Commission had already decided to defer the consideration of the political aspects of the problem until fully appraised of the technical and scientific issues. The results achieved so far would stand as a basis for future study; these, and the principles submitted in the two previous reports would therefore,

> "...provide an alternative to the armaments race that results from the absence of international control and which would not be prevented by an inadequate system of control."[52]

Noting the impact of the Commission's proposals upon the "traditional prerogatives of national sovereignty." The Report continued that

> "...in the face of the realities of the problem it sees no alternative to the voluntary sharing by nations of their sovereignty in this field to the extent required by its proposals."[53]

However, the Commission had been unable to secure the agreement of the U.S.S.R. ...

> "to even those elements of effective control considered essential from the technical point of view, let alone their acceptance of the nature and extent of participation in the world community required by all nations in the First and Second Reports of the Atomic Energy Commission."[54]

Therefore, the Report concluded, until such time as this situation could be resolved, or prior consultation between the five permanent members of the Security Council and Canada might yield the basis for agreement, negotiations in the U.N.A.E.C. should be suspended. The Third Report was adopted by ten votes in favour, to two against, (U.S.S.R. and Ukraine) on May 17th, 1948 .

The Report was then passed by the Security Council, where the Soviet Union mounted a strong defence of its position, and argued in favour of continued discussion in the U.N.A.E.C. The Soviet Union asserted the prior necessity of atomic weapons disarmament, and accused the U.S. of a negative and insincere response to the Soviet

initiative. The Soviet delegation was supported by the Ukrainians, whose delegation attacked the Baruch Plan, on the grounds that it consolidated the privile ged position of the U.S.A., violated the U.N. Charter's principle of the equality of all nations, large and small, and constituted an interference in the internal affairs of States that would jeopardise their sovereignty.[55]

The U.S. Resolution approving the U.N.A.E.C.'s Third Report was approved by nine votes to two, but was not adopted, since one of the two opposing votes, from the U.S.S.R. was from a Permanent Member. A Canadian resolution, passing discussion to the General Assembly was then adopted.[56]

In an attempt to resolve the deadlock, three resolutions were submitted to the General Assembly debate during the Autumn of 1948.[57] First, a Canadian resolution, basically putting the majority position of the U.N.A.E.C., then an Indian resolution urging continued discussion, and finally a Soviet resolution calling for conventions on disarmament and control to be brought into operation simultaneously. Most delegations favoured the continuation of discussion, and the Canadian resolution was suitably ammended to account for this. The U.K. delegation showed some sympathy for the Soviet proposals, so long as the machinery for control could be well established before the armaments prohibition became effective, but the U.S. hardened its position, maintaining that the Soviet proposals departed from the fundamental principle of international control.

On November 4th, 1948 the General Assembly rejected the Soviet draft resolution, and accepted that of Canada, by forty votes in favour to six against with five abstentions. This was adopted as Resolution 191 (III).

The Resolution regarded both the general findings and the specific proposals contained in the preceding two U.N.A.E.C. Reports as

> "...constituting the necessary basis for establishing an effective system of international control for atomic energy to ensure its use only for peaceful purposes."[58]

It continued by expressing deep concern at the impasse reached in the work of the U.N.A.E.C., and requested that the six U.N.A.E.C. Permanent Members maintain their consultations to determine if the basis for agreement could be found. Meanwhile, the Commission was urged to resume its sessions, and proceed to the further study of subjects which it considered practical and useful.

On July 14th, 1949 the Soviet Union made its first test detonation of an atomic bomb, and so broke the four-year U.S. monopoly of atomic weapons possession, upon which the Soviet attitude to the international control of atomic energy had been based. Any hope that this event might encourage either side to reconsider the priorities of international control and disarmament were unfounded. After a year of fruitless discussion the six U.N.A.E.C. permanent members were again instructed by a General Assembly resolution of November 23rd, 1949 Res. 299 (IV), to continue their discussions. The U.N.A.E.C. itself held its last meeting on July 29th, 1949.[59]

The six permanent members resumed discussion in December 1949. However, on January 19th, 1950, the Soviet delegation proposed that the Chinese delegation, termed by the Soviets as the "...representatives of the Kuomintang group..." be excluded. This was unacceptable to the other five members; and so the Soviet delegation withdrew from the consultations and did not return.

The U.N.A.E.C. was officially dissolved by General Assembly resolution 502 (VI) on January 11th, 1952. On a more positive note, this resolution established the U.N. Disarmament Commission which was to feature in subsequent negotiations for the establishment of international controls over the atomic energy industry.[60]

3.9. Conclusions

Any reasonable evaluation of the negotiations conducted in the forum of the U.N.A.E.C. between 1945-1953 must conclude that in relation to the Commission's terms of reference, the negotiations ended in failure. None of the four principles identified in the preceding

account, namely control, dissemination, disarmament and safeguards was translated into actuality, that is, into the form of international law and organisation.[61] The U.S.A. and U.S.S.R. were not only unable to agree upon the question as to whether provisions for international control should precede atomic disarmament or vice versa. The two super-powers were unable to reconcile their differences concerning the desired form and powers of the control provisions that they each proposed. The most fundamental difference between these was that Baruch's IADA was to assume ownership of all atomic energy materials, which were then to be leased to national research and development authorities. In contrast Gromyko's I.C.C. was proposed as an international inspectorate to monitor the operations of nationally owned atomic development authorities. Given this difference of opinion, a resolution of the dispute between the priorities of control versus disarmament would not in itself have cleared the way to American-Soviet agreement.

In any scheme of international control, agreement on the basic rules of ownership and, or leasing would have to precede the promulgation of more specific rules relating to the dissemination of materials, and the application of safeguards. Therefore it is ironic, if not surprising, that the U.N.A.E.C. came closer to agreement upon these two subsidiary issues. The principle of access to the benefits of peaceful atomic energy was repeatedly affirmed as a matter of international agreement, by both the Western powers and the Soviet Union.

Concerning safeguards, the work conducted in Committee 2 made considerable progress towards defining the objectives and methods of safeguards methods. However, from the foregoing account it can be seen that the technical feasibility of safeguards was clearly judged to be subordinate to political agreement on a suitable control system.[62] Furthermore, Committee 2's findings included the demand for sweeping powers of "...unrestricted access."[63]

Given these two conditions, the safeguards proposals made by Committee 2 could have been applied to either the Baruch or Gromyko

control systems. That is to say, consideration of the technical details of safeguards procedures was able to proceed despite a failure to agree upon the particular system of ownership, leasing or management that they would be applied to.

Certainly the Soviet proposals were less comprehensive than those of the U.N.A.E.C. majority. However, it was politically significant that the Soviets conceded the principle of safeguards. This proved to be a major step forward. As will be discussed in the next Chapter, it made it very difficult for the U.S.S.R. to retract its agreement to the safeguards principle, particularly when Eisenhower's 1953 Atoms for Peace plan accepted fundamental elements of the Soviet Union's view and in fact advocated a system of control closer in its essentials to the Gromyko rather than the Baruch proposals.

This Chapter has shown how the U.N.A.E.C.'s attempt to establish an all-embracing system for the international control of the atomic energy industry were unsuccessful. Furthermore, it has shown that the overt cause of failure, the conflicting priorities of control versus disarmament, obscured a more fundamental disagreement. The Soviet Union did not accept the majority opinion that the international control of the atomic energy industry was a problem to which the Functionalist solution, in its most complete form, was applicable. Rather, the U.S.S.R. reserved the ownership of materials and the conduct of research to the exclusive prerogative of national sovereignty. Beyond these, the Soviet view inclined towards a limited system of inspection and safeguards to uphold international confidence in the continuing peaceful uses of nationally owned and administered atomic energy programmes. Agreement to the principles of dissemination under safeguards therefore remained the limit to which the U.S.S.R. felt able to endorse elements of the Functionalist scheme.

This Chapter has therefore demonstrated the crucial importance of the political decision that States must agree to designate certain

responsibilities of domestic government as ones suitable for international co-operation before the Functional approach can be considered an appropriate solution to the problem under discussion.

The progress that was made by the U.N.A.E.C. reveals the operation of a more pragmatic Functionalist logic, seen in the establishment of separate processes of negotiation for the more obviously political and technical aspects of the control problem. In this case, Committee 2 was able to advance towards a technical solution of the safeguards problem, whilst awaiting the successful resolution of the safeguards problem, whilst awaiting the successful resolution of the outstanding political disputes between the U.S.A. and the U.S.S.R. The next Chapter will examine the process whereby such a resolution was eventually achieved in the period 1953-1957.

Footnotes to Chapter Three

1. For a fuller account of wartime developments see Gowing, M. Britain and Atomic Energy 1939-1945, Macmillan, London, 1964.
also Gowing, M., Independence and Deterrence Britain and Atomic Energy 1945-1952, Vol. I, Policy Making, Macmillan, London, 1974.
and Acheson, D., Present at the Creation, Hamish Hamilton, London, 1969, esp. Ch. 17, 19, pp. 149-156, 164-168.
see also Blackett, P.M.S., Military and Political Consequences of Atomic Energy, Turnstile Press, London, 1948.
Written without benefit of hindsight Blackett provides a particularly interesting perspective on the problems of establishing a control procedure, esp. Ch. IX - XI, pp104-145.

2. For the text of the joint declaration see "Joint Declaration of the Heads of Government of the United States, the United Kingdom and Canada. November 15th, 1945." Reproduced in Dupey, T. and Hammerman, G. eds. A Documentary History of Arms Control and Disarmament, Dupey-Bowker, New York, 1973, pp. 297-299.

3. ibid. p. 298.

4. loc. cit.

5. U.N. Yearbook 1946-1947 U.N. New York, 1947, p. 444.

6. Moscow Communique by the Foreign Ministers of the United States, the United Kingdom and the U.S.S.R. December 27th, 1945, see Dupey and Hammerman, op.cit., pp. 299-301.

7. ibid. p. 300.

8. See Blackett, P.M.S., op.cit., 1948, Ch. XI. pp. 131-145.
Baruch's June 14th speech is reproduced in Dupey and Hammerman, op.cit., 1973, pp. 301-308.

9. Popularly known as the "Acheson-Lilienthal Report" the Report was correctly speaking;
C.I. Barnard et al : "A Report on the International Control of Atomic Energy : U.S. Department of State 2498 : Washington D.C. U.S.G.P.O. : March 16th, 1946.

10. Lilienthal, D., The Journals, Volume II, The Atomic Energy Years 1945-1950. Harper-Row, New York, 1964, p. 27
see also discussion in Blackett, P.M.S., op.cit. 1948, pp. 108-115.

11. Dupey, & Hammerman, op.cit., 1973, p. 301.

12. ibid. p. 302.

13. ibid. p. 304.

14. ibid. p.305.

15. loc. cit.

16. ibid. p.306.

17. loc. cit.

18. loc. cit.

19. loc. cit.

20. ibid. p.307. 'Denaturing' refers to a subsequently disproved thesis that the presence of Plutonium 240 in the fission products of irradiated uranium fuel elements, so contaminated the fissile Pu.239 as to render it unusable for weapons manufacture. The presence of Pu240 certainly creates problems for effective weapons manufacture; e.g. heat, pre-detonation, and low yield, but such a bomb is still an effective nuclear device.
See: Kramish, A. The Peaceful Atom in Foreign Policy. Harper Row, New York, 1963, pp.24-25.

21. Dupey & Hammerman, op.cit., 1973, p.308.

22. ibid. p.301.

23. "Address by Soviet Representative. Gromyko to U.N.A.E.C. June 19th, 1946."
See Dupey & Hammerman, op.cit. pp.308-311.

24. ibid. p.311.

25. ibid. p.309. Blackett notes that
"it is doubtful whether the Soviet Government, with its knowledge of the state of mind of the American public and Service Departments, expected its proposals to be taken very seriously, since, they would have robbed the American Government of what it certainly then considered as its main weapon to weigh against the strength of the Soviet Army."
op.cit. 1948, pp.152-153.

26. First Report of the U.N.A.E.C.
See Dupey & Hammerman, op.cit. pp.313-320.
Also U.N. Yearbook 1946-47, pp.444-451.

27. Dupey & Hammerman, op.cit. 1973, p.314.

28. ibid. p.318.

29. loc. cit.

30. ibid. p.319.

31. ibid. pp.315-317.

32. ibid. p.315.

33. loc. cit.

34. ibid. p.316.

35. loc. cit.
36. loc. cit.
37. ibid. p.317.
38. ibid. pp.345-348.
39. ibid. p.345.
40. ibid. pp.345 348.
41. ibid. p.345.
42. ibid. p.346.
43. loc. cit.
44. ibid. p.304.
45. ibid. pp.320 341.
46. ibid. p.321.
47. ibid. p.323.
48. ibid. p.326.
49. ibid. p.327.
50. See Blacket, P.M.S., op.cit. 1948, Chapter XIII, also U.N. Yearbook 1947-48, pp.471-476.
51. U.N. op.cit., 1947 48, p.471.
52. ibid. p.472.
53. loc. cit.
54. loc. cit.
55. ibid. p.475.
56. ibid. p.476.
57. U.N. The U.N. and Disarmament 1945-1970, New York, 1971, pp.21 24.
58. ibid. p.22.
59. ibid. p.23.
60. loc. cit.
61. supra. note 4.
62. supra. note 27.
63. supra. note 32.

CHAPTER FOUR

"Atoms for Peace" and the Foundation of the I.A.E.A. 1953-1957

4.1. Introduction

This Chapter will examine the record of multi-lateral diplomacy which, during the period between 1953 and 1957 led to the establishment of the I.A.E.A. as an autonomous agency of the U.N. It will conclude with a detailed review of the I.A.E.A. Statute in order to evaluate whether it is consistent with Functionalist ideas. In particular it will examine the provisions made for the development of safeguards on the use of nuclear materials.

Following the abandonment of attempts to further the international control of the atomic energy industry through the U.N.A.E.C., the next major initiative was taken by the U.S. President, Dwight D. Eisenhower in an address to the U.N. General Assembly in December 1953. The "Atoms for Peace" proposals represented a move towards the U.S.S.R.'s view on the nature of an international Agency to regulate atomic energy developments. Also, and most significantly for the development of safeguards, the proposals were based upon a revision of the technical opinion contained in the Acheson-Lilienthal and Baruch proposals which asserted that the military and civilian uses of atomic energy were inseparable. Eisenhower argued, perhaps more in hope than in certainty, that it was possible to separate the civil activities from military ones, and that safeguards against diversion would be the chosen instrument to maintain that separation. This elevated the technical issues debated in the U.N.A.E.C. Committee 2 to a crucial role in the proposed control scheme.

Eisenhower's address initiated a major round of multi-lateral diplomatic negotiation among the other leading Western powers, to

draft a Statute for the proposed Agency. Thereafter, following adroit, and secret, negotiations between the U.S. and the U.S.S.R. the latter, and other East European and Third World States joined in the drafting process. The successful conclusion of this process was the Conference of eighty-one nations convened at New York in December 1956 which approved the final draft of the Statute.

The nature and extent of the proposed Agency's safeguards responsibilities was a persistent source of dispute in these negotiations. The evaluation of the Statute which concludes this Chapter demonstrates the extent to which compromises on the safeguards issue subsequently constrained the responsibilities and powers of the Agency.

4.2. Eisenhower's U.N. Address

On December 8th, 1953, the U.S. President, Dwight D. Eisenhower addressed the U.N. General Assembly on the subject "Atoms for Peace", a speech in which he outlined proposals for the foundation of an International Atomic Energy Agency under the auspices of the U.N.[1]

This second major U.S. initiative to establish a system of international control over the development of atomic energy was born out of two major changes which had occurred in U.S.-Soviet relations since 1949. First was the acquisition by both countries of nuclear weapons, and hence the opportunity to attempt negotiations from a position of parity. Secondly, changes within the domestic politics of the Soviet Union, occasioned by the deaths of Stalin and Beria, caused the Americans to anticipate a more conciliatory response to their proposals from the Soviet government.

In his address, President Eisenhower focus ed upon the new situation created by the loss of the U.S. atomic weapons monopoly, although he noted the quantitative superiority still possessed over the Soviet Union. First, he cited the certain fact that the knowledge at present restricted to the nuclear weapons States would come to be possessed by others, and with that knowledge would come

the possibility of weapons proliferation.[2] Secondly, Eisenhower asserted that even ...

> "...a vast superiority in the numbers of weapons, and a consequent capability of devastating retaliation, is no preventive, of itself, against the fearful damage and toll of human lives that would be inflicted by surprise aggression."[3]

The President argued that a "...mere reduction or elimination of atomic materials for military purposes"[4] would be an insufficient guarantor of security for the world. As Baruch had argued previously, the Americans took the view that national guarantees were an insufficient gesture of good faith when the technological and political capacity for covert weapons development was taken into consideration. Therefore Eisenhower asserted,

> "It is not enough to take this weapon out of the hands of soldiers. It must be put into the hands of those who will know how to strip it of its military casing and adapt it to the arts of peace."[5]

He outlined certain specific proposals by which this might be achieved. First, the governments principally involved could ...

> "...begin now and continue to make joint contributions from their stockpiles of natural uranium and fissionable materials to an International Atomic Energy Agency ... such an Agency would be set up under the aegis of the United Nations.[6]

The contributions would be small in quantity, however,

> "...the proposal has the great virtue that it can be undertaken without the imitations and mutual suspicions incident to any attempt to set up a completely acceptable system of world wide inspection and control."[7]

This represented a fundamental change in the American analysis, and in practical terms a major concession to the Soviet intransigence on the matter of international safeguards, inspection and control. Whereas previously, American policy was committed to a substantial measure of international ownership and control of the civilian atomic energy

industry, Eisenhower now alluded to the "...irritations and mutual suspicions..." generated by such a system.

He continued, that the proposed agency "...could be made responsible for the impounding, storage and protection of the contributed fissionable materials."[8] Then, in a reference to combined safeguards and physical security measures, the President maintained that,

> "The ingenuity of our scientists will provide special safe conditions under which such a bank of fissionable material can be made essentially immune to surprise seizure."[9]

However, the more important responsibility of the Agency would be "...to devise methods whereby this fissionable material would be allocated to serve the peaceful pursuits of mankind."[10] These would be in the fields of agriculture and medicine as well as the generation of electrical power.

Finally, the President insisted upon the inclusion of the Soviet Union among the governments principally involved in negotiations towards the foundation of such an agency. In case Soviet participation might be interpreted as leading to violations of the 1946 Atomic Energy Act, Eisenhower concluded his address with the assurance that Congressional approval for such a plan would be forthcoming if it were clearly based upon the promotion of peaceful uses, and the peaceful progress of relations between East and West.

4.3. Negotiations Commence

Negotiations towards the foundation of an Agency on the lines set out in Eisenhower's address were conducted on two levels. The U.S. and Soviet governments exchanged memoranda and conducted negotiations on a bilateral and confidential level, commencing in the Spring of 1954 and continuing until October 1955. Simultaneously, negotiations were conducted between the U.S. and seven other western States, and resolutions brought before the public forum of the United Nations General Assembly. After October 1955, the Soviet Union, and other

states, joined with the eight western nations in full negotiations to draft a Statute for the Agency.

On March 19th, 1954, the U.S. Department of State conveyed to the Soviet Ambassador Zarubin a draft statute for the proposed agency.[11] This draft contained provisions for the operation of safety, health and safeguards procedures. The initial Soviet reply on April 27th was not encouraging. Molotov restated the Soviet position calling for the abolition of atomic weapons without the need for safeguards.[12] A second U.S. memorandum of July 9th suggested that "...there are forms of peaceful utilisation in which no question of weapons grade material arises..."[13] This observation, although technically correct, revealed the extent to which the U.S. attitude had changed since the assertions of the Acheson-Lilienthal Committee, and the Baruch Plan, that no practical distinction would be drawn between civilian and potentially military uses.

On September 22nd, the eve of the U.N. General Assembly's opening debate on the peaceful uses of atomic energy, Mr. Gromyko communicated to the U.S. ambassador at Moscow, that the Soviet government was willing to discuss safeguards when negotiating the draft statute of the proposed agency.[14]

Meanwhile, the U.S. had conducted separate negotiations with those western governments principally involved in the civilian development of atomic energy, and which were interested in the creation of an International Atomic Energy Agency. The group of eight comprised, in addition to the U.S.A. also, Australia, Belgium, Canada, France, Portugal, South Africa and the U.K. Th group of eight decided to proceed towards the creation of the Agency despite the refusal of the Soviet Union to join their negotiations, hoping that the U.S. might persuade the Soviet government to change its policy. The eight governments evolved a common policy which was presented to the U.N. Ninth General Assembly.

The First Committee of the General Assembly met between November 5th-23rd, 1954, and a draft resolution was submitted by

those seven of the eight which were U.N. members (Portugal was a non-member at that time). The draft resolution called for the creation of an International Atomic Energy Agency, and the covening of an international conference on the peaceful uses of atomic energy.[15]

The Soviet Union introduced amendments to the draft resolution which called for all interested States, not just U.N. members, to be involved in the work of the proposed conference. This was a reference to the Peoples Republic of China. Furthermore the Soviets proposed that the Agency be responsible to both the General Assembly and the Security Council, so preserving their veto powers.[16] The United States, in a further concession towards the Soviet position then proposed that

> "...it would be preferable for the Agency to act as a clearing-house through which requests made by the various beneficiaries would be filled by States contributing materials."[17]

The U.S. outlined the extent to which they were willing to promote the peaceful uses of atomic energy both through the work of the Agency and through the proposed conference. The U.S. was supported by the U.K. and French delegates and together they offered to admit foreign scientists and students to their training programmes and to provide radioisotopes for export, with particular emphasis upon medical and agricultural applications. All stressed the importance of assistance for the developing countries, but sounded cautious notes on the introduction of commercial nuclear power as a feasible prospect for the near future.[18]

Thereafter, in a very important contribution, the Soviet delegate explained his country's position. He asserted that the root cause of the difficulties encountered thus far was not attributable to the intransigence of his government, but rather to the refusal of the Western countries to discuss atomic disarmament. However, after this formal, and familiar denunciation, the Soviet delegate then informed the First Committee that his country no longer made its

participation in the proposed Agency conditional upon the prohibition of atomic weapons.[19] Then, on November 15th, 1954 Mr. Vyshinski completed the Soviet about-turn by his remarkable observation on the "Atoms for Peace" proposal, that is,

> "...Although the plan had contained no safeguards to ensure that atomic energy would be used for only peaceful purposes...that did not mean that the Soviet Union considered it a bad one."[20]

By this statement, nine years of Soviet opposition to the principle of international safeguards and inspection was overturned. However, as part of their reasoning, a cautious qualification was attached to the Soviet position. International co-operation could only proceed so long as the legitimate rights of States were not infringed. Vyshinski noted that the seven-nation draft resolution, proposing that the Agency be accountable to the General Assembly, denied the Security Council its legitimate role. This restated the well-established Soviet insistence upon retaining Permanent Member veto powers over the operation of the Agency as a condition of their co-operation. Accordingly, a revision of the draft resolution was made, to leave open the question of the Agency's relation to the U.N. The Resolution was then adopted unanimously by the First Committee. At the plenary meeting of the Assembly, Soviet amendments were rejected and the resolution adopted, unanimously, on December 4th, 1954 as Resolution 810 (IX).[22]

The Resolution itself simply called for the establishment of the Agency without delay, following the successful conclusion of those negotiations already in progress within the eight-nation group, and that consideration be given to the views of other members of U.N. that might be interested. The Resolution also called for the organisation of a Conference on the peaceful uses of atomic energy to be held in August 1955, and established a committee composed of representatives of Brazil, Canada, France, India, the U.S.S.R., U.K. and U.S.A. to undertake its planning in conjunction with the U.N. Secretary General.

The preparatory committee met during January, and again in May 1955, and agreed to convene the conference at Geneva between 8-20th August. The Secretary General extended invitations to all eighty-four members and to several international organisations. In addition to its intrinsic value, the Conference made an important contribution to the negotiations on the foundation of the International Atomic Energy Agency. The appointment of Professor Walter G. Whitman of the Massachusetts Institute of Technology as Conference Secretary General was followed by the appointment of Dr. Viktor S. Vavilov, of the Institute of Physics of the Academy of Science of the U.S.S.R. as Deputy Conference Secretary General. This heralded the full and co-operative participation of the U.S.S.R. in the Conference and afforded useful experience of American-Soviet co-operation after nine years at fundamental variance on the issue of the international control of the peaceful uses of atomic energy.[23]

Following the conclusion of the Ninth General Assembly the U.S. government continued to prepare a first draft of an Agency Statute, taking account of both the views expressed by the other governments in the group of eight and recommendations arising from the debate leading to the adoption of Resolution 810 (IX). On March 2nd, 1955 the U.S. government transmitted this draft to the other seven governments.[24]

4.4. Soviet Co-operation

On April 14th, the U.S. government invited the Soviet Union to join the negotiating group, and submitted an agenda for the discussion of safeguards issues. On July 18th, the Soviet government replied, accepting the American invitation, and also agreeing to deposit fifty kilograms of fissionable material with the Agency on its foundation.

Following the incorporation of certain modifications to the U.S. draft statute of March 29th, which were suggested by the governments of the seven other negotiating states, the eight-nation group unanimously agreed to transmit a copy of the draft to the Soviet government on July 29th.[25]

Two days after the conclusion of the Geneva Conference on the peaceful uses of atomic energy the U.S. government undertook to distribute copies of the draft statute to all members of the U.N. and to the Specialized Agencies.[26] Subsequently, the U.S. and U.S.S.R. further agreed to convene a conference of experts on safeguards problems to also include Canada, Czechoslovakia, France and the U.K.[27]

On October 1st, 1955 the Soviet Ministry of Foreign Affairs conveyed to the U.S. government a statement to the effect that with certain amendments the eight-nation draft could serve as a basis for drawing up a charter for the Agency. The Soviet amendments endorsed the creation of a strong control system to apply safeguards to those countries in receipt of technical assistance from the Agency, and called for the extension of the Board of Governors so as to include more developing and Eastern European States. As one commentator noted,

> "In conformity with the 8-power draft, these Soviet proposals now envisaged the Agency acting not only as a clearing house but also as a 'bank' for fissionable materials."[28]

The focus of debate again returned to the First Committee of the U.N. General Assembly which met during the Autumn of 1955. An eighteen nation draft resolution noting progress made during the year in accordance with Resolution 810 (IX) was adopted by fifty three votes in favour, none against, with six abstentions, and was subsequently approved unanimously in the plenary meeting, as Resolution 912 (X).[29] The most important component of the Resolution was the welcome given to the extension of the eight nation group into a group of twelve by adding Brazil, Czechoslovakia, India and the U.S.S.R. This completed the expansion of the group proposed by the U.S. to the U.S.S.R. on April 14th.

The twelve nation group met at Washington D.C. between February 27th and April 18th, 1956, and published the report of their working level meetings on July 2nd. The final plenary meeting of April 18th approved unanimously the text of the draft statute, although

the Australian, Czechoslovakian, Indian and U.S.S.R. delegations reserved their positions on certain provisions. It was decided that a conference should be convened at the U.N. Headquarters during September 1956 to which all U.N. members could send delegations to discuss and approve the Statute of the Agency.

In both the eight and twelve nation groups the basic intention of the Western governments was to allay the suspicions of the U.S.S.R. concerning the powers of inspection contained in the safeguards provisions of the draft statute. To this end the concept of "Agency Projects" was developed.[30] Under this system safeguards would be applied to materials used in specific projects involving the receipt of Agency assistance. Subsequently, the concept of submitting standardised bilateral safeguards agreements between supplier and recipient to Agency inspection was advanced. In both cases, the application of safeguards was specific and voluntary.

This encouraged the co-operation of the Soviet Union, its allies, and a number of non-aligned developing states. However, this retreat from international ownership and control and from full fuel cycle safeguards constituted the final abandonment of the Baruch Plan.

In correspondence between the U.S. and U.S.S.R. governments prior to convening the planned September conference, the U.S. government conceded the extent to which it was unlikely that full Agency safeguards could be developed to match the anticipated expansion of bilateral assistance in nuclear materials and research equipment. The U.S. government therefore proposed to the Soviet Union that they, and other supplier states, commence separate negotiations to ...

> "... explore the possibility of reaching uniform safeguards for bilateral agreements not less comprehensive than the present ones of the Agency."[31]

Further to these Western concessions on the implementation of safeguards, the discussions within the twelve-nation group produced weak draft provisions in the matter of sanctions. By passing the

responsibility for the implementation of sanctions to the U.N. Security Council and Secretary General, the drive of the U.N.A.E.C. reports, towards preventive powers was blunted, and a much less ambitious objective of deterring the diversion of nuclear materials was substituted in its place.[32]

The objections to the safeguards provisions in the twelve-nation draft statute, that were raised at the New York Conference of eighty-one states in September of 1956, came mainly from India, and centred upon the inclusion of source materials and by-products in the accounting system. In order to prevent the stockpiling of weapons-grade materials, the draft Statute provided for the Agency to take possession of materials produced as by-products from their operations which used Agency supplied materials or assistance.

The compromise eventually agreed upon permitted the State to retain special fissionable by-products, under safeguards, in such quantity as could be used for research or in reactors, whether existing or under construction. Any excess, over these requirements was to be deposited with the Agency.[33] Further amendments reduced the rights of access to be enjoyed by the Agency's Inspectors. Access to the persons employed in the atomic energy industry was limited to those actually involved in the handling of materials, and all Agency Inspectors were to be accompanied by representatives of the State concerned when undertaking safeguarding duties. Finally, the right of the Agency to approve the design of equipment and facilities was reduced to that of the right to examine such designs.[34]

On October 26th, 1956 the Conference unanimously adopted the draft Statute as amended by the delegates. The Statute was signed by seventy states at once, ten more followed in the ninety days thereafter, and it was agreed that the Statute of the International Atomic Energy Agency would enter into force upon its ratification by eighteen states, including three of Canada, France, the U.K., U.S. and U.S.S.R. The U.S. government was appointed as the depositing government for instruments of ratification. The conference further recommended that the headquarters of the Agency should be established at Vienna. An

Annexe to the Statute established a Preparatory Commission to prepare for the First General Conference of the I.A.E.A. scheduled for October 1st, 1957.[35]

4.5. An Interpretation of the I.A.E.A. Statute

4.5.1. The Objectives of the Agency

> "The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world."[36]

This is a mandate in the style of the Functionalists. It links material welfare to the maintenance of peace; both to be advanced by the reasoned application of a new technology. In addition, The Agency,

> "...shall ensure so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."[37]

The Agency's objectives are therefore qualified by concern for the potentially destructive abuse contained in the technology that it seeks to manage. Therefore, control, as well as the promotion of technological innovation, is included in the Agency's responsibility.

Specifically, the Agency's functions are to encourage and to provide research and development, materials and services, the exchange of information, and the training of scientists for the "practical application of atomic energy for peaceful purposes throughout the world."[38] That much is the developmental and expansive role. The cautious and controlling responsibilities of the Agency are;

> "To establish and administer safeguards designed to ensure that special fissionable, and other materials, services, equipment, facilities and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards at the request of the parties to any bilateral or multilateral arrangement, or at the request of a State to any of that State's activities in the field of atomic energy."[39]

A further aspect of "safeguards", is the formulation and application of health and safety standards to all projects involving the Agency's assistance. Finally, it is the Agency's responsibility to "acquire or establish any facilities otherwise unavailable in an area where the Agency is carrying out its authorised functions".[40] The Agency is required to co-operate with the U.N. in promoting "peace and international co-operation" and furthering the establishment of safeguarded world-wide disarmament "...in conformity with any international agreements entered into pursuant to such policies," so permitting the Agency's involvement in multilateral diplomacy such as occurred in the case of the Non-Proliferation Treaty.[41] Furthermore, the Agency is to; "establish control over the use of special fissionable materials received by the Agency, in order to ensure that these materials are used only for peaceful purposes."[42]

The unique status of the Agency vis-à-vis the U.N., that of an autonomous specialised Agency, is established in the provision that the Agency shall submit annual reports to the General Assembly, and to the Security Council, when appropriate, with the additional proviso of being able to appeal directly to the Security Council in the event of a breach in safeguards requirements.[43]

In passing to the Security Council the responsibility for taking any serious action in the event of a breach of safeguards the U.S.S.R. obtained a double advantage. Firstly it ensured for them the right of veto, being Permanent Members of the Security Council. Secondly, the Soviets willingness to leave certain powers of sanctions with the I.A.E.A. demonstrated the minor importance to be attached to them (see 4.5.4. below).

Two final obligations upon the Agency's activities are non-discrimination in making "...assistance to members subject to any political, economic, military, or other conditions..." incompatible with the Statute,[44] and that "the activities of the Agency shall be carried out with due observance of the sovereign rights of States."[45] In the subsequent development of safeguards agreements, this provision has been used to restrict the independence, and scope of operations of the Agency's inspectors, as will be shown in the following Chapters.

4.5.2. Membership, Administration and Staffing of the Agency

The Agency's membership aspires to universality, the principle criteria being the ability and willingness "...to carry out the obligations of membership...in accordance with the purposes and principles of the Charter of the United Nations." Membership of the U.N. is not a condition of membership of the I.A.E.A.[46]

However, the Agency is also based upon the principle of the sovereign equality of all its members. As discussed in Chapter One, legal, sovereign equality is considered by Mitrany to obstruct the development of Functional equality in which...

> "...Instead of the legal fiction of equality there would be an evident and factual inequality springing from real differences in capacity and interest with regard to a specific function but also limited to that function."[47]

As Mitrany notes elsewhere, for an Agency to develop upon these lines, it is necessary to...

> "...find an arrangement which would show a measurable and acceptable relation between authority and responsibility, which would exclude no participant arbitrarily from a share in authority while bringing that share into relation not to sheer power but to the weight of responsibility carried by the several members."[48]

The international control and development of atomic energy is, by its technical and financial nature, a problem of leadership and assistance by a small minority of States advanced in the field. Therefore, the composition and powers, and voting procedures of the I.A.E.A.'s governing organs, combine both sovereign and Functional interpretations of equality.

The General Conference convenes annually, and at any other times when convened by the Director General or by a majority of members. Each member may send one delegate, each having one vote. A majority of members constitutes a quorum, and decisions are voted

by simple majority except for matters of budget, amendments to the Statute and the suspension of members, requiring a two-thirds majority.[49] The General Conference may

> "...discuss any questions or any matters within the scope of this Statute or relating to the powers and functions of any organs provided for in this Statute, and may make recommendations to the membership of the Agency or to the Board of Governors or to both on any such questions or matters."[50]

Therefore, sovereign equality within the Conference is guaranteed. Specifically, its powers include; the election of the Board, approval and suspension of membership, consideration of the Annual Report of the Board, and relations with the U.N., approval of the budget and borrowing powers, constitutional amendments, and approval of the Director General's appointment by the Board. As a final provision, Conference may decide upon any matter referred to it by the Board, and may "...propose matters for consideration by the Board, and request from the Board reports on any matter relating to the functions of the Agency..."[51]

Functional equality, with "due regard to equitable representation," that is, geographical distribution, guides the selection of membership and powers of the Board of Governors. Some members are chosen by the outgoing Board on the basis of their contributory expertise to the work of the Agency; others are elected by the Conference in a managed way which stabilises the representation of West, East, and the Third World.[52] In other words, a complex formula is used to combine Functionalist principles of equality and expertise, with traditional attitudes to sovereignty and the accommodation of political interests. The outgoing Board "...designate for membership on the Board the nine members most advanced in the technology of atomic energy including the production of source materials,..."[53] This ensures a predominance of North American, Western and Eastern European members, and so this Article also provides for the selection of ...

> "...the member most advanced in the technology of atomic energy including the production of source materials in each of the following areas in which none of the aforesaid nine is located."

In addition to those three just named, these areas are; Latin America, Africa, Middle East and South Asia, South East Asia and Pacific, and the Far East.[54]

A further twenty members are then elected by the Conference "...with due regard to equitable representation on the Board as a whole," so that at all times each region is represented by a minimum quota.[55] Board members designated by the outgoing Board serve for one year, those elected by Conference serve for two. A final two members are then elected from a re-arrangement of the groups which excludes The Americas and Europe. Within this complex formula it has been possible to accommodate specific disputes regarding the state of advancement made by regional rivals, for example, Brazil and Argentina, as well as the perennial representation conflicts centred upon South Africa, and Israel which confront all international organisations.

As with the Conference, the Board operates by simple majority voting, each delegate having just one vote, and budgetary matters requiring a two-thirds majority.[56] The Board's powers are executive; "to carry out the functions of the Agency in accordance with this Statute, subject to its responsibilities to the General Conference." It may meet and create committees at its discretion, although the only formal responsibility within this broad mandate is the preparation of annual reports on the work of the Agency.[57]

The same compromise between Functionalism and political and geographical expediency is evident in the staffing of the Agency.

> "The paramount consideration in the recruitment and employment of the staff and in determination of the conditions of service shall be to secure employees of the highest standards of efficiency, technical competence and integrity."[58]

This ideal type of employee recruitment is then qualified by the stipulation that ... "...due regard shall be paid to the contributions

of members to the Agency...". Also, "...to the importance of recruiting staff on as wide a geographical basis as possible."[59] Effectively, this provision establishes so called positive-discrimination in favour of new members, and less developed countries generally.

The ethos of the international civil-servant is clearly affirmed in the provision that...

> "...In the performance of their duties the Director General and the staff shall not seek or receive instructions from any source external to the Agency..."

Whilst member States are similarly advised to

> "...respect the international character of the responsibilities of the Director General and the staff and...not seek to influence them in the discharge of their duties..."[60]

The Director General, appointed by the Board, with Conference approval, for a four year term, is described as "...the chief administrative officer of the Agency..." "...responsible for the appointment organisation, and functioning of the staff...". He is "under the authority of and subject to the control of the Board..." a description and mandate which leaves little scope for innovative 'entrepreneurial' behaviour on the part of the Director General.[61] In fact, the I.A.E.A. has had only two Directors General in its history; the American, Stirling Cole, 1957-1961, and the Swede, Sigvar Eklund since 1961.

4.5.3. The Functions of the Agency

4.5.3.1. Information, Supply of Materials, Services of Projects

The Agency acts as a clearing-house and publicist of scientific information which may assist the members States in developing the peaceful uses of atomic energy.[62] The Statute also contains extensive provisions regarding the supply of materials through which the Agency was originally empowered to act as a controller and broker in the international trade of nuclear materials. The Agency is responsible for storage and protection of these materials against both

natural hazards, and more pointedly,against...

> "...unauthorized removal or diversion...damage or destruction including sabotage and forcible seizure..."

Furthermore, ...

> "The Agency shall ensure the geographical distribution of these materials in such a way as not to allow concentration of large amounts of such materials in any one country or region of the world."[63]

The Agency is empowered to establish, as necessary, the plant, equipment, physical safeguards, health and safety measures, control laboratories and staff facilities to conduct its role as broker and depository.[64]

States donating materials to the Agency are prohibited from ear-marking some part of their contribution for specific projects, and hence for the assistance of particular countries . Their contributions for use at the discretion of the Agency are welcomed.[65]

Agency projects "...for research on, or development or practical application of, atomic energy for peaceful purposes..." may be established by any member or group of members. The Agency's support may extend to the supply of materials, services and facilities; and assistance in the provision of finance. Before approval of any project the Agency must give due consideration to; its utility, feasibility, health and safety standards, equity in the distribution of assistance, and "...the special needs of the underdeveloped parts of the world..."[66]

4.5.3.2. Agency Safeguards

> "...With respect to any Agency project, or other arrangement where the Agency is requested by the parties concerned to apply safeguards, the Agency shall have the following rights and responsibilities..."

The Agency may...

> "...examine the design of specialised equipment and facilities, including nuclear reactors, and to approve it only from the view-point of assuring that it will not further any military purpose, that it complies with

> applicable health and safety standards, and that it will permit effective application of the safeguards provided for in this article."[67]

These safeguards comprise the observance of health and safety standards, the maintenance and production of operating records "...to assist in ensuring accountability for source and special fissionable materials used or produced...", the preparation of reports on the movement of materials, and approval of the means to be used for the chemical reprocessing of irradiated material, which must ensure non-diversion to military purposes. Furthermore, material recovered or produced as a by-product, which would include plutonium , must... "...be used for peaceful purposes under continuing Agency safeguards for research or in reactors existing or under construction specified by the member or members concerned..."[68] Also, to prevent stockpiling, any by-product material... "...over what is needed for the above stated uses..." must be deposited with the Agency.[69] Then, in a passage of fundamental importance, the Agency is empowered to,

> "...send into the territory of the recipient State or States inspectors, designated by the Agency after consultation with the State or States concerned, who shall have access at all times to all places and data and to any person who by reason of his occupation deals with materials, equipment, or facilities which are required by this Statute to be safeguarded, as necessary to account for source, and special fissionable material supplied, and fissionable products and to determine whether there is compliance with the undertaking against use in furtherance of any military purpose."[70]

This crucial passage is the basis of all I.A.E.A. safeguards development. Its powers are seemingly unambiguous and extensive, the most important right, for the Agency being "... access at all times to all places and data and to any person...". In subsequent chapters this study will make a detailed examination of the process whereby these sweeping Statutory powers of the I.A.E.A. have been constrained in the years since 1957. Before passing on to conclude this summary of the Agency's Statute , it may be noted that there is a

critical qualification to the seemingly all-embracing powers set down in this Article. Safeguards are only required to be applied to materials used in Agency projects, which is not to say all nuclear materials in the possession of the State, the latter is only obligatory upon parties to the N.P.T.[71] Thus, in the terms developed in Chapter Two of this thesis, the I.A.E.A. Statute sets limitations upon the degree of extension through the fuel cycle of safeguards application.

Furthermore, it should be emphasised that the I.A.E.A.'s safeguards responsibilities do not extend to the physical protection of nuclear materials, that is the para-military aspects of preventing the diversion of materials, which is a responsibility of the State alone.[72]

4.5.4. Sanctions

The sanctions available to the Agency in the event of suspected safeguards abuse, are basically those of ostracism and expulsion;

> "... In the event of non-compliance and failure by the recipient State or States to take corrective steps within a reasonable time, ..."

the Agency may ...

> "... suspend or terminate assistance and withdraw any materials and equipment made available by the Agency or a member in furtherance of a project."[73]

Additionally, the failure of a State to comply with the various obligations regarding non-military usage undertaken in Articles XI & XII will result in the inspectors reporting non-compliance to the Director General, and hence to the Board. Thereafter,

> "... The Board shall report the non-compliance to all members of the Security Council and General Assembly of the U.N. In the event of failure of the recipient State or States to take fully corrective action within a reasonable time, the Board may take one or both of the following measures: direct curtailment or suspension of assistance being provided by the Agency or by a member, and call for the return of materials and equipment made available to the recipient member or group of members ..."[74]

The Agency may also invoke Art. XIX and suspend the rights, privileges, and ultimately the membership of the non-complying member. The application of sanctions is deliberately gradual, its purpose being to demonstrate to the non-complying State the costs of breaking-off its relations with the Agency, and with other members. Clearly, as the preceding account has demonstrated, these frankly weak sanctions available to the Agency reflect a political purpose; a concession to the Soviet view of the Agency's necessary subordination to the U.N. Security Council. Here, as in the case of safeguards, the need for a system of controls which is credible in the eyes of the international community conflicts with the need for their acceptability to the interests of the individual members which comprise that community.

The Functionalist argument, which attempts to reconcile these conflicting needs, emphasises the ways in which the advantages of accepting and co-operating with international controls are realistic and lasting ones and not illusory.

4.5.5. Finance

In the same way that the acceptance of controls can reveal a State's attitude to the objectives and work of an international organisation, so can the financial arrangements for the gathering of revenues and the dispersal of assistance. This is of particular interest, because as will be seen in Chapters Six and Seven, some States have objected to safeguards finance. The Agency divides its budget between "Administrative expenses" including safeguards, and "other expenses", including the materials, services and equipment of Agency programmes. The former expenses are apportioned "... among members in accordance with a scale to be fixed by the guided by principles adopted by the U.N."[75] However, "... such amounts as are recoverable under agreements regarding the application of safeguards ..." shall be deducted.[76] Therefore, the safeguards system is classified as being basic to the collective interest of all the Members, whether individually subject to safeguards agreements or not. This is qualified by charging

to the individual safeguarded State some specific amount if calculable. In contrast the "... other expenses..." of the Agency including the actual provision of technical assistance, though not its administration, are met by charging members for the storage, handling and supply of materials; for services, equipment and facilities. The Board has the discretionary power to allocate some part of any voluntary contributions received, to the "other expenses" budget. Any surplus of revenues, and/or the balance of voluntary contributions is placed in a general fund to be used at the discretion of the Board with the approval of the General Conference.[77]

Voluntary contributions are a particularly sensitive indicator of different governments attitudes to the Agency. For example at the foundation of the Agency the U.S. government volunteered both financial and material contributions to its work. In contrast, at the time when several less developed countries opposed the safeguards system on grounds of discriminatory treatment, the U.S.S.R. expressed its support by withholding any voluntary contributions; a confused policy since, as stated above, safeguards are in no way related to volunteered contributions. However, the political purpose, as noted by Scheinman, is that "... differences over the budget are in reality differences over the program ...".[78]

To reflect the importance and delicacy of financial affairs in the work of the Agency, all budgetary decisions of both the Conference and the Board require a two-thirds majority, a compromise between the organisational efficiency of the simple-majority and the democratic purity of unanimity.[79]

The Statute concludes with conventional paragraphs referring to immunities for Agency staff;

> "... as are necessary in the independent exercise of their functions in connexion with the Agency,"[80]

and to the relationship with other International Organisations, "... the work of which is related to that of the Agency." Further provisions

refer disputes concerning the Agency to the I.C.J., and establish procedures for amendments to the Statute and withdrawal from membership, as well as the legal details of signature and ratification.

4.6. Conclusion

The negotiations which commenced in 1954, after President Eisenhower's U.N. address, and concluded in 1956 with the adoption of the I.A.E.A. Statute, represented a fundamental retreat from the objective of international control over the peaceful uses of atomic energy, under U.N. auspices, which was advanced by the Western allies in the immediate post-war years.

The earlier, ambitious proposals for international ownership and management of all atomic energy activities was eventually compromised to the extent that the I.A.E.A. was founded to serve primarily as a clearing-house for information, a co-ordinator of scientific research and development, with a particular responsibility to assist the technological and economic progress of the less developed countries. The Statute endowed the Agency with certain optional roles in respect of the storage of fissionable materials, and the arrangement of nuclear fuel supplies, for use at the discretion of Members. However, the negotiations and the resulting Statute did establish the necessity of creating a rigorous system of safeguards to verify that the assistance given by the Agency to the national atomic energy programmes of its Members was not diverted to military purposes.

This retreat from a western insistence upon the former U.N.A.E.C. proposals can be traced directly to the changed technological and political analyses which Eisenhower advanced in his address. First, that it was possible to separate the peaceful and military uses of atomic energy and to establish a system of controls and safeguards over the former that would promote its benefits without giving access to the technology of weapons proliferation. Secondly, that it was both desirable and necessary that the Soviet Union be fully involved in this undertaking. Thirdly, it was recognised that a fundamental compromise with the Soviet Union would be necessary.

On the one hand, the U.S. and the Western allies would have to concede to the Soviet Union on the matter of the proposed Agency's powers with regard to ownership and control, this in order to obtain from the Soviet Union an agreement to abandon their a-priori insistence upon disarmament, and to accept a system of internationally enforced safeguards and inspections. However, the Statute itself did not establish a safeguards system, but rather established the guidelines upon which individual states and the Agency would negotiate and conclude a safeguards agreements between them. As will be discussed in subsequent chapters, it was not until 1968 that a safeguards system broad enough to encompass the full range of Agency projects was elaborated.[82] Furthermore, it was not until 1970, with the entry into force of the Non-Proliferation Treaty that the concept of full fuel cycle safeguards extending to all nuclear activities in the signatory state came into being.

Those limitations to the extent of safeguards application referred to in the foregoing account stem directly from the basic division between ownership and control or management upon which the I.A.E.A. was founded. Such a division, although clearly a step backward from the all-embracing and 'pure' Functionalism of the Baruch Plan, was however a necessary political compromise. It was necessary in order to secure Soviet agreement to the establishment of the Agency with such powers as have been described above. The I.A.E.A. was founded upon the political realism of the Cold War, which by 1957 had become formalised in the strategic doctrines of nuclear deterence. The tantalizing prospects for disarmament and the international control of atomic energy resources, so painstakingly debated between Gromyko and Baruch, had passed. In their place had been created a less than fully comprehensive Functional Agency, but one in which the concept of safeguards was put forward as the means to secure the separation of peaceful from military uses of nuclear materials. In so far as the Statutory provisions relevant to safeguards were concerned the Agency's rights, with the exceptions noted, were comprehensive, particularly with respect to inspections. However both the application of safeguards and the relevance of sanctions for States violating safeguards depended

upon the Agency Projects concept. This in turn depended upon the extent to which the I.A.E.A. was permitted to implement its statutory provisions for fuel supply. As will be shown in Chapter Five these provisions were, in effect, stillborn, and, ironically, in view of the role played by the U.S. government in founding the Agency, it was American commercial policies which restricted this aspect of the Agency's responsibilities.

Footnotes to Chapter Four

1. See Eisenhower, D.D., Mandate For Change 1953-1956; Heineman, London, 1963, pp.251-255, on the drafting of the original speech, and the contributions of Special Assistant for National Security, General Robert Cutler, and the U.S. Atomic Energy Commission Chairman, Lewis L. Strauss. See also Kramish, A. The Peaceful Atom and Foreign Policy, Harper and Row, New York, 1963.
   Text of Eisenhower's speech reproduced in Dupey, T. and Hammerman, G. A Documentary History of Arms Control and Disarmament, Dupey-Bowker, New York, 1973, pp.358-364.
2. Dupey and Hammerman, op.cit., 1973, p.360.
3. loc. cit.
4. ibid. p.362.
5. loc. cit.
6. ibid. p.363.
7. loc. cit.
8. loc. cit.
9. loc. cit.
10. loc. cit.
11. Bechhoefer, B.G. and Stein, E. "Atoms for Peace, The New International Atomic Energy Agency," Michigan Law Review, Vol. 55, (6), 1957, pp 747-798. see p.785.
12. ibid. p.794.
13. loc. cit.
14. loc. cit.
15. U.N. Yearbook 1954, New York, 1955, pp3-4.
16. ibid. p.4.
17. ibid. p.6.
18. ibid. pp.6-7.
19. ibid. p.7.
20. Bechhoefer and Stein, op.cit., 1959, p.794.
21. U.N. Yearbook 1954. New York, 1955, pp7-8.
22. ibid. pp.9-10.
23. See record in U.N. Yearbook 1955, New York 1956, pp13-14.
24. Bechhoefer and Stein, op.cit., 1959, p.785.
25. ibid. pp.786-787.

26. ibid. p.787.

27. loc. cit.

28. loc. cit.

29. U.N. Yearbook 1955, New York 1956, pp13-17.

30. Bechhoefer, B." The Historical Evolution of International Safeguards;" from Willrich, M. ed. International Safeguards and Nuclear Industry, John Hopkins, 1973, pp.27-32.

31. Bechhoefer and Stein, op.cit., 1959, p.762 .

32. Bechhoefer B. op.cit. 1973, p.29.

33. U.N. Yearbook 1956, New York 1957, pp.104-106.

34. loc. cit.

35. ibid. p.107.

36. I.A.E.A. Statute. Vienna, June 1973, Article II. The only amendments to the Charter made since 1956 have concerned the number and geographical distribution of seats on the Board of Governors.
See also Stoessinger, J.G.," The I.A.E.A., The First Phase ," International Organisation, XIII, (3), 1959, pp.394-411.

37. I.A.E.A., Statute, 1973, Article II.

38. ibid. Article IIIA 1-4.

39. ibid. Article IIIA 5.

40. ibid. Article IIIA 6-7.

41. ibid. Article IIIB 1.

42. ibid. Article IIIB 2.

43. ibid. Articles IIIB 4 also XIIC.

44. ibid. Article IIIC.

45. ibid. Article IIID.

46. ibid. Article IV A; B.

47. Mitrany, D. "A Wartime Submission" from The Functional Theory of Politics. Martin Robinson, London, 1975, p.120. cf. I.A.E.A. op.cit. 1973, Article IVC.

48. Mitrany, D. A Working Peace System. Quadrangle, Chicago, 1966, p.64.

49. I.A.E.A., Statute, 1973, Articles XIVH, XVIIC, XIXB.

50. ibid. Article V D.

51. ibid. Articles V E, F.

52. ibid. Articles VI, A2.

53. ibid. Article VI A1.

54. loc. cit.

55. ibid. Article VI A2.

56. ibid. Article VI E.

57. ibid. Article VI F.

58. ibid. Article VII D.

59. loc. cit.

60. ibid. Article VII F.

61. ibid. Article VII A, B.

62. ibid. Article VIII.

63. ibid. Article IX H.

64. ibid. Article IX I.

65. ibid. Articles IX J, X.

66. ibid. Article X.

67. ibid. Article XII A.

68. loc. cit.

69. loc. cit.

70. ibid. Article XII A6.

71. supra, note 67.

72. I.A.E.A. is not responsible for the physical security of nuclear materials. That is a matter solely the responsibility of the State. The Agency has undertaken to publish guidelines for the assistance of governments in this matter. However, the separation of safeguards and physical security, an inevitable consequence of separating control from ownership of nuclear materials, is symptomatic of the incompleteness of the I.A.E.A.'s powers.
See I.A.E.A. The Physical Protection of Nuclear Materials (INFCIRC/225/Rev 1), Vienna, 1977.
Also Willrich, M. and Taylor, T.B., Nuclear Theft: Risks and Safeguards, Ballinger, Cambridge, Mass., U.S.A., 1974.

73. I.A.E.A., Statute. Vienna, 1973, Article XII A7.

74. ibid. Article XII C.

75. ibid. Article XIV B.

76. ibid. Article XIV C.

77. ibid. Article XIV E, F.

78. Scheinman, L. "I.A.E.A. Atomic Condominiom?" from Cox, R. and Jacobson, H. The Anatomy of Influence, Yale, New Haven, Conn. 1974, p.233.

79. I.A.E.A., Statute, 1973, Article XIV H.

80. ibid. Article XV.

81. ibid. Article XVI.

82. That is, I.A.E.A. INFCIRC/66/Rev 2, September 16th, 1968.

CHAPTER FIVE

The Development of I.A.E.A. Safeguards 1957-1968

5.1. Introduction

The development of I.A.E.A. safeguards in the year immediately following the ratification of the Statute was a record of initial frustration and disappointment. This was followed, after 1958, by the gradual establishment of a safeguards system appropriate for application to the small volume of nuclear materials subject to safeguards arising from unilateral submissions of material or from Agency projects. It was not until 1963 that simultaneous political, technical and economic developments created conditions more favourable to the further expansion of the system. In 1963, both the Soviet Union and the United States changed their policies in respect to the Agency. Both affirmed their confidence in the desirability of promoting safeguards under Agency, rather than bi-lateral control. There followed a major expansion of the safeguards system through to 1968. The change in Soviet policy in 1963, represented a fundamental reversal of attitudes. The bi-partisan and co-operative relationship established between the Soviet Union and the United States from 1954 onwards was broken soon after the foundation of the Agency. The Soviet Union reverted to a policy of fundamental opposition to the development of international safeguards. In this, the Soviets gained the support of important non-aligned states such as India. Their combined opposition was most clearly expressed in both the General Conference, and Board of Governors meetings during 1958.

The shift in U.S. policy was more subtle, yet clearly contradicted the enthusiastic promotion of the Agency's potential role which had been a consistent feature of U.S. policy since 1946. Basically, the U.S. expanded its provision of bi-lateral

safeguards under the terms of co-operation agreements concluded with states receiving U.S. reactor fuel supplies and technological assistance. Since this trade in no way entailed the use of Agency facilities it was not required to be subject to Agency safeguards. However, it had been enthusiastically anticipated that the U.S. would act to legitimise the Agency's statutory responsibilities. This could have been achieved, either by arranging to supply fuel through the Agency as an intermediary, or by the submission of bi-lateral safeguards agreements to tri-lateralisation with Agency participation. In the event, the latter did not occur until after 1963.

The renewal of bi-partisan co-operation between the Soviet Union and the United States after 1963 arose from several different factors. In the Soviet case the deterioration of relations with China, and the latter's imminent acquisition of atomic weapons, suggested the attractions of a strict international control system. This was reinforced by a belief that Chinese abuse of bi-lateral assistance, provided by the Soviet Union, had been instrumental in China attaining atomic weapons capability.

On the American part, the welcome change of Soviet policy enabled the U.S. to re-assume its former advocacy of the Agency's safeguarding role. Although bi-lateral safeguards offered clear advantages to American commercial interests,[1] support for Agency safeguards required Soviet co-operation in promoting a single potentially universal system. It was also the U.S. opinion that the Agency's pre-1963 safeguards capability was inadequate to deal with the volume of transactions then safeguarded by the U.S. Atomic Energy Commission under bi-lateral agreements.

The change in both Soviet and American policy was also a part of the broader detente between the super-powers which followed the Cuban missile crisis of 1962, and the deterioration of Sino-Soviet relations. The Partial Test Ban Treaty of 1963, concluded between the U.S.S.R., U.S.A. and U.K., was a concrete expression of these changed policies.

For the purposes of this Chapter, the first measures taken to establish an Agency safeguards system, were contained in the Report of the Preparatory Commission, established by the New York Conference which had adopted the Agency's Statute in 1956.

5.2. The Report of The Preparatory Commission

This Report, presented to the first General Conference in September 1957, drew attention to the centrality of the Agency's safeguards function. In relation to the Agency's work to promote the peaceful uses of atomic energy, the Report noted that ...

> "The creation of a reliable system of safeguards against the diversion of fissionable materials to military uses is ... an equally important part of the foundation, of confidence upon which alone the Agency can build an effective programme in the future."[2]

This "... equally important ..." role of the safeguards function was further endorsed by the statement elsewhere in the report that ...

> "In order to avoid any unnecessary delay which might prevent the Agency from assisting Member States, it is essential that the Agency should be prepared at an early date to discharge its statutory responsibilities."[3]

However, a note of ambiguity was sounded in the subsequent recommendations of the Report which stated;

> "The safeguards procedures should keep pace with the development of the Agency's activities."[4]

This important passage was later interpreted by the Soviet and Indian governments to imply a subordinate, and a chronologically subsequent development of safeguards in relation to the promotional functions of the Agency, this despite the clear determination to advocate their simultaneous growth in the other passages quoted above. The Report specifically recommended safeguarding the transport and storage of source and special fissionable materials as the starting point of safeguards development. Further to these recommendations, the Report

emphasised the operational linkage between safeguards, physical security and safety. These latter tasks were subsequently developed in isolation from each other, so further fragmenting the regulatory responsibilities of the Agency.[5]

The Report proposed that a Division of Safeguards be created, one of seventeen such divisions, with the responsibility to develop the safeguards methods and policies of the Agency, including procedures for accountability, storage and inspection. The Division was also to undertake the development of safeguards methodology, and to promote it both within the Agency and the Member States.

The Report proposed a staff level of eight professional and four general service staff. In addition, an Inspection unit was proposed, to plan for the implementation of safeguards and health and safety standards. This unit was to be staffed by four professional and two general service staff. This created twelve professional proposed appointments out of a total of 167.[6] The Report was adopted by the 1957 General Conference.

The Board of Governors met at approximately two-monthly intervals during the remainder of 1957, and through 1958. These meetings, principally concerned to implement the recommendations of the Preparatory Commission Report, were focussed upon staffing and finance. In respect to safeguards, two particular decisions placed an immediate restriction upon the Division's autonomy.

Firstly, it was decided that a Deputy Director General, with the title Inspector General, would head the Division of Safeguards, and the Inspections Unit. However, his appointment was to be deferred until such time as the volume of safeguards activities had more fully developed. Staffing the Division of Safeguards became an issue of contention between, on the one hand the U.S.S.R. and India, and on the other, the U.S.A., U.K. and Canada. The former argued that staffing the Division would be a premature expenditure in the absence of any requests or requirements to apply safeguards. The Western powers took the view that no such obligations would be forthcoming so

long as the Division was unmanned. Forced to a vote, the Board voted on July 2nd, 1958, to recruit staff for the Division, and on July 23rd appointed a Canadian, Mr. Roger M. Smith to the post of Director of Safeguards.[7] Subsequently, the Board vetoed a $300,000 special project on safeguards studies proposed by the Director General, Mr. Sterling Cole. Instead, the Board insisted that the Secretariat first study the work on safeguards methodology conducted by Member States, and by other international organisations.

Commenting upon these restrictions, the first Inspector General subsequently wrote that ...

> "This 1958 attitude set a pattern of parsimony in relation to I.A.E.A. activities and particularly the safeguards function."[8]

The first Board ultimately organised the seventeen Divisions proposed by the Report into five Departments. One of these was The Department of Safeguards and Inspection. This was divided into two Divisions one for each of those functions.

Between then and 1969 two changes were made to this structure. In 1964, the "still dormant"[9] Division of Inspections was merged with the Division of Safeguards, so creating a single Division within the Department of the same name. In 1968, the Department was reorganised into two Divisions, one of Development, the other of Operations. In both of these cases responsible Agency officials attributed the initiative to the Director General.[10]

The Agency was better able to respond to this need for internal reorganisation of its safeguards administration as a result of the 1961 General Conference decision to appoint a new Director General. Dr. Sikvard Eklund, a Swedish physicist, appointed to succeed Mr. Sterling Cole, was, as a European neutral, better able to gain the confidence of both the Soviet bloc and Third World Members of the Agency, especially since the expansion of safeguards was held by some States to be a western preoccupation. This does not infer a criticism of Mr. Cole's ability or integrity, but simply reflects the political realities of the

situations faced by the Agency in attempting to rebuild the spirit of Soviet participation developed between 1953-1957 which had so unfortunately lapsed thereafter.

5.3. The First Safeguards Agreement

At the 1958 General Conference, the Soviet Union declared its fundamental opposition to the development of I.A.E.A. safeguards. First, Mr. Emelyanov, expressed the opinion that any attempt to promote the development of the safeguards system in advance of the Agency's provision of technical assistance was premature. The danger existed that such a policy would divide the Agency's membership into two classes; on the one hand, those "countries exercising supervision," and on the other, "countries subject to supervision,"[11] in a manner which would disadvantage the less developed countries. He concluded by declaring that in pursuit of "peace and international co-operation," his government exercised no such supervision over the beneficiaries of Soviet assistance.[12] By 1958, in view of these difficulties and for commercial reasons, the U.S. had become fully committed to the policy of promoting bi-lateral safeguards agreements with those European states receiving reactor fuel and technical assistance. The issue of international credibility for such agreements between allies was, in the short term, improved by use of the EURATOM organisation to administer these safeguards.[13] However, this regionalisation of safeguards responsibilities was to have unfortunate consequences in the long term.

It was therefore of crucial importance to the I.A.E.A., when on September 3rd, 1958, the Japanese government requested the Agency to supply fuel for the JRR-3 research reactor. The nuclear fuel material requested was readily available on the open commercial market, being three tons of natural uranium, of reactor grade, in ingot form. It was therefore the deliberate intention of the Japanese government to activate the Agency's Statutory responsibilities, both with respect to fuel supplies and the application of safeguards to the resulting Project Agreement.

Addressing the General Conference on October 21st, 1958, Mr.

Furuuchi spoke of the need for the Agency to be able to offer fuel supply contracts on more favourable terms than those available bilaterally. Furthermore, his government had notified the U.S. government of their intention to request the application of Agency safeguards to their existing bilateral agreement, as soon as possible.[14]

The Agency met this request by soliciting offers of the material from among the total of ten States which had indicated a willingness to donate fissile material to it.[15] The Canadian government, in a conscious act to promote the Agency's role, offered the uranium metal to the Agency free of charge, subject to the condition that it be resold to the Japanese at the prevailing world price. The Agency therefore gained a windfall financial gain amounting to over $100,000, and secured a precedent in the activation of its untried Statutory provisions for the supply of fuel.

The explanation for the initiatives taken by both the Japanese and Canadian governments lies in a complex combination of technical and political factors. From the Japanese point of view, Mr. Furuuchi placed particular emphasis upon Japan's dependence upon imported fossil fuels, this vulnerability acting as a strong incentive for the development of commercial atomic energy.[16] To the Japanese, the Canadian built CANDU reactor offered a politically attractive alternative to dependence upon American types. This argument is supported by the fact that Japan simultaneously sought assistance from the U.K., purchasing a MAGNOX reactor, which, like CANDU is fuelled by natural uranium.[17] By this policy the Japanese were able to detach themselves not only from possible future reliance upon U.S. designed and supplied reactors, but also from dependence upon U.S. fuel enrichment services.

A final political incentive lay in the opportunity for Japan to gain the prestige of rehabilitation as a 'peace-loving' nation through adherence to the rules of an international organisation. This may be seen as an aspect of the so-called nuclear allergy which affected all levels of Japanese society in the wake of the Hiroshima and Nagasaki bombings. Another aspect of this argument, so far as Japan's neighbours were

concerned, was that the acceptance of international safeguards under I.A.E.A. auspices was evidence of the firm control of democratic forces over any lingering presence of militarist sentiments in Japan. The commitment to foreswear military uses of atomic energy was of course enshrined in Japan's Constitution with its famous 'Pacifist Article,' which stated that the Japanese people,

> "... forever renounce war as a sovereign right of the nation and the threat or use of force as a means of settling international disputes."[18]

From the Canadian point of view, Japan's interest in the CANDU reactor offered an appealing commercial opportunity to prove the merit of the Canadian reactor. The supply of natural uranium via the I.A.E.A. further showed that U.S. monopoly of nuclear fuel enrichment services could be by-passed. In this way the otherwise unlikely combination of Canadian and Japanese self-interest also served the altruistic needs of the I.A.E.A. In proper Benthemite manner the benefit of all except the U.S.A.E.C. was thus assured by the Japan-Canada initiative.

The Board, acting upon a draft supplied by the Secretariat and the Division of Safeguards, adopted the safeguards Agreement applicable to JRR-3 simultaneously with the Project Agreement establishing the extent of Agency assistance. Both were communicated to the Japanese government for signature.[19]

The Safeguards Agreement entered into force on March 29th, 1959, and was published by the Agency as INFCIRC/3.[20]

The terms set out in this document took account of the fact that it would serve to inaugurate the Safeguards System of the Agency. It was open ended in both duration and extent of application, and gave considerable discretionary powers to the Board.

The Japanese government agreed not to use the fuel supplied under the Agreement, in any way outside the scope of the project, which was defined in an Appendix to the text.[21] The Japanese government further agreed that ...

> "The details of the application of Agency safeguards shall be determined from time to time by the Board of Governors of the Agency, after consultation by the Director General of the Agency with the Government." [22]

The Japanese also agreed to accept the decision of the Board as final in the event of any dispute concerning the application of safeguards.[23] It was an inevitable consequence of the lack of a developed safeguards capability which necessitated these terms. Nonetheless, the combined effect of the tripartite, I.A.E.A.-Canada-Japan negotiations bestowed legitimacy upon the Agency. It required definitive action, and mobilised financial and man-power resources in furtherance of the safeguards function.

5.4. The First Safeguards System

The successful entry into force of INFCIRC/3 created substantial arguments in favour of the Agency establishing a single unified safeguards system to fully realise the terms of Article XII of the Statute. These arguments were in part, political, yet also administrative and technical.

The primary political consideration was the obligation to confer equal rights and responsibilities upon each State accepting the application of safeguards. This might not be possible if a series of ad-hoc agreements such as that applied to Japan, were concluded for every project in each State. This problem was soon highlighted by a request from the Finnish government for the Agency to apply safeguards to an experimental reactor. An ad-hoc Agreement, of a similarly open-ended nature was negotiated for this, parallel to the negotiations to draft a unified system.[24]

Besides the consideration of equal treatment, a unified safeguards Agreement offered the advantage that States would know, in advance, the requirements of accepting safeguards, and so be fully appraised of both the costs and benefits of their participation in the system. Furthermore, in view of the increasing number of U.S. sponsored bi-lateral safeguards agreements that were being established, a unified

Agency system would promote the tri-lateralisation of these agreements, by meeting the U.S. policy requirement for a more comprehensive I.A.E.A. system.

Administratively, the ad-hoc approach to safeguards would have required an enormous, and unjustifiable re-allocation of resources within the Agency, potentially damaging its promotional responsibilities. Furthermore, the projected expansion, both quantitatively and qualitatively of the many safeguarding tasks to larger and more complex facilities would have presented technical problems, if attempted on an ad-hoc basis. The general principles of safeguarding and the principles of their application could be codified into one document. In the opinion of the first Inspector General,

> "... it should have been foreseen that the Board might have been called upon to make 2,000 ad hoc decisions on relevant safeguards in a period of about ten years."[25]

However, the logic of the unified system approach was not accepted by all States.

The Secretariat prepared two documents on safeguards by May 1959. The first, concerning relevancy and methods, the second containing a detailed set of draft regulations for their application. Both documents combined the function of safeguards with that of health and safety, and proposed common inspection procedures for the two functions. Before submitting these documents to the Board, the Director General passed them to the Agency's non-Statutory, although influential, Scientific Advisory Committee.[26] This was interpreted by some Board members as a deliberate affront to their right to debate the terms of the draft, and contributed to the ill-feeling which characterised some subsequent Board discussions.[27]

During June, the Board met on thirteen occasions to debate the Secretariat's draft. The Soviet Union, her allies and India revived the arguments that they had presented to the Conference on the Statute concerning a-priori disarmament, sovereignty and discrimination.

Translated into the technical context, these objections centred upon the quantities of fissile materials to be subject to safeguards, and on the status of materials produced from initially safeguarded materials. Extensive revisions were proposed by these dissenting States. However, more damaging to the unified development of the Agency's regulatory functions was the decision to detach health and safety provisions from the development of the safeguards system. By so doing, the Board separated an unambiguously desirable and non-contentious function from one subject to dispute. This assured the more rapid promulgation of rules, relating to the former, but deprived the safeguards system of an important linkage to a less controversial issue.

Immediately prior to the 1959 General Conference, the Board reconsidered the draft safeguards system prepared by the Secretariat, which incorporated the amendments voted during the June meeting. The Board then created an "Ad-hoc Drafting Committee" comprising the representatives of Brazil, France, India, Rumania, U.S.S.R., U.K., and U.S.A.[28] The Committee further revised the Secretariat's draft, which on presentation to full Board, was provisionally approved on September 26th, 1959.[29]

At the General Conference the Secretary General reviewed the progress made by the Board, and drew attention to the Soviet and Indian criticisms. He urged the developed States, which did not require assistance, and were therefore not liable for safeguards, to voluntarily accept some degree of control and inspection.[30] This would serve to demonstrate to those States reluctant to accept safeguards that they did not pose an excessive encroachment upon national sovereignty, nor endanger commercial secrecy. In the event it was not until 1964 that the U.S. and later the U.K. made such an offer. The U.S.S.R. has still not done so.[31]

In their own addresses, both the Soviet and Indian representatives stressed the need for the Conference rather than the Board alone to approve whatever safeguards system was eventually adopted.[32]

The Secretariat placed before the Board a set of "Procedures for

the Attachment and Application of Safeguards against Diversion." Then, on January 20th, 1960 the Board established a "Special Working Group of Expert Representatives on Safeguards."[33] The group comprised the same membership as the "Ad-hoc Committee", save for the replacement of Rumania by Czechoslovakia. This Special Working Group was instructed to simplify and to combine the several drafts and their amendments that the Board had considered. The Group was chaired by Dr. Gunnar Randers, who, although a Norwegian Governor, acted in his personal capacity. He prepared his own revision of the Secretariat's drafts, and this document was adopted by the Group as their working draft. After a series of eleven meetings the Group presented its revised text to the Board. This was provisionally approved on April 7th, 1960.

In view of previous Soviet and Indian objections raised during the 1959 Board meetings it was agreed to submit the provisionally approved draft to the Conference. However, the wording of the recommendation did not specify if the Conference would be merely required to consider or to actually decide upon the draft.[34]

This draft was submitted to the 1960 General Conference,[35] and passed to the Administrative and Legal Committee, which, conveniently, was chaired by Dr. Randers. The Report of this Committee, in the form of a Resolution, proposed that a review of the application of safeguards be undertaken after two years. It "... took note ..." of the draft system and "... invited ..." the Board to "... take into account ..." the views expressed by the Conference.[36] On the floor of the Conference the Indian representative attacked the mild tone of the Committee's Resolution.[37] Subsequently the Soviet representative went so far as to declare that it would be premature to establish safeguards in respect of Agency assistance so long as nuclear weapons were not banned.[38] In reply, the U.K. representative made reference to the voting record of the Committee. The affirmative vote had exceeded a two-thirds majority, including the votes of countries from every region, and including a majority of less-developed countries. Five less-developed countries had abstained, whilst only six of the fourteen negative votes came from

less-developed countries. He suggested that this indicated a substantial acceptance of the need for safeguards.[39]

The draft resolution was put to the vote, and adopted by forty-three votes to nineteen, with two abstentions. An analysis of the figures reveals that of the less-developed countries, fourteen voted in favour, and ten against with two abstentions.[40] The interpretation of the U.K. representative was therefore supported. In particular, several of the less-developed states favouring the adoption of a system, were subject to bi-lateral safeguards and therefore better able to judge the claims of both arguments.

On January 31st, 1961 after adoption of further amendments, the Board approved the "Principles and Procedures for the Attachment and Application of Safeguards by the Agency" by seventeen votes to six with no abstentions.[41] This was then published as INFCIRC/26, on March 30th, 1961. This became known as "The Agency's Safeguards System (1961)."

The 1961 system was strictly limited in the range of facilities to which safeguards on the use of nuclear materials would apply. It was designed only to cover ...

> "...the anticipated requirements by the Agency in the immediate future and relate only to research, test and power reactors with less than 100 mega-watts thermal output, to the source and special fissionable materials used and produced in these reactors and to small research and development facilities.[42]

The Agreement contained the proviso that procedures applicable to other facilities would be developed "... as the probable need for them becomes evident."[43]

The long-standing objection of the Indian government to the application of safeguards to successive generations of nuclear material produced from an initially safeguarded batch, was conceded. Safeguards under the 1961 system related only to the first generation of by-product materials.[44]

The general principles of the system took into account the

potential for diversion to military purposes inherent in any assistance given by the Agency.[45] The attachment of safeguards was to ... "take into consideration ..." all peaceful nuclear activities in the State. Furthermore, safeguards could be extended to specialized equipment and to non-nuclear materials supplied by the Agency, if, in the opinion of the Board, they might further a military purpose.[46]

These provisions, recognised the limitations imposed by the 100 mw. thermal capacity ceiling on the attachment of safeguards. The Agency could not attach safeguards to larger facilities, and the system was only to operate upon materials either supplied by the Agency or voluntarily placed under safeguards by unilateral submission of the State.[47] These provisions offered the Agency a certain leverage, in that the application of safeguards required for the continuation of assistance, could be made subject to the Board's satisfaction that other non-safeguarded activities did not further any military purpose.

The system determined minimum quantities of nuclear materials, and the minimum power output (3 mw. thermal) of research reactors below which safeguards need not be attached.[48] This permitted the Agency to concentrate its resources upon materials and facilities most likely to be subject to diversion, and permitted States to operate minor research programmes without interference. This enhanced both the credibility and acceptability of the system. These concessions were revocable at the Board's discretion.[49]

The system set out the rights and procedures the Agency would enforce with respect, (a) to the examination of facility designs, (b) to the State's record system, (c) to account for the movement of nuclear materials, (d) to the submission of reports to the Agency, and, (e) to the role of the Inspectors.[50] The purpose of design review was to enable the Agency to determine whether the design of facilities would permit the effective application of safeguards.[51] The records system, established and operated by the State, was to be approved and verified by the Agency. It was to include the operating records of each facility, in addition to the full accountancy of nuclear materials.[52]

In addition to the submission of routine reports , presenting a detailed analysis of the record system,[53] provision was made for the notification of special reports. The State was required to notify the Agency within forty-eight hours of any unusual incident ...

> "... involving an actual or potential loss, destruction or damage of any facility or material to which Agency safeguards are applied..."[54]

Also, a special report was required in the event of an unaccountable loss of material exceeding the normal operating losses or margins of permitted error.[55] A final provision empowered the Agency to request "... additional special reports ..." if so desired.[56]

The 1961 safeguards system laid down four tasks to be included in a routine inspection. These were the examination of the construction of each facility, the auditing of reports and records, verification of the State's material accountancy by physical inspection, measurement and sampling, and the calibration of instruments.[57] Further provisions gave the Agency broad discretionary powers to vary the frequency of inspections,[58] including the right to perform special inspections to investigate the circumstances giving rise to a special report,[59] and in the event "... of unforeseen circumstances requiring immediate action."[60]

The legal status of the Agency's inspectors, their diplomatic immunity, and personal inviolability was the subject of a separate document, conforming to standard legal practice and negotiated separately from the Safeguards system.[61]

Final provisions set out a procedure for determining the frequency of routine inspections, based upon the annual production or usage of nuclear materials.[62]

The 1961 safeguards system has been described as "... one of the most convoluted pieces of verbal expression in history."[63] This was partly attributable to its novel purpose, which required the invention of concepts and terminology.[64] Furthermore, the system was specifically applied to technical assistance provided by the Agency, yet was clearly intended for subsequent application to bi-lateral trade,

pending the U.S. governments approval for the trilateralisation of its safeguards agreements to transferthem to the Agency.[65]

The 1961 system strictly limited the tasks permitted and assigned to the Agency. The most obvious limitation upon the scope of the system was the 100 mw. capacity ceiling. These was also the provision that only the first generation of materials produced from an initially safeguarded batch, would be subsequently subject to safeguards. The system gave the Agency broad powers of discretion and initiative regarding inspection. These were however considerably less autonomous than the statutory rights discussed in the preceding Chapter, permitting ...

> "access at all times to all places and data and to any person who by reason of his occupation deals with materials, equipment, or facilities which are required by the Statute to be safeguarded."[66]

The 1961 system was designed to meet the needs of the "... immediate future..."[67] not to fully realise the implementation of the Agency's Statutory objectives. To this latter end, there was built into the system the mechanism for its subsequent expansion. The system was made ...

> "...subject to a general review after two years, in the light of the actual experience gained by the Agency as well as of the technological development which has taken place."[68]

However, it was the simultaneous occurrence, in 1963, of major political changes, in the relations between East and West, and changes in the technical and economic feasibility of commercial atomic energy, which both permitted and encouraged the substantial extension and revision of the 1961 system.

5.5. The Extension of the First Safeguards System 1961-1964

During the two years after the publication of the 1961 safeguards document several project agreements were negotiated between the Agency and States receiving assistance. Yugoslavia, Pakistan, Zaire, Finland and Mexico accepted safeguards on a variety of facilities.[69]

Each contained subsidiary arrangements and facility attachments which set out, confidentially, the details of the safeguards procedures necessary to meet the requirements of the INFCIRC/26 system. After 1961 plans were developed in several countries to construct larger scale reactors for commercial nuclear power generation. India sought to construct both U.S. and Canadian designed reactors. Japan had contracted to build a British MAGNOX reactor, the type first used to generate commercial nuclear power at Calder Hall, Cumbria in October 1956. The U.S., Canada and U.K. each required safeguards to be applied which were capable of being transferred to the I.A.E.A. It was therefore necessary to expand and to revise the 1961 system to at least include reactors of larger output than 100 mw. thermal.

At a Board meeting in February 1963 the U.S. Governor proposed that the Director General instruct the Secretariat to prepare a draft for the extension of the 1961 system, to be considered by the Special Working Group.[70] During April, the Working Group met to discuss the proposals made by the Secretariat. They took a conservative interpretation of their mandate, and so submitted a draft for the extension rather than large scale revision of the system.[71]

At the Board meetings during June the U.S.S.R. abstained from voting on the matter.[72] There followed a highly significant agreement between Mr. Emelyanov and Mr. Smyth, the U.S.S.R. and U.S. Governors, to restrict their negotiations to a technical basis, which will be examined in more detail below.[73] The proposed draft was provisionally approved on June 19th.[74] The voting figures were nineteen in favour, none against, with three abstentions.[75] In the same way that the 1961 draft had been considered by the Administrative and Legal Committee of the Conference, so was the draft extension considered in 1963. The resolution passed by the Committee[76] was in turn passed by the Conference, by fifty-seven votes in favour, with four against, and six abstentions.[77] Without further alteration, the Board unanimously approved the extension on February 26th, 1964.[78] This was published on April 9th, 1964 as INFCIRC/26/Add 1.

Under the terms of this extension the safeguards applied under the so called "... principal safeguards document ..." were extended to include reactors of more than 100 mw. thermal capacity.[79] Also, to "... all generations of special fissionable materials derived from special fissionable material produced in a large reactor facility."[80] Provision was also made to cover the use of some proportion of safeguarded materials used in conjunction with non-safeguarded materials.[81] The extension also granted additional powers to the Agency's inspectors. Under the terms of the 1961 system a maximum of six routine inspections per annum was applied to natural uranium fuelled reactors of 100 mw. thermal output. On the same scale, in the case of a reactor requiring twelve annual inspections, that is one of 200 mw. thermal or 66 mw. electric capacity , "... the Agency's inspectors shall have access to the facility at all times."[82]

The manner in which agreement was reached to extend the provisions of the 1961 system was of greater significance for the development of the Agency's safeguards responsibilities than the additional powers granted to the Agency. The crucial factor in the rapid progress made in the Board meetings during 1963, culminating in the unanimous endorsement of the extension in February 1964, was the changed policy of the U.S.S.R. as evidenced by the Emylyanov-Smyth understanding, mentioned above.

The reasons for this second phase of Soviet support for the I.A.E.A. must be seen in the context of U.S.-Soviet relations which entered upon a renewed co-operative phase. Following the Cuban missile crisis of October-November 1962, the U.S.A. and U.S.S.R. revitalised long-standing arms control negotiations. There followed a determined effort to enhance international security by reducing the risk of nuclear war between them. These negotiations coincided with, and indeed contributed to, the deterioration of Sino-Soviet relations concerning the ideological leadership of the international communist movement. In June 1963 both processes reached their public climax.

On June 10th, President Kennedy announced the imminent commencement of negotiations with the Soviet Union concerning a partial

nuclear test ban.[83] Four days later the Communist Party of China published its denunciation of the Soviet Communist leadership.[84] On June 20th, the U.S.S.R. and U.S.A. signed a Memorandum to establish direct communication between the two Heads of State, the so called hot - line agreement .[85]

Kennedy's June 10th speech, and Khrushchev's reply agreeing to the negotiations for a partial test ban were of considerable importance. Both leaders agreed to set aside the long-standing dispute concerning verification of a comprehensive agreement. The resultant so-called 'Partial Test Ban Treaty' contained no provisions for international verification procedures. At best a rudimentary form of verification by national technical means could be undertaken by satellites.[86]

Signed on August 5th, 1963 by the U.S.S.R., U.S. and U.K., the Treaty was properly called the "Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water." It entered into force on October 10th, and had an unlimited duration.

Under the terms of the Treaty the atmospheric testing of nuclear weapons was renounced by the three parties. The agreement to prohibit outer-space and under-sea tests foreclosed future options. Testing continued, underground, and the annual number of such tests peaked in 1970.[87] This led to the Treaty being criticised as a hollow agreement, enacted more for the purposes of environmental protection and propaganda than as a serious measure of arms control.[88]

However, for the purposes of advancing the political conditions necessary to permit the revision of the I.A.E.A. safeguards system, the Treaty was a significant factor in signalling renewed U.S. - Soviet co-operation.

As mentioned above, it was not only changes in the political situation which encouraged the revision of the safeguards system. In December 1963, the Jersey Central Power and Light Company announced its intention to construct a 560 mw. nuclear-power reactor at Oyster Creek, New Jersey, U.S.A.[89] The significance of this announcement lay in the fact that the company was privately owned, and that the

proposed purchase was made on purely commercial criteria. The advent of profitable private atomic energy reversed the ailing prospects for the industry which the post-Suez oil price stability had brought. The coincidence of U.S.-Soviet detente and real commercial opportunities therefore provided the impetus for the revision and further extension of the I.A.E.A. safeguards system.

5.6. The Development of the Second Safeguards System 1964-1966

The General Conference Resolution of September 30th, 1963 which approved the extension of the 1961 Safeguards system also invited the Board to report upon its "... general review of the Agency's safeguards system..."[90] envisaged in the 1961 document.[91] Accordingly the Board established a new Working Group, under the Chairmanship of Dr. Randers. All members of the Board were to be represented, and all Member States were invited to communicate their views to the Group.[92] Szasz comments that ...

> "... the polemics which had dominated most previous considerations...were for the first time replaced by serious studies of how the system could be made to work most effectively and unobtrusively and how its provisions could be stated most simply."[93]

The Working Group met in four sessions, during February, May and October 1964, and January 1965. The first of these concerned planning the Group's work. Thereafter, in May, the Group considered the principles and procedures upon which a revised system would be based. During this session the comments and advice invited from non-participating States was received.[94]

During the Summer of 1964, before the third session of the Working Group convened in October, two developments contributed towards the further progress of the revision. On July 16th, the Agency published a document, "The Economic and Social Consequences of Disarmament."[95] In this the Director General drew attention to the announcements made by the U.S., U.S.S.R. and U.K. before and during

the Conference of the Eighteen Nation Committee on Disarmament, between January and April of that year. On January 8th, President Johnson announced the closure of fourteen plutonium producing plants. On February 6th the U.S. representative to the E.N.C.D. announced that one such plant would be liable to Agency inspection. Then on April 20th, both Johnson and Khruschev announced reductions in the production of uranium 235 and plutonium. The following day, Sir Alexander Douglas-Home made a similar announcement for the British government. It had been further suggested by the U.S. government that the Agency might assume the responsibility to verify an agreed halt in the production of fissile materials.[96] Further to these pledges the U.S. and U.K. governments also agreed a voluntary submission of certain commercial scale nuclear facilities to Agency inspection. On June 14th, the U.S. government agreed to place the Yankee Power Reactor of 175 mw. capacity located at Rowe, Massachusetts, under safeguards. The U.K. government made a similar pledge with respect to two Advanced Gas Cooled Reactors (AGR's).[97]

The second development contributing to the arguments in favour of revising the safeguards system was the Third International Conference on the Peaceful Uses of Atomic Energy held at Geneva between August 31st and September 9th, 1964. The Conference strongly emphasised the commercial feasibility of the nuclear power industry.[98]

The Working Group reconvened in October to discuss a draft safeguards document prepared by Dr. Randers and the Secretariat.[99] Following the submission of amendments, the Group met again during January 1965 and prepared its report for the Board. At the General Conference being held at that time, the U.S. representative congratulated the Agency on the progress made thus far and indicated his government's willingness to initiate the transfer of bi-lateral agreements to Agency supervision.[100] The Board provisionally approved the Working Group's draft by twenty-two votes to nil with two abstentions, on February 25th, 1965.[101] In contrast to previous sessions "... the discussion occupied only two meetings.[102]

In the manner established previously, the draft was passed to the General Conference, and hence to the Administrative and Legal Committee for their consideration. The Report of the latter body contained a resolution approving the draft safeguards document, and a clause inviting the Board to communicate to the Committee, the results of "...such reviews of the safeguards system as are periodically undertaken."[103] At an historic and unprecedented session of the Conference, the draft resolution was approved unanimously.[104] The Board re-convened and approved the revision of the safeguards system. The document was published as INFCIRC/66, "The Agency's Safeguards System (1965).

5.7. The 1961 and 1965 Systems Compared

The 1965 safeguards document provided the model for all subsequent non-NPT safeguards agreements applied by the I.A.E.A. It considerably enhanced the powers available to the Agency, relative to those contained in the INFCIRC/26 of 1961. This resulted, partly, from the consolidation of language and technical definitions so awkwardly developed in the 1961 document. More substantially, the 1965 document included subtle extensions to the Agency's rights in respect of safeguards applications. However the fundamental difference between the two documents lay in the conscious pursuit of political acceptability which permeated the revised text. This took two forms; the detailed terms concerning the application of safeguards ~~was~~ were prefaced by a major statement of principles, outlining the rights and duties of both the Agency and the State. Secondly, the extent of the Agency's authority, although expanded was explicitly stated. Accession was therefore encouraged by foreknowledge of the obligations entailed.

Safeguards agreements in accordance with the terms of INFCIRC/66 are still in force in several countries. The document forms the basis of all current safeguards agreements negotiated since 1965 with countries which have <u>not</u> ratified the non-Proliferation Treaty of 1968. These include a number of countries well advanced in the development of the nuclear sciences such as Brazil, Argentina, Pakistan, India, Chile,

and Spain. These current safeguards agreements have arisen, variously, from Project Agreements, transfer agreements of a formerly bi-lateral nature, and unilateral submissions.[105] It is therefore appropriate to discuss the terms of INFCIRC/66 in the present tense.

INFCIRC/66 sets out the legal and practical basis of the safeguards system, by reference to the statutory responsibilities of the Agency to promote the peaceful uses of atomic energy.[106] In addition to the provisions in the 1961 system for periodic review in the light of experience and technological developments,[107] the 1965 system specifically mentions the development of safeguards "... as necessary..." for facilities which produce or process safeguarded materials.[108] This was undertaken in the revisions of 1966 and 1968, discussed below.

The Agency is obliged to implement safeguards in such a way as to "... avoid hampering a State's economic or technological development ..."[109] and to observe "... prudent management practices ..."[110] The document requires the "... explicit decision of the Board ..." for the Agency to request a State to stop the construction of a principal nuclear facility.[111] Further obligations require the Agency to consult with the State regarding the application of safeguards,[112] and to observe a code of strict secrecy concerning proprietary information revealed through records and inspections.[113]

The principles and technical details of the implementation of safeguards are almost identical for the two systems, the same categories of project agreement, transfer agreements and unilateral submissions being used in the INFCIRC/66 document. Also, safeguards are applied successive generations of nuclear material.[114] However, the 1965 document contains an explicit and crucial statement of the Agency's right to consider "... all pertinent circumstances ..." concerning the possible diversion of materials to military purposes.[115] This means the Agency may, for example, withhold from making a safeguards agreement if suspicious of the States non-safeguarded nuclear activities. Furthermore, the document makes explicit reference to the Agency's Statutory sanctions.[116]

A significant difference between the two systems can be found with respect to Agency assistance regarding the materials subject to safeguards. The 1961 system required safeguards to be applied to materials derived from facilities "... supplied or, in the opinion of the Board, substantially assisted by the Agency."[117] The 1965 system makes the less demanding requirement, that safeguards be applied to materials produced in a facility "... supplied wholly or substantially ..." under the terms of either a project or transfer agreement.[118] The Agency has not supplied equipment on an industrial scale, such as reactor vessels, warranting the description "substantial." This provision therefore refers to bi-lateral assistance, and depends upon the terms and definitions used in those agreements.[119] INFCIRC/66 raised the threshold of minimum quantities of nuclear materials to which safeguards need be applied, An example being the 1 kg threshold for plutonium, compared to the 200 g. minimum in the 1961 document.[120] This reflects the practical requirements of a system which is designed to apply to large scale industrial operations, rather than the research facilities envisaged in the earlier system.

INFCIRC/66 sets out clear criteria for the termination of safeguards. These give the Agency the authority to determine that nuclear material has been ...

> "consumed, or has been diluted in such a way that it is no longer usable for any nuclear activity relevant from the point of view of safeguards."[121]

Furthermore, the transfer of materials out of the State is made subject to the application of equivalent safeguards which are "... accepted by the Agency."[122]

Under the 1965 document the inspectors are entitled to "Check... the operations carried out ..."[123] at ~~of~~ safeguarded facilities; the 1961 document referred simply to their "examination."[124] Further powers include the right to inspect as part of the design review stage, specifying additional grounds for the special inspections.[125] The Agency can order a special inspection on the basis of information contained in any

report,[126] whereas under the 1961 document this could only be authorised on receipt of a special report,[127] besides the common criterion of "... any unforeseen circumstance."[128]

Finally, the 1965 system takes as its minimum frequency of reporting, the figure given as the normal requirement in 1961.[129]

5.8. The Extension of the 1965 System

The 1965 system was designed for application to all principal nuclear facilities except enrichment plants.[130] However, in the opinion of the Board, it was necessary to supplement the provisions of the 1965 document with specific arrangements suitable for fuel reprocessing, conversion and fabrication plants.[131]

During February 1966, the Board therefore re-established the Working Group under the continued Chairmanship of Dr. Randers. The Group was first instructed to prepare a draft Annexe to the 1965 document to extend its provisions to re-processing plants.[132]

The Working Group adopted the same procedures it had used previously. At a meeting in May 1966 it decided to convey to the Board the text of a draft Annexe prepared by the Chairman which took account of the suggestions of the Member States.[133] In June 1966, by a unanimous vote, the Board gave its provisional approval to the draft.[134] The text was communicated to the General Conference in the form of an information document.[135] This was not placed on the Provisional Agenda, and was therefore not made the subject of a resolution or even specific debate.[136] During the General Debate of the Conference the U.S. representative announced that safeguards would be applied to the Nuclear Fuel Services reprocessing plant at West Valley, New York, in connection with the processing of irradiated fuel from the safeguarded Yankee Power Station.[137]

Most significantly the Soviet representative also endorsed the extension of the safeguards system expressing the opinion that

> "... it was absolutely logical that safeguards, as the need arose, should embrace the whole fuel cycle."[138]

The Board's approval in June 1966 was therefore sufficient to implement the extension as INFCIRC/66/Rev. 1.

The Working Group was again re-established in June 1967 to consider a second extension of the 1966 system to detail the procedures applied to conversion and fabrication plants.[139] After five meetings, which included the consideration of opinions from all those Member States which accepted the Board's invitation to participate, Dr. Randers was authorised to report to the Board in November 1967.[140] The Board gave its provisional approval in February 1968, returning the draft to the Working Group for the consideration of amendments. Following three meetings of the Group in May, the Board reconsidered, and gave its provisional approval to the new draft, again unanimously, in June 1968.[141] The Annexe was published as INFCIRC/66/Rev. 2, on September 16th, 1968, bearing the full title "The Agency's Safeguards System (1965 As Provisionally Extended in 1966 and 1968)."

Both Annexe's contain the provision that the procedures described ...

> "shall be subject to review at any time and shall in any case be reviewed after two years experience of their application has been gained."[142]

They establish a monthly frequency for the submission of routine reports;[143] and in the case of plants with a throughput in excess of 5 effective kilograms of nuclear material, provision for inspection "at all times."[144] In the case of reprocessing plants, whenever possible, safeguarded material is to be measured and sampled separately from un-safeguarded materials. However, where this is not possible all material being processed in one operation (called a "campaign") will be subject to safeguards.[145]

Annexe II, concerning conversion and fuel fabrication plants, emphasises the need for a selective concentration of inspections upon highly enriched uranium and plutonium; these being the materials of greatest military significance.[146] The State is obliged to notify the Agency in advance of its programme for handling materials.[147] This is of particular importance in preparing for the treatment and blending of

part-safeguarded and part un-safeguarded materials. As with reprocessing, the system makes a clear preference for handling the two sorts of material separately. However, where mixing or blending occurs, safeguards are applied to the whole batch of material if the originally safeguarded component comprises 30% or more of the total, or if the blending involves plutonium or an increased concentration of fissionable isotopes.[148]

The final stage necessary to complete the extension of the INFCIRC/66 system, to include enrichment plants, was unsuccessful. The Board urged upon the Director General the importance of preparing to take this final measure, a fact noted by the Director General in his address to the eleventh General Conference.[149]

However, the Director General took no further action on this matter. This is attributed by Szasz to the imminent development of gaseous centrifuge technology, which would have required a wholly new appraisal of safeguards procedures relative to that necessary for the 'conventional' technology of gaseous diffusion.[150]

The publication of INFCIRC/66/Rev. 2, marks the present state of the Agency's non-NPT safeguards system. New safeguards agreements signed with non-parties to the NPT must conform to the conditions of the system described above. States subject to this system, which subsequently ratify the NPT, negotiate a safeguards agreement in conformity with the INFCIRC/153 system of May 1971 which is the subject of the next chapter. Upon the entry into force of the States INFCIRC/153 based NPT safeguards, those applied under INFCIRC/66/Rev. 2 conditions are terminated.

5.9. Conclusions

The development and application of the I.A.E.A. safeguards system between 1957 and 1968, (and its continued application to non-NPT parties), substantially fulfilled the Statutory obligations of the Agency in respect of both Articles II and XII. A unified safeguards system was established, suitable for application to both Agency

assisted projects, and to bi-lateral commercial and technical assistance agreements. Furthermore, the transfer of existing bi-lateral agreements to Agency supervision was specifically encouraged. These latter, transfer agreements entrusted to the Agency far greater technical and political responsibilities than would have arisen from the safeguarding of Project Agreements alone. The very limited acceptance of Agency safeguards under provisions for unilateral or voluntary submissions will be discussed below.

In terms of the criteria for safeguards application developed in Chapter Two of this thesis, the achievements of the 1957-68 period may be evaluated in the following manner:

(a) Firstly, with regard to the principle of universality, the record of acceptance of the system by accession to, and ratification of safeguards agreements may be summarised as follows.

In the period under discussion here the Director General was able to announce that by 1968 safeguards were applied to sixty-five reactors in a total of twenty-nine countries, of which eighteen were less-developed countries.[151] By 1971, before the application of NPT safeguards came into effect, this had risen to one hundred and eight installations, covered by forty-four safeguards agreements with thirty-two States.[152]

This impressive numerical growth, from one single installation subject to safeguards in 1959; the JRR3 reactor to one hundred and eight installations twelve years will be qualified below in discussing the limited acceptance of safeguards among particular States, and the limited extent of their application relative to the world's total installed nuclear capacity. Currently, as expected, fewer safeguards agreements under the INFCIRC/66 system remain in force. States which have ratified the NPT since 1968 having transferred their pre-NPT agreements to the jurisdiction of post-NPT agreements. A total of sixty-three non-NPT safeguards agreements remain in force, twenty-three as Project Agreements, thirty-one as transfer agreements concerning bi-lateral aid, and nine unilateral submissions.[153]

(b) The principle that the application of safeguards should involve an equality of responsibilities for all States accepting safeguards was fulfilled in the manner that INFCIRC/66 was developed, deliberately, as a unified system. This was undertaken for those political, technical and administrative reasons discussed above.

(c) The systems developed from 1957 onwards involved a gradual extension of application through the stages of the nuclear fuel cycle. Firstly, to embrace large-scale nuclear reactors producing fissile materials of weapons grade in quantities vastly exceeding the output of the small research reactors initially subject to safeguards. Secondly, the system was extended to include those stages of the fuel cycle at which diversion to military purposes is most likely to occur; conversion, fabrication and, most sensitively, reprocessing, the stage at which chemically pure fissile material is derived from irradiated fuel.

Although the exclusion of enrichment plants from the Annexes of INFCIRC/66 is a potentially damaging omission from the otherwise comprehensive scope of the system, three points should be borne in mind. Firstly, the enormous cost, size and electrical energy consumption of an enrichment plant render the possibility of its covert establishment and operation extremely difficult. Secondly, the loss of nuclear materials from the material accountancy records of the safeguarded fuel cycle would be detected as an irregularity. Thirdly, and related to both of these matters, INFCIRC/66 empowers the Agency to consider "... all pertinent circumstances ..." before entering into a safeguards agreement. This could include consideration of suspicious circumstances relating to unsafeguarded facilities, covert or publicly known.[154]

(d) The development of each safeguards system in this period did not necessarily entail an unambiguous refinement in the technical rigour of its application.

Certainly, the legal powers of the Agency in each of its verification activities was strengthened. This may be seen in the preceding references to INFCIRC/66/Rev. 2's powers in respect of design review, material accountancy and inspection.

However a note of caution must be sounded. In each of these activities it will be noted that the powers conferred upon the Agency by the safeguards agreement fall short of those set out in the Statute. Secondly, the precise codification of rights and duties carries some disadvantages which counter the advantages referred to above, namely technical standardisation and political acceptability .

In the case of INFCIRC/3, ambiguity and uncertainty were resolved by bestowing enormous discretionary powers onto the Agency. As an inevitable consequence of standardisation and the search for acceptance this fail-safe element was discarded. As will be demonstrated in Chapter Seven the institutionalisation of States-rights and the reduction of the Agency's discretionary powers severely hampers the credibility of NPT safeguards.

(e) The sanctions available to the Agency to uphold these enhanced powers did not enjoy any commensurate development. As discussed in Chapter Four the Agency's sanctions, first set out in the Statute, and unaltered since, contain neither preventive nor frankly realistic deterrent value. The relationship between this inadequacy and the Agency's role in the management of the nuclear fuel cycle will be more appropriately discussed in the Conclusion to this thesis.

(f) The last criteria, that of automatic provision for amendment can be seen to have been well fulfilled in the review of both the 1961 and 1965 systems undertaken in subsequent years. In addition to the purely formal authority of these provisions, their inclusion creates a political incentive for review; States which choose to accept the Agency's safeguards have adhered to an agreement which proclaims its own shortcomings and need for improvement.

The major factors encouraging the expansion outlined above may be discerned as follows. An articulate statement of the need for safeguards, and the priorities for their development was contained in the Report of the Preparatory Conference of 1957. In a fashion similar to the three Reports of the U.N.A.E.C. the Preparatory Conference demonstrated the need to establish the technical feasibility of the

undertaking, pending its political acceptability. This provided a stimulus for its implementation, and countered the argument that there was nothing feasible to be discussed prior to the expansion of other tasks by the Agency.

Secondly, there was the initiative of the Japanese and Canadian governments to break the deadlock which set in during 1958. As Soviet hostility to Agency safeguards was renewed, U.S. policy veered away from active support for expanding Agency Projects, to favour instead bilateral aid, under bilateral, U.S.A.E.C. safeguards. The former may be attributed to Krushchev's initiation of his vigorous campaign to gain the friendship of the Third World States. It will be recalled that the opposition to the extension INFCIRC/26 and subsequent developments was an Indian initiative to which the U.S.S.R. lent strong support. Not until the Sino-Soviet split were the Russians to reconsider the wisdom of lending such generous support to the promotion of an unsafeguarded trade in nuclear materials. The U.S. policy change was effected partly for commercial reasons, and partly as a consequence of Soviet intransigence. However, it should be noted that despite there being an act of faith in the Japan-Canada agreement this too had its commercial aspects. The deal offered both Japan as a purchaser and Canada as a producer of nuclear materials and equipment an opportunity to avoid possible over-reliance upon U.S. suppliers. In this the I.A.E.A. was a willing beneficiary.

The successful conclusion of the INFCIRC/3 safeguards agreement, with its enormous grant of discretionary powers to the Agency created strong arguments for the development of a unified rather than ad-hoc approach. The coincidence of political, administrative and technical reasons for so doing was fortuitous. However, in the longer term, the detachment of health and safety responsibilities from safeguards weakened the comprehensive benefits to be derived by States accepting safeguards.

There followed the events of 1963, in which again a coincidence of political and technological changes promoted the expansion of the Agency's responsibilities. The Agency was the beneficiary of these changes, not their instigator. Certainly it would be immodest to claim

a greater role for the Agency, except to note that, by 1963, there had accumulated seventeen years experience, from the U.N.A.E.C. onwards, of negotiating the technical and legal basis of the safeguards principle. As a result , the political objections to the application of safeguards could not invoke technical unpreparedness in their support.

The role of the Secretariat and the Director General in those procedings was discreet although crucial. The appointment of Dr. Eklund, in 1961, as successor to Mr. Sterling Cole afforded the Soviet Union and the more militant developing countries, such as India and Egypt, a greater opportunity to co-operate with the Secretariat. Similarly the professional and political integrity of Dr. Randers, as a scientist and a Scandinavian, conferred greater credibility and acceptability upon the safeguards Working Group.

The voluntary submissions to safeguards made by the U.S. and U.K. in 1964 had a partly symbolic, and partly practical impact. It was a demonstration of faith in the Agency's claim that no adverse effects upon industrial operations or commercial secrecy need follow the acceptance of safeguards. Practically it afforded the Agency the opportunity to train its inspectors in commercial scale operations, for which the U.S. took full credit.[155]

The more important contribution of U.S. policy was the transfer of eighteen bi-lateral safeguards agreements to Agency supervision between 1963 and the entry in force of the NPT safeguards system in 1971. There were also three such transfers by the Canadian government, two by the U.K., and one by Japan.[156]

Regarding voluntary unilateral submissions by other States, this was only done by Mexico, Panama and Taiwan. The first two, submitting all nuclear activities to Agency safeguards in 1968 and Taiwan placing a reactor under safeguards in 1969.[157] In his 1967 address to the General Conference the Director General noted that the sixty-five reactors in twenty-nine countries then subject to safeguards, represented only 8% of the thermal capacity of the world civilian reactors. In particular ...

> "... it was to be regretted that so many countries in Europe, one of the most highly developed areas of the world had not yet given tangible expression to their support by placing their nuclear facilities under Agency safeguards."[158]

This was also clearly perceived by the Soviet Union. As part of a propaganda attack on the rumoured acquisition of nuclear weapons by the Federal German Republic, the Soviet government quite legitimately criticised the EURATOM organisation. The NATO countries ...

> "... continued to insist on the application not of the generally accepted international safeguards system of the Agency but of the control system established by the European Atomic Energy Community (EURATOM) a narrowly regional organisation which was in fact a closed group of States inspecting and controlling each other."[159]

Further reference will be made to the damaging effects upon I.A.E.A. safeguards, made by the separate EURATOM system in discussing the implementation of the NPT safeguards system.

The final factor which promoted the development of the Agency's safeguards system in this period was the practical and commercial consequences of the 1963 breakthrough in the economic feasibility of the nuclear energy industry. After 1963, the clear desire and need for the commercial expansion of the industry initiated a quantitative and qualitative transformation of the materials and equipment to which safeguards could be applied. So long as these required the assistance of the Agency, or of a State which insisted upon a transfer agreement for bi-lateral assistance, then, necessarily, these materials and facilities would be subject to Agency safeguards.

Footnotes to Chapter Five

1. Under the Atomic Energy Act of 1954, and the I.A.E.A. Participation Act the U.S. government ensured that reactor fuel could be purchased direct from the Atomic Energy Commission at less cost than by using the I.A.E.A. as an intermediary. See Bechhoefer, B: "The Historical Evolution of International Safeguards" in Willrich, M: International Safeguards and Nuclear Industry, Johns Hopkins, Baltimore, U.S.A., 1973, pp.32-33.

2. I.A.E.A. Report of the Preparatory Commission of the I.A.E.A. GC/1 GOV 1, I.A.E.A. New York, 1957, p.5. The Preparatory Commission, created on October 26th, 1956, comprised the representatives of Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia, Egypt, France, India, Indonesia, Japan, Pakistan, Peru, Portugal, Union of South Africa, U.S.S.R., U.K. and U.S.A. It elected the Brazilian Carlos Bernades as its President, and Pavel Winkler of Czechoslovakia as its Vice-President. See ibid, p.1.

3. ibid. p.21.

4. ibid. p.22.

5. loc. cit.

6. ibid. p.34-35.

7. See Stoessinger, J. "The International Atomic Energy Agency: The First Phase." International Organisation, Vol. XIII, No.3, 1959, p.397. Also McKnight, A. Atomic Safeguards, A Study in International Verification, UNITAR, New York, 1971, p.45.

8. McKnight, op.cit. 1971, loc. cit.

9. Szasz, P.C. The Law and Practices of the International Atomic Energy Agency, I.A.E.A., Vienna, 1970, p.215.

10. loc. cit.

11. I.A.E.A., GC (II) /OR 21, November 26th, 1958, p.8.

12. loc. cit.

13. See Gorove, S. "Transferring U.S. bi-lateral Safeguards to the I.A.E.A. The "Umbrella" Agreements": Duquesne University Law Review, Volume 6, No. 1, 1967-1968. pp.1-14.

14. I.A.E.A., GC (II) /OR 17, October 10th, 1958, p.3. See also Stoessinger, op.cit. 1959, pp.404-406, for further details of the Japanese request.

15. See Szasz, op.cit. 1970, p.401. for the details of this tender competition.

16. I.A.E.A. op.cit. October 10th, 1958, p.2.

17. loc. cit.

18. The Constitution of Japan. Article IX. Peaslee, A.J., Constitutions of Nations, Nijhoff, Hague, 1966, 2nd Vol., 3rd ed. p.523.
See also Langdon, F. Politics in Japan. Little, Brown; Boston, Mass, U.S.A., 1967, pp.264-279.

19. Szasz, op.cit. 1970, pp.420-421.

20. I.A.E.A., INFCIRC/3, April 15th, 1959.

21. ibid. p.8. para. 1.

22. ibid. p.9. para. 2.

23. ibid. p.9. para. 4.

24. The Finnish project, FIR 1, was safeguarded under I.A.E.A. INFCIRC/24 of December 30th, 1960.
See also Szasz, op.cit. 1970, p.422.

25. McKnight, op.cit. 1971, p.47.

26. The Scientific Advisory Committee was composed of seven individuals, all eminent scientists in the atomic sciences. They served in a purely individual capacity, not as national representatives, although their selection was subject to lengthy debate.
See Szasz, op.cit. 1970, pp.237-241.

27. ibid. p.551.

28. loc. cit.

29. loc. cit.

30. I.A.E.A., GC (III) OR 26; December 4th, 1959, pp.7-8.

31. See below, footnote 96.

32. I.A.E.A. GC (III) /OR 27; December 7th, 1959, p.12, and I.A.E.A. GC (III) /OR 30; December 8th, 1959, p.17.

33. Szasz, op.cit. 1970, p.552.

34. loc. cit.

35. I.A.E.A., GC (IV) /108/Rev 1, August 10th, 1960.

36. I.A.E.A., GC (IV) /142, September 30th, 1960, p.3.

37. I.A.E.A., GC (IV) /OR 44, December 16th, 1960, p.3.

38. ibid. p.6.

39. ibid. p.9.

40. ibid. p.12.

41. McKnight, op.cit. 1971, p.62.

42. I.A.E.A., INFCIRC/26, para. 4.

43. loc. cit.

44. loc. cit.

45. ibid. para. 22.
46. ibid. para. 24, see also para. 25.
47. ibid. paras. 28-31.
48. ibid. paras. 32-36.
49. ibid. para. 37.
50. ibid. paras. 40-59.
51. ibid. para. 42.
52. ibid. paras. 44-46.
53. ibid. para. 47-50.
54. ibid. para. 51 (a)
55. ibid. para 51 (b)
56. ibid. para. 53.
57. ibid. paras. 54-56.
58. ibid. para. 57.
59. ibid. para. 58.
60. ibid. para. 59.
61. The provisions of the Inspectors Document were subsequently incorporated into the revised safeguards system. See McKnight, op.cit. 1971, pp.50-53.
62. I.A.E.A. INFCIRC/26, paras. 61-66.
63. McKnight, op.cit. p.55.
64. ibid. p.56.
65. loc. cit. See also Gorove, S. op.cit. supra, footnote 13.
66. I.A.E.A., Statute, Article XII, A.6.
67. I.A.E.A., INFCIRC/26, para. 4.
68. ibid. para. 5.
69. These were the subject of I.A.E.A., INFCIRC/32, INFCIRC/34, INFCIRC/37, INFCIRC/53, and INFCIRC/52 respectively.
70. McKnight, op.cit. 1971, p.54.
71. Szasz, op.cit. 1970, p.553.
72. Bechhoefer, B. from Willrich, M. ed. op.cit. 1973, p.36.
73. loc. cit.
74. Szasz. op.cit. 1971, p.553.
75. McKnight, op.cit. 1970, p.62.
76. I.A.E.A. GC (VII) /258, September 30th, 1963.
77. I.A.E.A. GC (VII) OR 80, para. 27, January 9th, 1964.

78. McKnight, op.cit. 1970, p.62.

79. I.A.E.A., INFCIRC/26/Add 1, para. 1.

80. ibid. para. 2.

81. ibid. para. 3.

82. ibid. para. 6.

83. See Barton, J.H., and Weiler, L.D. ed. International Arms Control, Issues and Agreements, Stanford, U.P., 1976, pp.107-108.

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93. ibid. p.554.

94. loc. cit.

95. I.A.E.A., GC (VII) /INF/71/GOV/INF/127, July 16th, 1964.

96. ibid. paras. 3-6.

97. Gorove, S. op.cit. 1967-68, p.13.
See also Bechhoefer, from Willrich, op.cit. 1973, p.37.

98. I.A.E.A. GC (VII) /INF/71/GOV/INF/127, of July 16th, 1964, para. 16.

99. Szasz, op.cit. 1970, p.554.

100. I.A.E.A. GC (VIII) /OR 84, January 14th, 1965, pp.4-5.

101. McKnight, op.cit. 1971, p.62.

102. ibid. p.55.

103. I.A.E.A., IX GC/319, September 27th, 1965, para. 4.

104. I.A.E.A., IX GC/OR 98, December 16th, 1965, para. 34.

105. See, respectively, INFCIRC's/143/110/116/154/133 and 99.
See Sanders, B., Safeguards Against Nuclear Proliferation, SIPRI, Stockholm, 1975, pp.71-72, for full status of safeguards agreement, current, under terms of INFCIRC/66.
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107. I.A.E.A., INFCIRC/26, Add 1, para. 5.
108. I.A.E.A., INFCIRC/66, para. 7.
109. ibid. para. 9.
110. ibid. para. 10.
111. ibid. para. 11.
112. ibid. para. 12.
113. ibid. paras. 13-14.
114. ibid. paras. 15-16.
115. ibid. para. 17.
116. ibid. para. 18.
117. I.A.E.A., INFCIRC/26, Add 1, para. 36.
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121. ibid. para. 26, (c).
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123. ibid. para. 49, (d).
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126. ibid. para. 53 (c).
127. I.A.E.A., INFCIRC/26, Add 1, para. 58.
128. ibid. para. 59, cf. INFCIRC/66, para. 53 (b).
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136. Szasz, op.cit. 1970, p.555.
137. I.A.E.A., GC (X) OR 103, February 23rd, 1967, para. 8.
138. I.A.E.A., GC (X) OR 104, February 24th, 1967, para. 76.
139. Szasz, loc. cit.

140. loc. cit.

141. loc. cit. See also McKnight, op.cit. 1971, p.62.

142. I.A.E.A., INFCIRC/66/Rev. 2, Annexe 1, para. 1.
Also Annexe 2, para. 1.

143. ibid. para. 2, of each Annexe.

144. ibid. para. 3, of each Annexe.

145. ibid.

146. ibid. Annexe 2, para. 5.

147. ibid. para. 6.

148. ibid. paras. 9, 11.

149. I.A.E.A. GC (XI) / OR 111, February 8th, 1968, para. 29.

150. Szasz, op.cit. 1970, p.555.

151. supra fn 149, paras. 30-31.

152. I.A.E.A. (GC) XIV OR 135, February 18th, 1971, para. 33.

153. supra fn 105.

154. I.A.E.A., INFCIRC/66 Rev. 2, para. 17.

155. I.A.E.A., GC (XI) OR 112, January 31st, 1968, para. 21.

156. Sanders, B. op.cit. 1975, pp.71-72.

157. ibid. p.72.

158. I.A.E.A., GC (XI) OR 111, February 8th, 1968, para. 31.

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CHAPTER SIX

The NPT and INFCIRC/153 Safeguards; the Negotiation and Terms of the Treaty and Safeguards Agreement

6.1. Introduction

The safeguards system developed between 1957 and 1968, discussed in the preceding Chapter, could not, and could not be expected, to detect nuclear weapons manufacturing activities outside the scope of Agency Projects, bi-lateral arrangements and voluntary, unilateral submissions of nuclear materials to safeguards. In other words, the I.A.E.A. was constrained by the technical and political logic of Eisenhower's "Atoms for Peace" proposal. The technical logic of this was that an effective distinction could be made between the peaceful and military uses of nuclear materials, and that Agency safeguards were a sufficient means of identifying and maintaining that distinction. The political logic, which distinguished Eisenhower's from Baruch's proposals, was that the safeguarding role of the Agency should be restricted to the verification of nuclear programmes owned and controlled by national authorities, and only to the extent that through project, bi-lateral, or voluntary agreements, the Agency was responsible for the materials used.

Clearly, however effective safeguards might be under the various systems developed between 1957-1968, in no way did they constrain the State determined upon the acquisition of nuclear weapons and capable of doing so by solely national means.

The first purpose of this Chapter is to examine the means by which the several States most concerned to restrict opportunities for nuclear proliferation sought to extend international controls over the operation of entire national nuclear programmes. The means chosen was the formulation of a treaty whereby States could solemnly renounce their intention to acquire for themselves, or to transfer to other States,

possession of nuclear weapons. The verification of such a treaty would then require the application of safeguards to all nuclear activities in the State to guard against the covert manufacture of nuclear weapons. The second purpose of this Chapter is to examine this development of the I.A.E.A.'s duties. If the Agency were to implement these safeguards, a fundamental transformation of its responsibilities would be required. Firstly, an extension of its authority in relation to the rights of the safeguarded State, and second an enlargement of the Agency's scale of operations in discharging its responsibilities for material accountancy, record keeping and inspection. The negotiation of this entirely new safeguards system was undertaken in the period 1970-1972 following the successful conclusion of the negotiations to draft a non-proliferation treaty between 1958 and 1968.

The Conclusion to this Chapter is brief and of an interim nature. The whole of Chapter Seven is devoted to an evaluation of the Non-Proliferation Treaty and the I.A.E.A. safeguards system which is applied under the provisions of the Treaty.

6.2. The negotiation of the Non-Proliferation Treaty

6.2.1. Issues

The negotiation of the Treaty on the Non-Proliferation of Nuclear Weapons, (NPT) was successfully concluded in 1968. However, its genesis may be traced to a draft resolution put before the U.N. General Assembly during October 1958. This would suggest that the negotiation of the Treaty was highly contentious. Therefore, before proceeding to a more detailed discussion of the process of negotiation it may be useful to introduce the major issues of political dispute which the negotiations had to resolve.[1]

First amongst these was the problem of how to define nuclear proliferation. As will be shown, the contentious aspect centred upon the status of nuclear weapons deployed upon the territory of the alliance partners of the super-powers; in particular Soviet objections to U.S. plans to create a so-called Multi-Lateral Nuclear Force (MLF) within

NATO. By extension, and with Cuba in mind, the Western powers also sought assurances against weapons transfers to client States of the U.S.S.R.

A second major issue was the status of negotiations toward a non-proliferation treaty vis-à-vis other arms control agreements. Certain non-aligned countries and traditional European neutrals favoured linking the negotiation of a non-proliferation treaty to measures such as a comprehensive test-ban. As will be demonstrated, the formation of a U.S.-Soviet coalition against the Indian-Swedish line heralded the formation of a super-power consensus to co-operate toward the single purpose of non-proliferation.

A third, and related issue was that of attaining a balance of obligations between the non-nuclear States which were to renounce the acquisition of nuclear weapons, and the nuclear-armed States which would be renouncing nothing. The search for elements of mutual concession centred upon, firstly free and assisted access to the peaceful uses of nuclear energy for the non-nuclear weapons states (N.N.W.S.); secondly, security assurances for the N.N.W.S. that they would not be victims of nuclear aggression, and thirdly the N.N.W.S. made strong verbal demands that the nuclear-weapons states should take steps to effect nuclear disarmament. These three demands reflected some genuine and realistic concerns, such as the belief that the possession of a nuclear weapons programme could produce advanced technology spin-offs for civilian use. However, the demand to link non-proliferation to super-power disarmament was an issue clearly beyond the effective control of the N.N.W.S., and one which was at variance with the emerging U.S.-Soviet collaboration upon which the successful conclusion of a non-proliferation treaty rested.

These three issues, definition, separate negotiation, and the demands of the N.N.W.S., underlay the negotiations throughout the period 1958-1968. The fora in which these negotiations were conducted comprised the U.N. General Assembly, and the U.N. Disarmament Commission, later reformed as the Eighteen Nation Committee on Disarmament (E.N.C.D.) in 1961.[2]

Until 1965 negotiations took the form of formal resolutions proposed variously by the Irish Republic, Sweden and India. There followed a more enlivened procedure when, after 1965, the U.S.A. and U.S.S.R. submitted, at first separately and then jointly, draft treaties for consideration by the General Assembly and the E.N.D.C. Also the Italian government contributed its own novel scheme, proposing that, whilst awaiting the successful negotiation of a full treaty, each State should make unilateral declarations on non-acquisition.

With these principles and procedures established it is now appropriate to examine in greater detail the process of negotiation.

6.2.2. Process

The origins of the NPT may be traced to a series of draft resolutions brought before the U.N. General Assembly by the Irish Republic. The first of these, presented on October 17th, 1958, was not voted upon. The next year, Resolution 1380 (XIV) made the argument that,

> "... the danger now exists that an increase in the number of States possessing nuclear weapons may occur, aggravating international tension and the difficulty of maintaining world peace."

The Resolution called upon the Disarmament Committee to consider

> "... the feasibility of an international agreement subject to inspection and control."[3]

Subsequent Resolutions, adopted by the General Assembly in 1960 and 1961 noted with regret that no action had followed upon the adoption of Resolution 1380 (XIV).[4]

Resolution 1665 (XVI) of December 4th, 1961, urged upon all States the urgency of concluding a treaty which would contain provisions;

> "... under which the nuclear States would undertake to refrain from relinquishing control of nuclear weapons and from transmitting the information necessary for their manufacture to

> States not possessing them, and provisions under which States not possessing nuclear weapons would undertake not to manufacture or otherwise acquire control of such weapons."[5]

This Resolution therefore sought to define and deal with the problem of the proliferation of nuclear weapons in terms of both ownership and control, and the transfer of technology. Also, it emphasised the reciprocal nature of the agreement, neither to promote, nor seek to acquire the possession of nuclear weapons. These components remained the basis for the negotiations which followed, and were, eventually, successfully included in the actual treaty.

At this stage, the Swedish government placed their draft resolution before the General Assembly. This disputed the Irish definition of proliferation, and challenged the wisdom of negotiating a non-proliferation treaty separately from other arms-control issues. In Resolution 1664 (XVI), the Swedes called upon States to,

> "refuse to receive, in the future, nuclear weapons in their territories on behalf of any other country."[6]

This clause directly confronted the NATO policy of maintaining U.S. nuclear armed forces in allied countries and was therefore opposed by the U.S. government. Furthermore, Resolution 1664 (XVI) called upon the Director General of the U.N. Disarmament Commission to seek ways to link the negotiation of a non-proliferation treaty to a test-ban treaty.[7]

The difference between the Irish and Swedish definitions of proliferation was clearly substantial. The former, gaining support from the nuclear powers themselves, restricted proliferation to mean a transfer of possession or control of nuclear weapons to countries not currently possessing or controlling them. The latter definition, was extended to include the deployment of nuclear weapons in N.N.W.S., even though the control of such weapons would continue to rest exclusively with the existing nuclear State. In this way the Swedes were defining proliferation in a way which linked the narrower concept

of proliferation (i.e. to new nuclear powers) with such matters as NATO and Warsaw Treaty inter-allied co-operation, nuclear free zones, and weapons testing.

These differences became more significant over the next three years as the U.S. broached its proposals for a NATO Multi-Lateral Nuclear Force.[8] Besides confusing the definition of proliferation successfully advanced by successive Irish Resolutions, the MLF proposal raised intense Soviet opposition to the prospect of the Federal Republic of Germany gaining physical control over formerly U.S. controlled nuclear-forces, and participating in NATO nuclear planning. The U.S.-Soviet confrontation over MLF frustrated the work of the newly established E.N.C.D., and prevented the adoption of any Resolution by the 1962 General Assembly, and permitted only the most general re-iteration of support for continued negotiations by the following Eighteenth Session in 1964.[9]

A more substantial discussion of the MLF issue was undertaken during the meetings of the E.N.C.D., convened at Soviet request between April and June, 1965. The U.S. and U.K. delegates stated that their control mechanisms for the deployment of nuclear weapons in Europe did not contravene the terms of the Irish sponsored Resolution 1665 (XVI). By this, they effectively admitted the demise of the original MLF proposals. This de-fused the U.S.-Soviet confrontation, and in effect signalled the emergence of their coalition against the Swedes, now joined by other N.N.W.S., most notably India, and their proposal to constrain the superpower's deployment of nuclear weapons on the territory of their respective allies.

The Swedes and Indians then added to their package of arms-control demands a requirement that the nuclear weapons States offer security guarantees to the N.N.W.S.[10]

U.S.-Soviet agreement upon the narrower definition of proliferation, and their mutual interest in separating the negotiation of a non-proliferation treaty from other issues of arms-control, produced a change in the pattern of negotiation. Although the ponderous and formal annual procedures of the General Assembly and E.N.C.D.

remained, the U.S. and U.S.S.R. adopted the practice of submitting draft treaties to them for their consideration.

The first U.S. draft was submitted to the E.N.C.D. on August 17th, 1965. Its basic provision was to propose a total prohibition upon the transfer of nuclear weapons to the national control of any non-nuclear State. It further prohibited the transfer of technology, or information intended to assist the manufacture of such weapons. A reciprocal obligation was proposed, binding the non-nuclear States not to seek to acquire nuclear weapons.[11] The Americans also elaborated upon their previous declaration to respect the terms of U.N. General Assembly Resolution 1665 (XVI). Their intention was to allow co-operation among the existing nuclear States, so permitting the continuation of Anglo-American scientific and technical co-operation, and leaving open the possibility of a merger of the Anglo-French nuclear forces.

However, the ambiguity of this statement vis-à-vis the possibility of a German role in any future E.E.C. nuclear force did not satisfy long-standing Soviet hostility on this matter. The Soviets made no immediate response but waited to submit their own draft treaty a month later. This draft, submitted to the General Assembly during September contained basically similar provisions to the U.S. draft. The essential difference however lay in the proposed prohibition of

> "... the right to participate in the ownership control or use of nuclear weapons."[13]

This would have prohibited the creation of any joint European nuclear force, and so the progress of the first U.S. and Soviet drafts was arrested at this impasse.

It was from this point onwards that a basic re-alignment of negotiating positions was effected. On the one hand, from the end of 1965 the U.S. for all practical purposes abandoned further interest in MLF and related schemes. This permitted the promotion of a non-proliferation treaty by a bi-partisan process of U.S.-Soviet co-operation. On the other hand, the misgivings of certain non-nuclear weapons States multiplied and these were expressed more

firmly as the U.S.-Soviet rapprochement seemed increasingly likely to produce a comprehensive non-proliferation treaty.

The Soviet insistence upon an unambiguous prohibition of any shared control of U.S. nuclear weapons among the NATO allies, presented a stark choice to the American government. It had to choose between two virtually exclusive options, to secure either an MLF, or a non-proliferation treaty. The government was itself divided upon the correct choice to be taken. The State Department, most eager to sustain the unity of NATO, supported MLF, whereas the Defense Department, viewing the further proliferation of nuclear weapons as the greater threat to U.S. security, favoured the non-proliferation treaty.[14] President Johnson, influenced by the waning interest for MLF among the European allies, and by soundings of Congressional opinion, itself increasingly pre-occupied with the threat of proliferation, therefore instructed Secretary of State Rusk to abandon the MLF.[15]

On the part of the non-nuclear States, the U.S.-Soviet impasse evident at the 1965 General Assembly, presented the opportunity to draft a concise statement of five principles on non-proliferation. As the U.S.-Soviet relationship of co-operation emerged after Johnson's decision on MLF, these five principles became the yardstick against which subsequent U.S.-Soviet draft treaties were judged by the most critical non-nuclear States. The key passage of Resolution 2028 (XX) read as follows;

> "(a) The treaty should be void of any loop-holes which might permit nuclear or non-nuclear powers to proliferate directly or indirectly nuclear weapons in any form;
>
> (b) The treaty should embody an acceptable balance of responsibilities and obligations of the nuclear and non-nuclear powers;
>
> (c) The treaty should be a step towards the achievement of general and complete disarmament and, more particularly nuclear disarmament;
>
> (d) There should be acceptable and workable provisions to ensure the effectiveness of the treaty;

(e) Nothing in the treaty should adversely affect the right of any group of States to conclude regional treaties in order to ensure the total absence of nuclear weapons in their respective territories."[16]

The first principle may be seen as an attempt to seek a common-sense definition of the terms of the treaty acceptable to both the U.S.S.R. and U.S.A. The second and third, comprised the central demands of the non-nuclear States. The fourth offered a concise statement of the need for verification. The fifth, took note of an O.A.U. declaration and the negotiations among the Latin American states to conclude a regional non-proliferation treaty.[17]

At this time the Italian government made a separate contribution to the attempts of the non-nuclear States to define their interests in the negotiation of a non-proliferation treaty. The Italians proposed at the XXth General Assembly that it would be both possible and desirable for States to make unilateral declarations of intent not to acquire nuclear weapons. By this pragmatic suggestion the Italians sought to create an option for States between the exclusivity of the U.S.-Soviet process, and the perfectionism of the militant non-nuclear weapons States such as Sweden, India and Tanzania.[18]

The 1966 meetings of the E.N.C.D. offered the first evidence of the U.S.-Soviet common approach to emerge from the confidential negotiations conducted between them since the preceding September.[19] The U.S. stated that it would not concede the "... right or ability to fire nuclear weapons ..." to any ally, but would continue to station nuclear weapons on allied territory and to consult allied governments on nuclear strategy.[20] After making its by now routine denunciation of the Federal Republic of Germany, the Soviets then joined with the U.S., and the U.K. in jointly condemning the non-nuclear States for their insistence upon linking non-proliferation to other disarmement measures as maintained in Resolution 2028 (XX).[21]

There followed a seeming lull in the negotiations. The 1966 General Assembly adopted a U.S., U.S.S.R. and U.K. co-sponsored Resolution which urged all States to refrain from any action which might

hamper the conclusion of a non-proliferation agreement.[22] However this lull disguised a considerable volume of bi-lateral secret negotiations between the U.S. and the U.S.S.R. The product of these negotiations, and of public debate in the E.N.C.D. was the submission to the Committee by the U.S. and Soviet delegates, on August 28th, 1966, of separate but identical, partly completed, draft treaties.[23]

The reason for the adoption of this curious procedure was never publicly explained. However, Epstein convincingly suggests that it was at Soviet insistence and was designed to permit unilateral revision of the draft.[24]

Articles I and II of the drafts contained the basic obligation that a State should neither transfer, nor seek to acquire nuclear weapons or control over them. Agreement on these terms indicated the final settlement of the U.S.-Soviet dispute over the status of NATO, and emphasised the subordinate role of the European allies by confirming exclusive U.S. control of U.S. nuclear weapons stationed in Europe.

The drafts also contained a pledge to the non-nuclear weapons States to promote the peaceful uses of nuclear energy. However, the drafts made no reference to other disarmament measures, an omission consistent with the U.S.-Soviet position established in the E.N.C.D. during the preceding year.

An omission of greater significance was that the drafts contained no provisions for the application of safeguards to verify compliance with the treaty's obligations. The Swedish delegate to the E.N.C.D. took advantage of this to urge upon the super-powers a provision that safeguards be applied to the peaceful nuclear activities of the nuclear-weapon States, as well as to all activities in the non-nuclear States.[25]

Some States such as Rumania and Tanzania persisted in their attempts to link the non-proliferation treaty to other disarmament issues. However, as will be shown, the great majority of non-nuclear weapon States joined with Sweden in identifying safeguards as a key issue upon which to establish their demands for reciprocal obligations on the part of the nuclear weapons States.[26]

The U.S. and U.S.S.R. submitted a second pair of draft treaties to the opening session of the E.N.C.D. on January 18th, 1968. These contained provisions for the application of I.A.E.A. safeguards to be applied to the non-nuclear weapons States only. Specific assurances were made that their purpose was only to permit verification of the treaty and would not interfere with the efficient operation of nuclear facilities, nor with legitimate research. It was further proposed that safeguards be applied to all source and special fissionable materials, and that any provision of these materials to non-nuclear weapon States would require the application of safeguards.

The second drafts made one concession to the principles of Resolution 2028 (XX) in the form of an undertaking by the U.S. and U.S.S.R. that they would pursue negotiations in good faith to end the nuclear arms race between them. The drafts also conceded the principle of permitting peaceful nuclear explosion under international supervision, as a form of access to the peaceful use of atomic energy.[27]

A third draft treaty was submitted jointly by the U.S. and U.S.S.R. to the General Assembly on March 3rd, 1968, and the subsequent debate focussed attention on the safeguards issue.

The objections raised against the draft treaty provisions were political, technical and commercial.

The political objection to safeguards rested on the argument that their application to the non-nuclear weapons States alone was discriminatory. From this followed the expression of fears concerning interference in national sovereignty and the right to conduct legitimate research activities. The commercial dimension was raised in the suggestion that the application of safeguards would place an unfair burden upon the routine operations of nuclear facilities, so raising both capital and running costs. A further objection, but one not inimical to the nuclear weapon States, was raised by the uranium-ore producing countries. Canada, Australia and South Africa each urged that uranium and thorium ores be excluded from the definition of source materials.[28] Their fears for the inclusion of these materials were probably unfounded. I.A.E.A. practice established in INFCIRC/66 Rev 2 was to exclude crude

ore from the application of safeguards.[29]

The terms of a treaty designed to outlaw the proliferation of nuclear weapons would necessarily be discriminatory in its effects upon the non-nuclear weapons States. Frankly, from the arms-control perspective, there can be no practical value in attaching safeguards to a State already possessing nuclear weapons. Nonetheless certain States argued against the basic principle of a non-proliferation treaty on these grounds of discrimination . Albania and Cuba each argued that the draft treaty was discriminatory in placing no controls on the enlargement of the super-powers' arsenals, or so-called vertical proliferation. Tanzania and Zambia argued that the draft treaty institutionalised and attempted to legitimize the "neo-colonialism" of the super-powers.[30] This was also the argument advanced by the Peking government which, of course, was unrepresented in either the General Assembly or E. N. C. D.[31]

The other non-nuclear weapons States emphasised the practical, operational and commercial aspects of the discriminatory application of safeguards. In an attempt to answer these criticisms the U. S. and U. K. re-affirmed their willingness to accept safeguards on their peaceful nuclear activities, first made in December 1967 in the context of negotiating the revision of INFCIRC/66.[32] This was a sufficient concession to satisfy all but the most militant objectors. The governments of Japan and the Federal Republic of Germany, which as commercial rivals of the U. S. and U. K. had most to lose from the application of safeguards, accepted the realism of the Anglo-American decision. In justification of this, Scheinman notes that

> "... once subject to safeguards... there is not any basis upon which to deny any nuclear research and development activities in non-nuclear weapon states aside from those directly prohibited by the NPT."[33]

Also, as will be shown shortly, both Germany and Japan took the lead in arguing for the least intrusive safeguards system to be applied under the NPT.

On May 31st, 1968, the U.S. and U.S.S.R. jointly submitted a final draft treaty. Attached to this was a draft resolution commending the treaty for signature. The General Assembly adopted this draft as Resolution 2373 (XXII) on June 12th by ninety-four votes in favour, to four against, with twenty-one abstentions.[34] On that same day, the U.S., U.K. and U.S.S.R. also presented a draft resolution to the Security Council concerning security assurances for the non-nuclear weapon States. This was adopted by ten votes in favour to none against, and with five abstentions.[35] The text of this Resolution will be discussed with that of the text of the treaty .

The NPT was opened for signature on July 1st, 1968. It was signed on that day by the U.S.A., U.K. and U.S.S.R., and by fifty-eight other States.[36]

6.3. The Terms of the Treaty on the Non-Proliferation of Nuclear Weapons

6.3.1. Introduction

The Resolution commending the Treaty affirms its dual purpose. It aims to both prevent the further spread of nuclear weapons, and to promote the peaceful uses of nuclear energy. With reference to both the principle of mutual obligation and the non-nuclear weapon States' demands for security assurances, it calls upon all States to respect the U.N. Charter, and to pursue further disarmament.[37]

The Preamble contains a specific reference to the I.A.E.A. The Parties to the Treaty undertake to co-operate with the Agency in the application of safeguards on their peaceful nuclear activities. The Agency in turn is bound to develop its safeguards system with particular emphasis upon instrumentation "... at certain strategic points." This may be interpreted as an obligation upon the Agency to refrain from over-zealous and unacceptable intrusion upon legitimate activities.[38]

The terms of the Treaty may be discussed in three parts; the first concerning non-proliferation, and the application of safeguards, the second concerning the principle of reciprocal obligation in respect of the rights of States renouncing the acquisition of nuclear weapons and the

third concerns the concluding details of the Treaty.

6.3.2. Non-Proliferation and Safeguards

States Party to the NPT agree ...

> "... not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices."[39]

This prohibition also includes transfer of control, and encouragement or inducement to non-nuclear States to manufacture or otherwise acquire such weapons. A reciprocal prohibition applies to each non-nuclear State Party. Under Article II, each agrees,

> "not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices, or of control over such weapons...or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices."[40]

Among the loopholes which may be detected in the apparently unambiguous language of these two Articles none, practically, undermines the uncompromising nature of the prohibition envisaged. Young has, for example, suggested that nothing in these Articles prevents a non-signatory conducting contract research for the benefit of a non-nuclear weapons State signatory.[41] Any attempt to subsequently apply the benefits of contract research would, however, constitute an unambiguous violation of the undertaking not to seek to acquire control of nuclear weapons in any form and by any means.

Fischer draws attention to the absence of definition for such terms as "control' and "indirect." Also, to those doubts raised by Egypt and Nigeria that non-state actors, such as private companies or terrorists, might take advantage of some lacuna in these Articles.[42] However these criticisms are frankly inappropriate in view of those factors noted in the process of negotiating the NPT.

As shown in the earliest drafts of the treaty, Articles I and II were the most readily accepted and least contested. The dissent of the non-nuclear weapons States was directed at the inadequate provisions for access to peaceful uses, and at the discriminatory application of safeguards. Following the settlement of the MLF and related issues they did not dispute the semantics of 'nuclear weapons' or 'control'.[43]

Turning now to the role of the I.A.E.A., under Article III, each non-nuclear weapon State, party to the NPT, agrees to accept Agency safeguards. These are set out in an agreement negotiated between that State and the Agency. The negotiation of a standardised safeguards agreement, as achieved in INFCIRC/153 is the subject of the latter part of this Chapter . The proviso that the "... exclusive purpose" of the safeguards is to verify the fulfilment of the Treaty has been noted above. Significantly, the Treaty refers to ...

> "... preventing the diversion of nuclear energy from peaceful purposes to nuclear weapons or other nuclear explosive devices."[44]

The Statute, and the NPT safeguards agreement as it was eventually accepted, cautiously avoid any reference to the prevention of diversion as the objective of safeguards. The Statute refers to the Agency's obligation to "ensure, so far as it is able" that materials subject to its responsibility are not diverted to military purposes.[45] The text of INFCIRC/153 holds that ...

> "... the objective of safeguards is the timely detection of diversion of significant quantities of nuclear materials...to the manufacture of nuclear weapons...or for purposes unknown,"

the purpose being the ...

> "... deterrence of such diversion by the risk of early detection."[46]

This distinction is of course, of considerable importance when assessing the extent to which the Agency has been able to fulfil its obligations.

The passage of the NPT which defines the exact scope of the

Agency's safeguarding responsibilities states;

> "The safeguards required by this article shall be applied on all source or special fissionable material in respect of all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere."[47]

This establishes the Agency's right to develop a system of safeguards applying to the entire nuclear fuel cycle and to commercial and research activities. Compared to the provisions of INFCIRC/66 Rev. 2, which applied only to project agreements, transfer agreements and specific unilateral submissions, the NPT required the I.A.E.A. to develop a greatly enlarged scale of operations.

The term, "... peaceful nuclear activities" used in Article III requires explanation. The use of this term, rather than simply all nuclear activities permits the use of nuclear materials for non-proscribed, that is, non-explosive, military uses. The purpose of this seemingly substantial loophole is to permit the development of nuclear propulsion for naval vessels by the non-nuclear weapon States. The use of nuclear materials for authorised military purposes is governed by strict provisions in INFCIRC/153.[48] It might however be interpreted as a breach of the Agency's Statutory prohibition upon assistance for "... any military purpose."[49] The safeguards implications of this provision will be examined in Chapter Seven.

Other provisions establish that all trade and assistance in nuclear materials and equipment, involving non-nuclear weapon States, shall be subject to safeguards.[50] The definition of equipment and materials liable to control was dicussed within the I.A.E.A. and in secret negotiations between the major supplier States. The former resulted in the publication of an Information Circular in 1974.[51] The latter negotiations formed the basis of the so-called London Club, or more properly, the Nuclear Suppliers Group.[52] (The terms of these definitions are discussed at 6.4.4.6.)

The commitment to restrict safeguards to the "... exclusive

purpose of verification" is defined in greater detail. It requires that safeguards be designed in such a manner as to "... avoid hampering the economic or technological development of the parties ...". Also, safeguards must not hamper international co-operation in the peaceful uses of nuclear energy.[53]

A final matter pertaining to the application of safeguards concerns regional arrangements. The Treaty permits States to negotiate agreements with the I.A.E.A. either individually or collectively, subject to a strict timetable.[54] This provision allowed EURATOM members to negotiate a single safeguards agreement between themselves and the Agency. However, as EURATOM previously applied safeguards to certain of the peaceful nuclear activities of its members, these States were reluctant to simply transfer those responsibilities to the I.A.E.A. The EURATOM States therefore entered into lengthy negotiations with the I.A.E.A. to achieve a compromise whereby the two organisations shared the safeguards function between them. These negotiations were complicated both by the fact that France has not become a party to the NPT, and by the entry of Denmark, Ireland and the U.K. to EURATOM in 1973. The eventual resolution of this matter, and its implications for the credibility of the NPT will be discussed at 6.4.4.7.

Another aspect of regional arrangements for safeguards arises from the establishment of regional nuclear free-zone agreements. The promotion of such agreements is included in the statement of principles contained in General Assembly Resolution 2028 (XX). The NPT also permits these agreements "... in order to ensure the total absence of nuclear weapons ..." in those countries.[55] The Treaty for the Prohibition of Nuclear Weapons in Latin America, the so called 'Tlatelolco Treaty' of February 14th, 1967, is currently the only treaty of this kind. Its safeguards provision will also be discussed at 6.4.4.7.

6.3.3. Safeguards and Reciprocal Obligations

Article IV of the Treaty contains the more positive aspects of the undertaking that the application of safeguards should not hamper the economic and technical development of the Parties. It guarantees the

"... inalienable right ..." of each to pursue national research and development. Also, all Parties have the right to participate in "... the fullest possible exchange ..." of materials, equipment and information for the peaceful uses of nuclear energy. In a particular reference to the role of the developed countries, and the I.A.E.A., the Treaty urges that international co-operation in this field "... give due consideration to the needs of the developing areas of the world."[56] A particularly contentious aspect of the peaceful uses of nuclear energy concerns so-called peaceful nuclear explosions. The NPT assures the non-nuclear States that any potential benefits derived from peaceful nuclear explosions will be made available to them "... under appropriate international observation and through appropriate international procedures."[57] The early technical optimism, among advocates of the large scale use of nuclear explosions for civil engineering and other schemes has not been fulfilled, and no use has been made of the provisions of this Article.[58] The contentious quality of these provisions derives from the suggestion of some countries such as India, that the reluctance of the nuclear weapon States to give greater consideration to the peaceful uses of nuclear explosions is prejudiced and discriminatory. This point was most forcefully argued by India in defending its test-detonation of a nuclear device in May 1974.[59]

With regard to other obligations upon the nuclear weapons States the NPT requires that each Party undertake,

> "... to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date.[60]

The same Article also refers to nuclear and to general and complete disarmament. This constitutes the commitment of the nuclear weapons States to pursue the regulation of so called vertical proliferation. This Article in fact commits the nuclear weapons State to take little action. Although a realistic hierarchy of priorities is stated, no actual objectives of control in terms of weapons levels, characteristics or deployment are suggested. Furthermore, no time limit is suggested for the commencement, let alone the conclusion of the negotiations.

Nonetheless, on the day that the NPT was opened for signature, Premier Kosygin of the U.S.S.R. and President Johnson of the U.S. announced their agreement to commence bi-lateral discussions on the limitation of strategic arms.[61] The SALT talks commenced at Helsinki on November 17th, 1969, and this series of bi-lateral negotiations has become the central forum for nuclear arms control between the U.S.S.R. and U.S.A. Agreements were reached on anti-ballistic missiles, and a threshold test ban, in addition to the ceiling agreed upon the total number of delivery vehicles permitted by both sides.[62] It remains at the discretion of the non-nuclear States to judge whether the results of the SALT series constitute a sufficient implementation of Article VI of the NPT.

The security assurances contained in Security Council Resolution 255 of March 7th, 1968, constitute a final class of obligations undertaken by the nuclear weapons states, party to the NPT.

The U.S., U.K. and Soviet jointly sponsored Resolution was, in fact, minimal in its commitments. It bound the three to "... act immediately in accordance with their obligations under the United Nations Charter ...", should any State possessing nuclear weapons threaten aggression against a non-nuclear weapon State.[63] They also pledged to "... provide or support immediate assistance in accordance with the Charter" under the same circumstances. These effectively restricted the commitment of the three to support any action that the Security Council might take under Article 34 of the Charter, and to affirm the right to self-defence contained in Article 51.

6.3.4. Concluding Articles

The concluding Articles of the NPT are largely conventional and non-controversial, such as those pertaining to authentic texts. However, matters of considerable importance and potential dispute are raised in those provisions concerning amendment, ratification and withdrawal from the Treaty.

The NPT entered into force when ratified by the three depository governments, the U.S.S.R., U.S.A. and U.K., and forty other

signatories.[64] This was achieved on March 5th, 1970, twenty months after the Treaty was opened for signature. The Treaty also defines a nuclear weapon State as one "... which has manufactured or exploded a nuclear weapon or other nuclear explosive device prior to January 1st, 1967."[65] This restricts the definition to the three depository governments, plus France and China. Therefore a State exploding a nuclear weapon, or other device after that date and subsequently adhering to the Treaty, would be defined as a non-nuclear State, and would be subject to selective safeguards on all those sectors of its nuclear industry defined as peaceful. These would be substantially more rigorous than the voluntary safeguards accepted by the U.S.A. and U.K. An anomaly thus arises from the voluntary acceptance of safeguards by these nuclear weapons States and their compulsory application upon any State gaining de-facto weapons status after 1967.

To amend the NPT requires a procedure so elaborate and qualified by powers of veto as to effectively prevent this occurring in the period between quinquennial Review Conferences.[66] Amendment requires the majority vote of a special Conference convened at the request of one third of the Parties. The majority must contain the votes of the depository States, and all the members of the I.A.E.A. Board of Governors.[67] Furthermore, it is a fundamental principle of international law that amendments only apply to these States which ratify them.[68] Thus far, no amendments to the Treaty have been made. The proceedings of the 1975 Review Conference will be referred to, briefly, in Chapter Seven.[69]

A final and controversial provision of the NPT concerns the procedures for withdrawal. Each State Party has the right to withdraw from the Treaty

> "... if it decides that extraordinary events, related to the subject matter of this Treaty have jeopardised the supreme interests of its country."

Withdrawal is effective upon three months advance notice to the U.N. Security Council, and must include some statement of the "... extra-ordinary events ..." which have led to the decision.[70] A Treaty

normally makes provision for Parties to withdraw from obligations.[71] The controversial dimension of the NPT provisions in this respect, is the short period of notice required. - Three months provides little opportunity for the other Parties, the Security Council and the I.A.E.A. to act. They may either attempt to dissuade the State intending to withdraw, or take other measures if they suspect the imminent acquisition of nuclear weapons capability by that State.

6.4. The I.A.E.A.-NPT Safeguards System

6.4.1. Introduction

After the NPT was opened for signature on July 1st, 1968, the I.A.E.A. Director General formally accepted the burden of responsibility that would fall to the Agency upon the entry into force of the Treaty.[72] He also acknowledged that a considerable expansion of the Agency's safeguarding activities would be central to that responsibility. The Director General anticipated that a two year period of transition would be required to prepare for the conclusion of NPT safeguards agreements. Emphasising the need for a substantial effort to recruit and train the necessary staff of inspectors, he appealed to the Member States for assistance and co-operation in addition to the usual financial contributions. The Director General established a number of groups for liaison between the Department of Safeguards and Inspection and eminent consultants drawn from the Member States. These groups considered the legal, technical, operational and financial implications of designing a safeguards system to be applied to the entire national nuclear energy programmes of the NPT Parties.[73]

This process of liaison commenced in October 1968 and continued until August 1969. In addition to the U.S.S.R., U.S.A. and U.K., Canada, Denmark and Hungary also participated.[74] The Director General recognised that the negotiation of a new safeguards system might be interpreted by some less developed, non-nuclear weapon States as a further diversion from the promotional responsibilities of the Agency. To assist the fuller participation of those countries in drafting the new system, he therefore suggested forming a committee of

the whole membership.[75] This would replace the Safeguards Working Group, previously chaired by Dr. Randers, which had negotiated the 1965 system and its subsequent revisions.

The Safeguards Committee was established on June 12th, 1970 and was chaired by Dr. Kurt Waldheim. The Committee eventually entailed the participation of forty-eight Member States.

In fact the work of the 'committee of the whole membership' was dominated by eight States, the U.S.A., U.S.S.R. and U.K., with Canada, the Federal Republic of Germany, Italy, Sweden and Japan.[76] Within this group of eight differences of opinion centred, not unnaturally, upon the rigour of proposed safeguards. The non-nuclear States favoured a laxer system to minimise interference in commercial activities. The Committee compromised by accepting the German and Japanese proposals for use of" strategic points measurement." This approach maximised the use of statistical and automatic, or remote control verification procedures, such as T.V. surveillance in preference to a heavier burden of inspections.[77] The details of "strategic points measurement" will be discussed at 6.4.3. Having agreed these principles as essential to the acceptability of the proposed system, the Committee worked both quickly and with little subsequent dispute. On March 10th, 1971, the Committee unanimously adopted its final report in the form of a model safeguards agreement. This was approved by the Board on April 20th, 1971.[78] It will be for consideration in Chapter Seven to determine to what extent the Director General's criteria that the system should combine "optimum acceptability and efficiency" were both able to be fulfilled without conflict between them.[79]

6.4.2. The Characteristics of the System

The model safeguards agreement was published as I.A.E.A., INFCIRC/153 under the elaborate title "The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons." Not unnaturally the document is more usually referred to as "INFCIRC/153" or colloquially, "The Blue Book." Szasz, correctly, although pedantically

refers to the document as "the negotiating instructions."[80] In keeping with the nomenclature adopted previously, and in recognition of the precise purpose to which the document is addressed this study will refer to it as the I.A.E.A.-NPT safeguards system.

Like the 1965 system, the I.A.E.A.-NPT safeguards system takes the form of a draft agreement between the Agency and the State party to the Treaty. The great majority of this is reproduced verbatim in each agreement. Other provisions, requiring a choice between alternative obligations are adjusted for each case.

The I.A.E.A.-NPT safeguards system is designed to implement Article III of the NPT.[81] Safeguards are applied on all source, and special fissionable materials "... in all peaceful nuclear activities within the territory of the State or carried out under its control anywhere."[82] The Agency is required to apply safeguards in such a way as to avoid hampering the economic and technological development of the State or international co-operation in peaceful nuclear activities.[83] Also, the application of safeguards should "... avoid undue interference in the operation of facilities ..." and be "... consistent with prudent management practices," in respect of the thrifty conduct of nuclear activities.[84] The Agency is furthermoreb ound to take every precaution to protect industrial and commercial secrets and other confidential information that it may acquire.[85] By these provisions the Agency is strictly bound to fulfil the proviso contained in the NPT that the exclusive purpose of its safeguards function is to verify the continued use of nuclear materials for peaceful purposes.

The I.A.E.A.-NPT safeguards system requires the State to establish a national system of accounting for and controlling nuclear materials. This must be designed to permit the verification of its effectiveness by the Agency.[86] The system emphasises the constraints under which the Agency must operate. Specific reference is made to the use of "... instruments and other techniques at certain strategic points." Also, the Agency is obliged to concentrate its verification procedures on those stages of the fuel cycle involving the production or use of

potential weapons grade material.[87] The Agency is specifically limited to the acquisition of the minimum information and statistical data necessary to fulfil its duties.[88]

As a preliminary exemption, the system also sets out the conditions whereby materials may be exempted from the application of safeguards for certain military purposes. The material must not be subject to any prior obligation requiring its exclusively peaceful uses, an example being a bi-lateral fuel supply agreement stipulating only peaceful uses. Secondly, the material must not be used for any explosive purpose.[89] This includes a prohibition on so called peaceful nuclear explosions. It permits the use of previously safeguarded materials for naval propulsion and as a heat -source in military satellites.

In the event that the Agency's inspectors have reason to suspect that a diversion of nuclear materials has occurred, the system provides that the Agency's Statutory procedures and sanctions be applied.[90] Under these provisions it is the responsibility of the State to demonstrate that diversion has not occurred. In this respect a considerable discretionary power rests with the Agency. It may initiate sanctions on its own judgement and responsibility.

The first part of the safeguards system concludes with routine provisions relating to third-party liability and finance, and procedures for the settlement of disputes. In the event of any dispute arising from the application of safeguards, the matter is referred to the Board of Governors. If the Board are unable to achieve a settlement, each party nominates an arbitrator, and these two, appoint a third . The decisions of this arbitral tribunal are binding. Any amendment of the safeguards agreement requires the consent of both the State and the Agency.[91]

6.4.3. The Operation of the Safeguards System

The objective of system is defined as ...

> "... the timely detection of diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or

> of other explosive devices or for purposes unknown, and deterrence of such diversion by the risk of early detection."[92]

To achieve this objective, material accountancy is employed as a measure of "... fundamental importance ..." with containment and surveillance as "... important complementary measures ...".[93] The conclusion of the Agency's verification measures takes the form of a statement for each material balance area reporting the amount of material unaccounted for over a specific period, including the limits of accuracy.[94]

The national system of accounting for, and controlling, nuclear materials which the State establishes must make provision for a system of measurement to determine the quantities of nuclear materials in inventory, and also be able to measure materials received, produced, shipped , lost or otherwise removed from that inventory.[95] The system must also provide for calibration procedures, for taking a physical inventory of nuclear materials, and identifying differences in the measurements of the shippers and receivers of nuclear material. The system must also provide reports for each material balance area, the inventory of nuclear material and the changes in that inventory including receipts into and transfers out of the material balance area.

This elaborate, and seemingly over qualified system serves two purposes. First, the physical accuracy of the safeguards system must attempt to measure the smallest possible quantities of material with the greatest possible accuracy. Secondly, as the onus of proof rests with the State in the event of an alleged diversion, it is prudent to establish and maintain a system of material accountancy of the highest standards.

Safeguards are not applied to materials in the mining and ore-processing stages of the fuel cycle. The State is however obliged to report to the Agency the existence of such materials, also their destination if exported.[96]

The safeguards system comes into operation ...

> "... when any nuclear material of composition and purity suitable for fuel fabrication or for being isotopically enriched leaves the plant or process

> stage in which it has been produced, or when such nuclear material or any other nuclear material produced at a later stage in the nuclear fuel cycle is imported into the State, the nuclear material shall become subject to the safeguards procedures specified in the Agreement."[97]

Safeguards remain in force until one of three conditions is met; the consumption or dilution of the material in such a way that it is "... no longer usable for any nuclear activity relevant from the point of view of safeguards or has become practicably irrecoverable ...".[98] Alternatively, safeguards are terminated when the materials are exported out of the State, in which case the material becomes subject to the receiving State's Safeguards Agreement with the Agency.[99]

Thirdly, by agreement with the Agency, materials may be removed from safeguards for use in non-nuclear activities such as the manufacture of alloys and ceramics.[100]

Thus far materials may avoid the application of safeguards by one of three ways. First before entry into the fuel cycle by omission from the initial report and inventory. Second, by its consumption or transformation in use. Third, by its use for military, but non-explosive uses. A final category of exemptions is created on criteria of quantity and isotopic concentration. Within certain limits, specific quantities of nuclear materials are judged incapable of assisting the manufacture of nuclear weapons.[101] Criteria based upon these limits permit the exempting of up to one gramme of plutonium, through to ten metric tonnes of natural uranium. Further limits are defined in the Statute.[102]

The actual implementation of the safeguards system requires more detailed information than that contained in any Safeguards Agreement based upon the text of INFCIRC/153. Each Agreement is therefore accompanied by "Subsidiary Arrangements." These,

> "... specify in detail, to the extent necessary to permit the Agency to fulfil its responsibilities under the Agreement, in an effective and efficient manner, how the procedures laid down in the Agreement are to be applied."[103]

The Subsidiary Arrangements are made in two parts. The General Part sets out the details of the national accounting system established by the State. The Facility Attachment , one for each facility, defines the material balance areas and strategic points used for material accountancy and inspection purposes.[104] The Subsidiary Arrangements fulfil an additional purpose of promoting the standardisation of safeguards procedures, to the mutual benefit of the State and the Agency. Under similar technical circumstances, similar techniques may be applied. These may be codified, de-limiting more precisely the Agency's responsibilities, and so promoting the confidence of the State. It must be emphasised that although an Arrangement may "... elaborate and specify ..." it must "... carefully avoid giving the Agency any rights that are not found in the underlying agreement."[105] In accordance with this principle, Subsidiary Arrangements are strictly confidential documents. They contain explicit details of facility operations, the publication of which would contravene the Agency's obligations undertaken elsewhere in the Safeguards Agreement.[106]

6.4.4. The Safeguards Procedures Employed

6.4.4.1. Design Information

Safeguards are applied to the design and construction of nuclear facilities through which safeguarded material will pass, as well as to nuclear materials. The system contains provision for design information which identifies the location, purpose and capacity of the proposed facility, its arrangements for the flow of nuclear materials and the layout of important items of equipment; also a description of intended procedures for material accountancy, containment and surveillance. Further information should indicate the organisational responsibility for material accountancy within the management of the facility, and details of health and safety procedures employed. Finally, all information must be provided sufficiently in advance to allow for adjustments to be made to the design.[107]

Design information serves several purposes. First to identify the features of the facility relevant to the application of safeguards,

secondly to determine the material balance areas to be used by the Agency, the "strategic points" and the "key measurement points" from which a record of material accountancy can be compiled, and surveillance and inspections concentrated.[108]

Also, design information may be used to establish the nominal timing and procedures for taking the physical inventory; the requirements for records, reports and their evaluation; procedures for the verification of the quantity and location of nuclear material; and the appropriate combination of containment and surveillance techniques.

In the light of subsequent operating experience and developments in safeguards technology, the original design information submitted by the State may be re-examined by the Agency with a view to modifying the procedures outlined above.

Furthermore, the Agency may send inspectors to the facilities in question to verify the accuracy of the information that has been submitted.[109]

6.4.4.2. The Initial Report and The Inventory

The basis of any system of accountancy is to establish an inventory, or record of the material subject to control. The safeguards system requires the Agency to establish an inventory ...

> "of all nuclear material in the State subject to safeguards...under the Agreement, irrespective of its origin, and maintain the inventory on the basis of subsequent reports and the results of its verification activities."[110]

The inventory is derived from an "initial report" that the State makes to the Agency. The State is bound to provide a report on "... all nuclear material which is to be subject to safeguards ...".[111] This must be made within thirty days of the end of the month in which the safeguards agreement enters into force. In conjunction with the eighteen month period of grace allowed for the negotiation of the safeguards agreement after ratification of the NPT, a maximum of

nineteen months plus thirty days is therefore permitted before the commencement of safeguards operations.[112] The significance of this "initial report" is twofold. All subsequent material accountancy and calculation of material unaccounted for is based upon additions to and subtractions from the inventory. Therefore the accuracy of the entire safeguards system depends upon the accuracy of this inventory.

Secondly, any material not included in the initial report would not be safeguarded. The possibility therefore exists that a State wishing to allay suspicion concerning its intended diversion of nuclear materials may set aside some quantity of such material prior to submitting the initial report, and then use that material in clandestine research and development towards the manufacture of nuclear weapons.

This seemingly substantial failing in the extent of application of the safeguards system is not so damaging as might appear at first. No material diverted in this manner could subsequently enter the safeguarded fuel cycle without appearing as an anomaly in material accountancy. Undetected diversion would therefore require a complete, clandestine, fuel cycle. The possibility of such a scheme remaining undetected is slight. Detection of the physical plant associated with a clandestine fuel cycle could be made by aerial or satellite observation. Its operation would require elaborate falsification of public expenditure accounts and electricity supply records and the maintainance of strict secrecy among the personnel involved in such an undertaking.

6.4.4.3. The Record System

As a preliminary to the establishment of the record system the State is obliged to give an account to the Agency of the location, quantity and use of any nuclear materials outside those nuclear facilities covered by the system. That is, an account of those non-explosive and non-nuclear uses discussed above.[113]

The records are of two sorts; the operating records of the facilities through which safeguarded materials flow, and the accounting

records of those materials. Records are kept for each material balance area, and are available for inspection by the Agency. The measurements from which the records are made must conform to the latest international standards of accuracy, and all records must be retained for at least five years.[114]

The accounting records must show all inventory changes, and so permit the determination of a book inventory at any time. All the measurements used and all corrections and adjustments to the book inventory, physical inventory and inventory changes must also be shown. Inventory changes and the physical inventory identify each batch of nuclear material and provide information regarding its composition and its source.[115] Also, the material balance area in which the material originated and the receiving material balance area is reported for each inventory change.[116]

The operating records provide the data used to establish changes in the quantity and composition of nuclear material passing through the nuclear facilities; data to ascertain the accuracy of measuring techniques; a description of the procedures used to take a physical inventory; and the actions to be taken to determine the cause and magnitude of accidental or unmeasured losses.[117]

6.4.4.4. The Reporting System

The reports submitted by the State are based upon, and explain, the operations giving rise to the measurements and accountancies contained in the record system.[118] In addition to the "initial report" already described, the State also provides the Agency with accounting reports for each material balance area. These reports indicate inventory changes, within thirty days of the end of the month in which they occur, or are established. Similarly, reports are made of the physical inventory to determine the quantities of nuclear material in each material balance area.[119]

The reports must clearly explain the operating procedures giving rise to inventory changes, and where possible the anticipated operating

programme, particularly that which is to be used to take a physical inventory. Periodically, each inventory change, adjustment and correction is reported as a consolidated list, or where appropriate individually, so that the Agency may then provide the State with a "semi-annual" statement of the book inventory of all materials subject to safeguards.[120]

The calculation of material unaccounted for is derived from the seven part presentation of each report. Commencing with a physical inventory the report records the changes known to have occurred. From this is calculated the book inventory. Any difference between the amount of nuclear material recorded as shipped out of one material balance area, and that received by the next is used to derive an adjusted book inventory. This is then compared to a second physical inventory to derive the final entry, material unaccounted for, or " M.U.F." [121]

It is thereafter the responsibility of the inspectors to determine the possible cause of a difference in shipper-receiver balances, uncertainties in the book inventory or other reasons for recording material unaccounted for.[122]

As in the 1965 safeguards system, it is the responsibility of the State to immediately inform the Agency, in the form of a special report, of any unusual incident or circumstances which the State believes may have led to a loss of nuclear materials exceeding the margins of tolerance and error permitted in the Subsidiary Arrangements. The State is further bound to provide the Agency with amplification and clarification of any report, so far as it is relevant for the purposes of safeguards.[123]

6.4.4.5. Inspections

Inspections conducted under the terms of the I.A.E.A.-NPT safeguards system fulfil the same purpose as those established under previously developed systems. They perform a number of routine duties to verify the accuracy of the material accountancy records, and

also furnish a physical, and partly symbolic, presence of the Agency in the territory of the State. Their presence enhances the credibility of the safeguards system by introducing an element of human judgement and dedication to the principle of effective international verification. The system of safeguards applied under the NPT creates three forms of inspection, each distinguished by their frequency, and the activities entrusted to them.

Ad-hoc inspections are undertaken in order to verify the information that is contained in the initial report made by the State. They are also intended to identify and to verify changes in the situation that have occurred since submission of that report. Ad-hoc inspections are also undertaken to identify and verify the quantity and composition of nuclear materials intended for transfer out of the State.[124]

The actual duties undertaken in these, and routine and special inspections may be summarised as follows. The inspectors examine records, and take independent samples and measurements of nuclear materials for analysis.

The inspectors also apply the techniques of containment to manage stored materials, and utilise surveillance to observe, and record on film and closed circuit television operations in inaccessible locations. The Agency is also empowered to use "... any other objective methods which have been demonstrated to be technically feasible."[125] The use of instrumentation which reduces the frequency of inspections assists the State by reducing interference in legitimate activities that the inspector's presence may inhibit. It also assists the Agency by reducing, or at least moderating the rise in safeguards costs. However, these techniques weaken the personal qualities and credibility inherent in the inspector's attendance.

For the purposes of ad-hoc inspection the Agency's inspectors have access to any location where the initial report indicates the presence of nuclear material. This is only up until such time as the strategic points have been established in the Subsidiary Arrangement

Thereafter, for ad-hoc inspections related to imminent international transfers of nuclear material, access is restricted to those locations of which the Agency has been notified.[126]

Ad-hoc inspections to determine the quantities and composition of nuclear materials for export, require at least twenty-four hours notice; for other purposes, including design inspection, at least one week.[127]

Routine inspections serve to verify the mutual consistency of reports and records. They are made to verify the location, identity, quantity and composition of all nuclear materials subject to safeguards. Routine inspections also investigate the circumstances giving rise to material unaccounted for and other problems or errors in material accountancy.[128] Access is limited to those strategic points specified in the Subsidiary Arrangements, and to the records system maintained by the State.[129]

The frequency and intensity of routine inspections is severely limited. They must "... be kept to a minimum consistent with the effective implementation of safeguards."[130] Furthermore, inspections

> "... shall be no more intensive than is necessary and sufficient to maintain the continuity of knowledge of the flow and inventory of nuclear materials."[131]

The actual number of routine inspections is calculated by a complex formula based upon the volume of material passing through each facility.[132] Other factors permit the Agency to exercise its discretion with respect to the timing, intensity, duration and mode of inspection. Some, such as the composition and accessibility of materials, require judgement on technical criteria. The Agency, may also consider ... "the extent to which the operators of facilities are functionally independent of the State's accounting and control system." The Agency may further take into account the degree of co-operation it has received, and the promptness and accuracy of the States accounting and control procedures.[133] These more sensitive criteria permit the Agency to vary its inspection effort as a quid-pro-quo

relative to the attitude and behaviour of the State. Therefore, these provisions create a positive incentive for the State to assist the Agency in fulfilling its safeguarding responsibilities.

Other criteria combine technical judgement with an interpretation of the State's willingness to co-operate with the Agency. Information derived from design reviews falls into this category, particularly the assessment of each facility's suitability for the application of safeguards. Finally, the degree of international interdependence inherent in each State's fuel cycle operations may be used as a criterion for establishing safeguards priorities, particular attention being given to the import and export of nuclear materials.[134]

A final condition pertaining to routine inspections establishes the need for twenty-four hours notice before inspection of containments and uranium enriched in excess of five per cent. Routine inspections for any other purpose require advance notice of one week. Some part of the random sampling which is permitted may take place unannounced, although the general programme of such visits must be notified in advance.[135]

The combined effect of these provisions is to offset the State's right to insist upon a minimal interpretation of the Agency's safeguarding duties. The extent of the Agency's investigative and discretionary powers is further enhanced by the provisions governing special inspections. They are, however, challenged by other provisions, which emphasise the rights of the State. Both will be discussed immediately below, although a fuller interpretation of these competing provisions and their impact upon the overall credibility of the system will be attempted in Chapter Seven.

The role of the inspectors reflects the deterrent nature of the safeguards system. Their duty is to verify the accuracy of the State's system of accountancy and control. It is not seriously expected that the inspectors would actually witness attempted acts of diversion. The procedures discussed above may be seen to lack the characteristics of independent investigation and intervention authorised by the Agency

Statute. This holds that "... inspectors...shall have access at all times to all places and data and to any person...".[136]

Special inspections go some way towards implementing those statutory provisions. They are made following the submission of special reports, and, more searchingly may be made if,

> "... the Agency considers that information made available by the State including explanations from the State and information obtained from routine inspections, is not adequate for the Agency to fulfil its responsibilities under the Agreement."[137]

Furthermore, the Agency,

> "... may obtain access in agreement with the State to information or locations in addition to those specified for ad-hoc and routine inspections."[138]

The Agency need only give notice "... as promptly as possible ..." before undertaking a special inspection.[139] If the State and the Agency cannot agree upon the access required by the State, and if the Board consider the matter to be urgent, the Agency may invoke its sanctions procedures.[140] Otherwise, the more elaborate arbitration procedure is invoked.[141]

The I.A.E.A.-NPT safeguards system includes three distinctive provisions whereby the State may limit the rights of the Agency's inspectors. These apply to all three varieties of inspection, and are in addition to those specific limitations upon the timing and detailed scope of inspections discussed above. Firstly,

> "In the event of the State concluding that any unusual circumstances require extended limitations on access by the Agency, the State and the Agency shall promptly make arrangements with a view to enabling the Agency to discharge its responsibilities in the light of these limitations."[142]

The Agency's Director General must report any such arrangement to the Board.

Secondly, with regard to routine inspections, the system

provides for ...

> "... consultation between the Agency and the State if the latter considers that the inspection effort is being deployed with undue concentration on particular facilities."[143]

Thirdly, the State may, for any reason, and without explanation, refuse to accept the designation of an inspector made by the Director General. The Director General is then bound to withdraw the designation, and propose another, until one acceptable to the State is made.[144]

The State may wish to delay the visit of an inspector for some purpose. This would not necessarily imply an attempt to prevent the detection of diversion. The State may not wish to reveal an accident or malpractice attributable to inefficiency. More prosaically, the State may object to the nationality of the designated inspector. The State may feel vulnerable to commercial espionage, and doubt the integrity of inspectors recruited from countries engaged in commercial rivalry. However, the Agency is clearly sensitive to such fears and its policy of recruitment and designation reflects this.

To conclude its safeguards procedures, the Agency informs the State of the result of its inspections, and other verification activities. This takes the form of a statement pertaining to each material balance area, made as soon as possible after a physical inventory has been taken. The Agency does not publish these results, nor make any public statement of material unaccounted for. Thus far no instance of suspected diversion has been reported, or sanctions procedures publicly initiated.

6.4.4.6. International Transfers of Nuclear Material

The I.A.E.A.-NPT safeguards system requires that nuclear material which is transferred between countries must always be the responsibility of either the exporting or the importing State, the point at which responsibility is transferred being decided between them.[145]

The exporting State must notify the Agency of the identification, quantity, and composition of the materials intended for export and also the material balance areas from which they will be taken. The State must also advise the Agency of the destination of the materials, and the dates of preparation, dispatch and expected arrival. This information then allows the Agency to conduct an ad-hoc inspection.[146] The importing State is required to provide the Agency with reciprocal information concerning receipt of the materials. The Agency may then conduct an inspection at the unpacking of the materials, paying particular attention to the seals attached at the dispatch of the materials.[147] A special report is made in the event of any incident or unusual circumstances that leads the State to suspect a loss of materials. A special report is also required in the event of any "... significant delay ..." during transfer.[148]

Article III of the NPT lacks a precise definition of those materials and equipment which, if exported, would require the application of safeguards in the recipient State. It was not until the second half of July 1974 that the major exporting States, the 'Nuclear Supplies Group' or 'London Club' began discussions towards drafting such a list. This followed the test detonation of a nuclear device by the Indian government on May 18th.[149] On August 22nd each submitted identical memoranda to the Director General setting out a list of items which would "trigger" the application of safeguards, if exported. This memoranda was published by the I.A.E.A. on September 3rd, revised on October 24th, as INFCIRC/209.

Memorandum 'A' requires the exporting State to specify that materials and equipment supplied will not be used for the manufacture of nuclear weapons or explosive devices. Also, that all exports will be subject to Agency safeguards.[150] Exports to non-NPT Parties, and their re-exports must be similarly safeguarded. Memorandum 'B' lists the materials and equipment subject to safeguards. These range from complete nuclear reactors to zirconium alloy tubes, suitable for cooling equipment. Also, non-nuclear materials, such as graphite, used as a moderator, are included.[151] Two further provisions

strengthen the conditions contained in the 'trigger-list.' Firstly, further items of equipment and materials may be added to the list.[152] Secondly, the possibility that certain components may be supplied separately, in an attempt to avoid the designation of items on the list is noted. A final provision warns that;

> "... the separate supply of these unique, especially designed and prepared, critical, large and expensive items would not necessarily be considered as falling outside the area of concern ..."[153]

6.4.4.7. I.A.E.A. Safeguards, EURATOM, The E.N.E.A., and Parties to the "Tlatelolco Treaty"

The I.A.E.A.-NPT safeguards system has had to accommodate the claims of several regional organisations that their safeguarding prerogatives be retained. The theoretical and practical problems of resolving the competing claims of the near-universal I.A.E.A., and EURATOM have been mentioned above; the political consequences of the latter's insistence upon upholding its jurisdiction have also been formidable described by Szasz as,

> "... a stubborn issue that first delayed the conclusion of the NPT, and later its entry into force for a number of significant States."[154]

The need for some kind of accommodation between the Agency and the Community was foreseen during the initial E.N.D.C. negotiation of the NPT. After an initial U.S. proposal in 1965 to give EURATOM an equivalent standing to the I.A.E.A., the unfavourable Soviet and East European response led to a shift in U.S. policy in favour of a Soviet sponsored proposal of 1967 calling for the application of I.A.E.A. safeguards on all non-nuclear weapon States party to the NPT.[155] EURATOM responded to this diminution of U.S. support by issuing a memorandum of five points, which the Community insisted must be honoured in any agreement with the I.A.E.A. It insisted that safeguards be restricted to the flow of nuclear materials, that existing supply contracts be maintained, that the relations between

the Agency and the Community be formally agreed, the concept of joint verification clarified, and no guillotine provisions be enacted to transfer safeguards to the Agency after a given period of time.

Negotiations to enlarge the membership of the European Communities in the period 1970-2 further delayed the accession to the NPT by the EURATOM States. Several meetings of the EURATOM commission and the I.A.E.A. between November 1971 and July 1972, resulted in the formulation of a draft Safeguards Agreement and Protocol between the seven EURATOM non-nuclear weapons States, EURATOM and the I.A.E.A.[156]

Under the terms of this draft Agreement

> "... EURATOM is to act in part as an agent of its member States, in part as an instrument of the Agency, in part as an independent actor carrying out its peculiar responsibilities, and in most respects as a buffer between the Agency and the EURATOM States ..."[157]

The opening Articles of the draft Agreement establish that ...

> "The Agency shall have the right and the obligation to ensure that safeguards will be applied."

The Community ...

> "... undertakes, in applying its safeguards on source and special fissionable materials in all peaceful nuclear activities within the territories of the States, to co-operate with the Agency ..."[158]

The basic relationship between the Agency and the Community is that

> "The Agency shall apply its safeguards...in such a manner as to enable it to verify...the findings of the Community's system of safeguards. The Agency's verification shall include, inter-alia, independent measurements and observations conducted by the Agency."[159]

The safeguards procedures in this Agreement are the same as those undertaken in the I.A.E.A.-NPT system. In the matters of design information, records and reports, the Community performs these

tasks and passes on its findings to the Agency for their verification and approval.

The Agency may make ad-hoc, routine and special inspections under the same circumstances and for the same purposes as under I.A.E.A.-NPT Agreements. Agency Inspectors may accompany those of the Community, as observers, with the right to take additional measurements and samples of nuclear materials for the Agency's independent verification. This right of access is subject to the same two restrictions found in the I.A.E.A.-NPT Agreement; that is "extended limitations on access ..." for, unspecified "... unusual circumstances ..."[160] and in the event of the Community accusing the Agency of "... undue concentration on particular facilities."[161]

In the Protocol attached to the draft Agreement, the details of co-operation between the Agency and the Community are established. The timing of Inspections is to be negotiated between the two organisations and Agency inspections "... shall be carried out simultaneously with the Inspection activities of the Community ...".[162]

Finally, "... with a view to facilitating the application of the Agreement and...Protocol, a liaison Committee shall be established, composed of representatives of the Community and the Agency."[163] This Committee meets, at least annually, and more frequently in technical meetings at a lower level of representation.

The Safeguards Agreement between the seven States, EURATOM and the I.A.E.A. eventually came into force on February 22nd, 1977, a little over five years after the entry into force of the first I.A.E.A.-NPT Safeguards Agreement, concluded with Finland on February 9th, 1972. This delay, and the elaborate procedures taken to protect the sensitive self-esteem of EURATOM contrast unfavourably with the uncomplicated manner in which the I.A.E.A. has reached agreement concerning the division of responsibilities between itself and N.E.A. and O.P.A.N.A.L. the organisation of the Tlatelolco parties.

The Nuclear Energy Agency, established by the O.E.C.D. applies safeguards to a number of joint enterprises, for example the

Dragon experimental High Temperature Gas Cooled Reactor at Winfrith, Dorset and the Halden reactor in Norway. Some part of its responsibilities are undertaken by EURATOM, principally the Eurochemic reprocessing plant, at Mol, in Belgium; (at present closed). A recent statement from the N.E.A. noted that

> "... There is now a substantial duplication of control procedures in installations subject to N.E.A. control. Negotiations are now under way to eliminate this." [164]

The Treaty for the Prohibition of Nuclear Weapons in Latin America, signed at Mexico City on February 14th, 1967, establishes a nuclear-weapons "free-zone" among the Parties and is operative among twenty-one Latin American and Caribbean States. (However, the Treaty is unsigned by Cuba, unratified by Argentina, and its entry into force for Brazil is subject to a waiver until the Treaty is ratified by Argentina). Usually called the "Treaty of Tlatelolco", it establishes a system of safeguards based upon Agreements being concluded between the individual State-Parties and the I.A.E.A. However, Article 7 of the Treaty creates an Agency for the Prohibition of Nuclear Weapons in Latin America, which, unlike the NPT arrangements, serves as a permanent executive organ of the Treaty. Its Council is to act as a forum for any complaints and accusations of Treaty violations made by one State against another. Its powers of safeguarding and Inspections are partly complementary to those of the I.A.E.A., and delegated to it.[165]

6.5. Conclusion

As stated in the Introduction to this Chapter, the conclusions presented here are of a brief and interim nature. The purpose of Chapter Seven is to present a thorough analysis and evaluation of the implementation of the NPT and its safeguards system.

The successful negotiation of the NPT relied upon the identification of a common interest between the U.S. and U.S.S.R. on the

issue of non-proliferation. Furthermore, the translation of this common interest into the solemnly binding instrument of the NPT required active collaboration between the super-powers, frequently in opposition to coalitions of other States. This U.S.-Soviet collaboration resulted in the drafting of Treaty precise in its objectives and unambiguously uncompromising in its terms. The weaknesses of the Treaty lie in the ease with which it may be revoked rather than in loopholes which may be exploited by States party to it.

The U.S.-Soviet coalition, supported by the U.K., overcame the demands of many non-nuclear weapon States which pursued a broader definition of proliferation, which would have infringed upon the alliance relations and nuclear weapons deployments of the super-powers. Related to this issue of definition, the demands of the non-nuclear weapon States to link non proliferation to other arms control issues, was also resisted. The commitment of the nuclear-armed States under Article VI of the NPT, is, as noted previously, less than rigorous in its content, and unenforceable in whatever way it may be interpreted. The reciprocal provisions of the treaty rest upon the undertaking of the developed countries to assist the less developed countries to obtain the maximum benefits from the peaceful uses of nuclear energy.

The U.S. and Soviet governments were aided in their collaboration by the active support of the major nuclear equipment and material suppliers, the other six active members of the Safeguards Committee, and in general, by the developed countries of the O.E.C.D. and COMECON. France was the exception, in both categories. In particular the Federal Republic of Germany and Japan supported the process of negotiation despite having greater commercial investments at stake than some of those less developed countries which were more vocal in their criticisms of the treaty. Among the less developed countries the support of the majority and acquiesence of the minority was secured with the exception of Albania, Cuba, Tanzania and Zambia. However, as is discussed in the following Chapter, the critical, non nuclear weapons States were neither wholly satisfied nor silenced by the successful conclusion of the NPT negotiations.

As regards the role of the I.A.E.A., the necessity of U.S.-Soviet consensus was again revealed as a pre-condition of any qualitative transformation in the relations between the Agency and the States subject to safeguards; that is to say, a transformation involving an extension of the Agency's right to make further impositions upon the sovereignty of the member States. In this need for U.S.-Soviet consensus, the obligations placed upon the Agency under Article III of the NPT may be likened to the other key events in the Agency's development; its foundation in the period 1953-1956, and the most extensive development of its pre-NPT safeguards responsibilities between 1963 and 1968.

The rights conferred upon the Agency under the NPT followed directly from the terms of Article III which required the application of safeguards to all peaceful nuclear activities in the State. Therefore, the NPT conferred upon the Agency more substantial responsibilities than those provisions for project and transfer agreements, and in so doing transcended the political reasoning and constraints, of the "Atoms for Peace" initiative upon which the Agency was originally founded.

However, the terms of INFCIRC/153 clearly constrained the Agency from fully enjoying those rights contained in the Statute of "... access at all times to all places and data and to any person."[166] After assessing the acceptability of the NPT, and the criticisms made of the treaty, Part Three of Chapter Seven will fully examine the effectiveness of the INFCIRC/153 system. In this, particular attention will be paid to identifying those weaknesses which may be attributed to the pursuit of acceptability, contrary to the need for credibility.

Footnotes to Chapter Six

1. For the text of the NPT see U.N., Office of Public Information, The Treaty on the Non-Proliferation of Nuclear Weapons, New York, 1968. Text hereinafter referred to as NPT.
For detailed discussion of the background to and progress of the negotiations which drafted the NPT see
Barton, J.H. and Weiler, L.D., International Arms Control; Issues and Agreements. Ch.5 and14, pp.66-93, 288-309. Stanford, U.P. 1976.
Epstein, W. The Last Chance, Free Press, New York, 1976.
Fischer, G. The Non-Proliferation of Nuclear Weapons translated by David Willey, Europa, London, 1971.
For discussion of the relation of non-proliferation to doctrines of nuclear deterrence see
Bull, H., The Anarchical Society, Macmillan, London, 1977, Ch. 5, 7. pp.101-126, 162-183.
Also Bloomfield, L. "Nuclear Spread and World Order" Foreign Affairs Vol 53, (4), 1975, pp.743-755.
Also J. Herz, The Nation State and the Crisis of World Politics, 1976, McKay, Ch. 3, 8, which re-prints Herz's classic article of 1957 "The Rise and Demise of the Territorial State" and its partial retraction "The Territorial State Re-visited" of 1968.
For a Third World perspective, and review of policies, see Kapur, A. International Nuclear Proliferation, Praeger, London, 1979.

2. The U.N. Disarmament Commission established in 1952 was first modified in 1954 by the creation of a five nation Sub-Committee of the Disarmament Commission. Its members were Canada, France, U.K., U.S.A. and U.S.S.R. The Sub-Committee was enlarged from five to ten members in 1959 by the addition of Bulgaria, Czechoslovakia, Poland, Rumania and Italy. In 1961 an agreement between the U.S.A. and U.S.S.R. brought about a further enlargement and the admission of non-aligned countries with the entry of Brazil, Burma, Egypt, Ethiopia, India, Mexico, Nigeria and Sweden. At this stage the Sub-Committee was renamed the Eighteen Nation Disarmament Committee (E.N.D.C.)
See U.N., The United Nations and Disarmament, 1945-1970, U.N., New York, 1971.
Also Barton and Weiler, op.cit., 1976, pp.72-85.

3. U.N., op.cit., 1971, pp.259-260.

4. These were, respectively, Resolution 1576 (XV) and Resolution 1665 (XVI).

5. U.N., op.cit., 1971, p.263.

6. ibid. p.265.

7. loc. cit.

8. See Young, E., A Farewell to Arms Control, Penguin, London, 1972.
Also Quester, G. Nuclear Diplomacy: The First Twenty-Five Years, Dunellen, New York, 1970, pp.256-257.
Quester in particular doubts the realism of M.L.F. as a strategic option for NATO, its purpose being more to promote the political credibility of the U.S. commitment to the alliance.

9. U.N. op.cit. 1971, pp.266-267, and Resolution 1908 (XVII).

10. ibid. p.269.

11. ibid. p.270.

12. ibid. pp.273-274. See also Epstein, op.cit., 1976, pp.64-65.

13. U.N. op.cit. 1971, p.275.
See also Barton and Weiler, op.cit. 1976, pp.295-296, for details of Soviet draft.

14. For further comment on this internal difference of opinion, see Barton and Weiler, op. cit. 1976, pp.296-297.
Also Quester, G. op.cit. pp.264-266.

15. ibid. p.297.

16. U.N. op.cit. 1971, p.279. See also Epstein, W. op.cit. 1976, pp.67-68.

17. The O.A.U. had passed a Resolution in July 1964 calling for a regional initiative on non-proliferation. See U.N. op.cit. 1971, p.268.

18. See ibid. p.272.

19. Barton and Weiler, op.cit. 1976, p.296.

20. U.N. op.cit. 1971, pp.280-281.

21. loc. cit.

22. U.N. op.cit. 1971, p.283.

23. See ibid. pp.284-287.

24. This system was also used in the negotiation of the Seabed Treaty and the Biological Weapons Convention. See Epstein op. cit. 1976, pp.71-72.

25. U.N. op.cit. 1971, p.287.

26. The 1967 General Assembly passed Resolution 2346A (XXII) as a general statement welcoming the U.S.-Soviet drafts and calling attention to the principles of Resolution 2028 (XX).

27. U.N. op.cit. 1971, pp.290-291.

28. Epstein, W., op.cit. 1976, pp.81-82.

29. I.A.E.A., INFCIRC/66, Rev. 2, September 16th, 1968, paras 19 and 77. Also Statute Article XX 3.

30. U.N. Office of Public Information. Notes on Treaty on the Non-Proliferation of Nuclear Weapons, New York, 1969, Introduction p.22.

31. People's Daily Editorial Department, Two Different Lines on the Question of War and Peace, Foreign Languages Press, Peking, November 19th, 1963, pp.22-35.
The key passage from this statement reads;
"We have always maintained that the socialist countries must achieve and maintain nuclear superiority. Only this can prevent the imperialists from launching a nuclear war and help bring about the complete prohibition of nuclear weapons." p.26.
See also Halperin, M.H., China and Nuclear Proliferation, University of Chicago, 1966.

32. Gorove, S., "Transferring U.S. Bi-Lateral Safeguards to the I.A.E.A." Duquesne Law Review. Vol. 6, No. 1, 1967-1968.
See this thesis, Chapter Five, footnote 97.

33. Sheinman, L. "Political Implications of Safeguards" Chapter 9 of Willrich, M. ed. International Safeguards and Nuclear Industry. John Hopkins, Baltimore, 1973, p.237.

34. U.N. op.cit. 1971. pp.298-299.
Those voting against the Resolution were;
Albania, Cuba, Tanzania, Zambia.
Those abstaining were;
Algeria, Argentina, Brazil, Burma, Burundi, Central African Republic, Congo (Brazzaville), France, Gabon, Guinea, India, Malawi, Mali, Mauritania, Niger, Portugal, Rwanda, Saudi Arabia, Sierra Leone, Spain, Uganda.

35. ibid. p.299. The five abstentions were; Algeria, Brazil, France, India, Pakistan.

36. Supra. footnote 1, hereinafter referred to as NPT. Preface, p.1. The extent of current ratification is discussed in Chapter Seven of this thesis.

37. Resolution 2373 (XXII) ibid. p.2.

38. ibid. p.4.

39. ibid. Article I.

40. ibid. Article II.

41. Young, E. op.cit. 1972, pp.116-117.

42. Fischer, op.cit. 1970, pp.56-59.

43. See U.S. Senate 90th Congress, Second Session. Non-Proliferation Treaty, Hearings before the Committee on Foreign Relations. U.S. G.P.O. 1969, pp.356-359.

44. NPT. Article III, para 1.

45. I.A.E.A. Statute, Article II.

46. I.A.E.A. INFCIRC/153, para 28.

47. NPT. Article III, para 1.

48. I.A.E.A. INFCIRC/153, para 14.

49. I.A.E.A. Statute Article II.

50. NPT. Article III, para 2.

51. I.A.E.A. INFCIRC/209, September 3rd, 1974, and INFCIRC/209 Add 2 of October 24th, 1974.

52. Within the I.A.E.A. a Special Committee under the Chairmanship of Dr. Zangger, a Swiss academic prepared a detailed list of equipment subject to safeguards. See below, footnote 151.
On the formation of the Nuclear Suppliers Group see
The Economist August 14th, 1976, pp.12-13.
also Turner, L. and Parry, A, "The Next Steps in Energy Co-operation" World Today Vol. 34, No. 3, March 1978, pp. 89-99.
The original seven members of the Group, U.S., U.K., Federal Rep. of Germany, Japan, Canada and U.S.S.R. also included France, not a signatory of the NPT.
The most recent statement of the Group's 'trigger list' is reproduced in Survival IISS London, Vol. XX, No. 2, April 1978, pp. 85-87.

53. NPT. Article III, para 3.

54. ibid. para 4.

55. ibid. Article VII.

56. ibid. Article IV.

57. ibid. Article V.

58. The most thorough research on the applications of peaceful nuclear explosions has been conducted by the U.S. A.E.C.'s "Project Ploughshare" dating from 1957. The use of p.n.e. below ground to stimulate the recovery of natural gas, the retorting of oil shales and the leaching of copper has proven disappointing. Unsolved problems of radioactive pollution and seismic shock have, despite advantages of cost and explosive energy density, made the use of p.n.e. relatively unattractive compared to conventional explosives.
See Long F.A. "Peaceful Nuclear Explosives", Bulletin of the Atomic Scientists, Vol. 32, No. 8, October 1976, pp. 20-28.
I.A.E.A. Panel Proceedings Series, Peaceful Nuclear Explosions V. November 1978, Vienna.

59. See Desai, B.A. Atoms For Peace, An Exposition of India's Nuclear Policy, A.I.C.C. New Delhi, 1975,
also Annual Report of the Department of Atomic Energy 1974-1975, Government of India, Bombay, pp. 31-33.

60. NPT. Article VI.

61. Epstein, W. op.cit. 1976, pp.189-190.

62. At the time of writing SALT is a continuing series of negotiations. The principle agreements so far attained are the Revised Hot Line Agreement, The Accident Measures Agreement, The A.B.M. Treaty and Interim Offensive Arms Agreement, all four 'packaged' in the SALT I series 1971-1972. SALT II, concluded in June 1979 provides for definitive quantitative limits on the construction and deployment of nuclear weapons delivery systems.
See Barton and Weiler, op.cit. 1976, Ch. 9, 10. pp.172-227.

63. U.N. Security Council Resolution 255 (1968), para 2.

64. NPT. Article IX, para 3.

65. loc. cit.

66. ibid. Article VII, para 3.

67. ibid. Article VIII, para 2.

68. International Law Commission, Draft Convention on the Law of Treaties, Vienna, 1969, Article 40, para 4.
See also Brownlie, I. Basic Documents in International Law. O.U.P. 1972, pp. 232, 233 & 248.

69. Review Conference of the Parties to the NPT, Final Document, U.N., Geneva, 1975.
See also Epstein, op.cit., 1976, Ch. 18.

70. NPT. Article X.

71. International Law Commission, op.cit. Article 54.

72. I.A.E.A. GC (XII) OR 119 September 24th, 1968, para 31.
See also the Directors General's statement to the preceding General Conference, I.A.E.A., GC (XI) OR 118, September 26th 1967, para 29.

73. I.A.E.A. GC (XII) 1968 OR 119, paras 31-34

74. I.A.E.A. GC (XIII) 1969 OR 127, para 39.
See also Sanders, op.cit. 1975, p.6.

75. I.A.E.A. GC (XIII) 1969 OR 127, para 29.

76. For a particularly helpful discussion of the 'Safeguards Committee' membership and operations see "Safeguards old and new" I.A.E.A., Bulletin, Vol. 15, No. 1, 1973, pp.23-30.
also Pendley, R., Scheinman, L., "International Safeguarding as institutionalised collective behaviour" International Organisation Vol. 29, No.3, 1975, esp. pp.612-615.
also Sanders, op.cit. 1975, pp.7-9.

77. Pendley and Scheinman, op.cit., 1975, p.613.

78. See I.A.E.A., The I.A.E.A. 1957-1977, Vienna, 1977, pp.60-61.

79. I.A.E.A. GC (XIV) 1970 OR 135, paras. 28-29.

80. The colloquial name derives from the blue covers in which all I.A.E.A. documents are published.
See Sanders, op.cit. 1975, p.73.
Also Szasz, P., "I.A.E.A. Safeguards", Ch. 4, of Willrich, M. ed., op.cit., 1973, p.78.

81. I.A.E.A. INFCIRC/153, para 1.

82. ibid. para 2.

83. ibid. para 4a.

84. ibid. para 4b,c.

85. ibid. para 5.

86. ibid. para 7, see also Pendley and Scheinman, op.cit. 1975, pp.614-615 on this point.

87. I.A.E.A., INFCIRC/153, para 6.

88. ibid. para 8.

89. ibid. para 14.

90. ibid. para 18.

91. ibid. paras 15-26.

92. ibid. para 28.

93. ibid. para 29.

94. ibid. para 30.

95. ibid. para 32.

96. ibid. para 33, 34a,b.

97. ibid. para 34c.

98. ibid. paras 11, 35.

99. ibid. paras 12, 92, 93, 94.

100. ibid. para 13.

101. ibid. paras 36, 37, 38.

102. ibid. paras 37, and I.A.E.A. Statute, Article XX.

103. INFCIRC/153, para 39.

104. Sanders, op.cit. 1975, pp.25-27.

105. ibid. p.26.

106. INFCIRC/153, para 5.

107. ibid. paras 42-45.

108. ibid. para 46a,b.

109. ibid. para 46c-f.

110. ibid. para 41.

111. ibid. para 62.

112. loc. cit. and NPT Article III, para 4.

113. INFCIRC/153, paras 49, 50.

114. ibid. paras 51-55.

115. A "batch" of nuclear materials means "a portion handled as a unit for accounting purposes" ibid. para 100.

116. ibid. para 57.

117. ibid. para 58.

118. ibid. para 61.

119. ibid. para 62, 63.

120. ibid. paras 64-65.

121. ibid. para 67.

122. ibid. para 72c.

123. ibid. para 68.

124. ibid. para 71.

125. ibid. para 74, 75.
See also I.A.E.A. I.A.E.A. Safeguards Equipment. I.A.E.A. Vienna, 1977.

126. I.A.E.A. INFCIRC/153, para 76a,b.

127. ibid. para 83a.

128. ibid. para 72.

129. ibid. para 76c.

130. ibid. para 78.

131. ibid. para 79.

132. ibid. para 80.

133. ibid. para 81a,b.

134. ibid. para 81c,d.

135. ibid. para 81,c, 84.

136. I.A.E.A. Statute, Article XII A6.

137. I.A.E.A. INFCIRC/153, para 73.

138. ibid. para 77.

139. ibid. para 83b.

140. ibid. paras 77,18.

141. ibid. paras 77, 21, 22.

142. ibid. para 76d.

143. ibid. para 82.

144. ibid. para 85.

145. ibid. para 91.

146. ibid. para 92, 93.

147. ibid. paras 95, 96.

148. ibid. para 97.

149. See supra footnotes 52, and 58.

150. I.A.E.A. INFCIRC/209, Memorandum A, para 3.

151. ibid. Memorandum B, paras 2.2.-2.5.
See also supra, footnote 52.
The full list of items is as follows: nuclear reactors, reactor pressure vessels, reactor fuel charging and discharging machines, reactor control rods, reactor pressure tubes, zirconium tubes, primary coolant pumps, deuterium and heavy water, nuclear grade graphite, reprocessing plants, fabrication plants and special equipment designed for them, equipment designed for separation plants.

152. ibid. Memorandum B, para 6.

153. ibid. Memorandum B, para B5.

154. Szasz, P., "I.A.E.A. Safeguards" Ch. 4, of Willrich, M. ed. op.cit. 1973, p.135.

155. Scheinman, L., "Nuclear Safeguards, The Peaceful Atom and the I.A.E.A.", International Conciliation, March 1969, p.39.

156. I.A.E.A., INFCIRC/193 of September 14th, 1973, the seven states are; Belgium, Denmark, Irish Rep., Federal Rep. of Germany, Italy, Luxembourg and Netherlands.

157. Szasz, from Willrich, op.cit. 1973, p.137.

158. INFCIRC/193, Article 2.

159. ibid. Article 3.

160. ibid. Article 76d.

161. ibid. Article 82.

162. ibid. Protocol, Article 14.

163. ibid. Protocol, Article 25.

164. O.E.C.D., N.E.A., Activity Report, Paris, 1975, p.43.

165. The origins of the Treaty lies in the response of the Latin American States to the Cuban Missile Crisis of October 1962. The treaty establishes, inter alia for the exclusively peaceful uses of all nuclear materials under the jurisdiction of the signatory nations. They are also prohibited from permitting the deployment, testing or storage of nuclear weapons on their territory. For text and further details see Barton and Weiler, op.cit. 1976, pp.88-89, 292-295.

166. I.A.E.A., Statute, Article XII, A.6.

CHAPTER SEVEN

An Evaluation of the NPT Regime

7.1. Introduction

The NPT-I.A.E.A. safeguards system applies only to States which have ratified the Treaty, but constitutes a unified political and legal regime, or method, of controlling the non-proliferation of nuclear weapons. The purpose of this Chapter is to offer a critical evaluation of that regime. In discussing the negotiation and actual text of the NPT, considerable reference was made to matters of definition and dispute, such as the scope for contentious interpretation of the crucial first three Articles. Therefore, the first part of this chapter will concentrate upon the political limitations of the Treaty: in particular upon the limited extent of ratification, and the most articulate criticisms of the Treaty advanced at the Conference of the Non-Nuclear Weapon States in 1968 and the Review Conference of 1975. This emphasis is further justified on the grounds that ratification of the Treaty is a prior condition for the application of the I.A.E.A.'s INFCIRC/153 safeguards system, and that the limited extent of such ratifications is the most fundamental constraint upon the overall effectiveness of the I.A.E.A. safeguards system.

It is beyond the scope of this thesis to venture into the 'n^{th} country debate,' and explore the particular military-security incentives which may encourage a State to undertake the acquisition of nuclear weapons. The purpose of this first section is to identify those countries which, by reference to their acceptance or otherwise of other I.A.E.A. safeguards obligations, are most likely to be detected if they attempted the diversion of nuclear materials. In other words, rather than suggesting which States are most likely to attempt the manufacture of nuclear weapons, this classification is restricted to identifying those among several potential 'n^{th} countries' which are least burdened by the risk of detection.

A fundamental weakness of the NPT is the very limited period of three months notice which need be given to effect withdrawal from the Treaty. Certain States party to the NPT, which, since accession have suffered a drastic deterioration in their external security situation may be tempted to exercise this 'three month option.' Without imputing positive intentions to these States, it is none the less possible that following the unification of Vietnam in April 1975, the invasion of Kampuchea by Vietnam in 1979, and the transfer of U.S. recognition from Taipei to Peking, S. Korea, Japan and Taiwan may consider reviewing their continued adherence to the NPT. Also that the successor government to the Shah of Iran may revise that country's defence arrangements with the U.S. and reassess the option of nuclear weapons acquisitions.[1]

Essentially, this is to point out the continuing debate on a workable definition of proliferation which has ensued since President Carter's announcement of April 1977 on U.S. nuclear technology export policy.[2] In this debate the definition of proliferation as the successful detonation of a nuclear explosive device, has been criticised by the U.S. administration. Increasingly the Carter-Nye argument has identified the acquisition of stockpiles of separable plutonium and plutonium separation facilities as a technical level of capability, which of itself implies a military-political intention to proceed to the manufacture of nuclear weapons.

The several I.A.E.A. safeguards systems can only be expected to effect the early detection of attempted diversion, and hence give warning of a State's imminent acquisition of nuclear weapons. In making only limited reference to the problem of distinguishing between intentions and capabilities in the 'n^{th} country debate' this does not cast judgement upon the logic or justice of the Carter-Nye assessment, but more prosaically reflects the limited task set for this thesis.

The second part of this Chapter will review the effectiveness of the safeguards system, INFCIRC/153. Each of the safeguarding tasks, namely design review, material accountancy and inspection will be analysed with reference to each of the other criteria established in Chapter Two, namely, (after, 1, universality)

2. The Unified System approach;
3. The Extent of Application, throughout the fuel cycle;
4. The Technical Rigour of Application;
5. The Credibility of Available Sanctions;
6. The Provisions for Review and Amendment.

In particular, it will be suggested that the technical rigour of the material accountancy system is no longer an effecti ve guarantee of the "early detection" of the attempted diversion of significant quantities of nuclear materials, because of the physical overloading of the system.

This Chapter draws upon material gathered, on a non-attributable basis, from interviews conducted with senior I.A.E.A. officials, members of the U.S. and U.K. missions to the Agency, and with civil-servants in the U.K. Foreign and Commonwealth Office and the Department of Energy.[3] It will also make reference to several studies made by official organs of the U.S. government such as those of the Comptroller General of the United States, the Congressional Research Service and others.[4]

An internal I.A.E.A. investigation into the effectiveness of the safeguards systems was undertaken at the request of the Board of Governors and completed in June 1977. However, this Special Safeguards Implementation Report remains restricted to circulation within the Board of Governors.[5]

7.2. The Political Acceptability and Limitations of the NPT

7.2.1. The Scope of Current Ratification

7.2.1.1. The Parties

In Chapter 2 the criterion was established that

> 'The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, the fullest attainable acceptance of the safeguards system by accession to and ratification of safeguards agreements among all States possessing, developing, or capable of developing nuclear activities on a scale capable of contributing to the manufacture of nuclear weapons.'

As of October 1st, 1980, there were one hundred and ten non-nuclear weapon States party to the NPT. Seventy-eight of these had concluded safeguards agreements with the I.A.E.A., and the remaining thirty-two were in the process of negotiating agreements with the Agency.[6] (Appendix I contains full details of the current status of the NPT.)

Among the nuclear weapon States the U.K., U.S.A. and U.S.S.R. are also parties to the Treaty and are therefore bound not to transfer nuclear weapons to any other State or other recipient.

Among the one hundred and ten non-nuclear weapon States, a second category of adherents can be most readily identified among the members of the Warsaw Pact, NATO and some other allies of the U.S. All members of the Warsaw Pact are party to the NPT, and so are all members of NATO.[7] Among the non-NATO allies of the U.S., Australia, New Zealand, Japan and S. Korea are parties to the NPT, as is the Republic of China (that is Taiwan).

A third category of NPT parties may be identified as the large group of Third World countries, so chronically under developed that their opportunities to develop nuclear weapons from indigenous resources are extremely remote. Included in this group are some of

the poorest countries in the world such as Burundi, Chad, Haiti, Mali, Nepal and Upper Volta. Given the inability of these countries to acquire nuclear weapons indigenously, the importance of their NPT participation lies in the reassurance afforded against the subversion of their strategic and domestic political stability, by other States. Thus far, the States adhering to the NPT may be classified as being in one of two military-security environments. At one extreme there are the two superpowers, and the allies under their nuclear protection. At the other extreme are many poorer Third World countries, with no realistic opportunity to develop nuclear weapons, but with a considerable interest in gaining access to the peaceful uses of nuclear energy, and hence, both prestigious and practical interests in acceding to the NPT. In both cases it might be suggested that these States have the least to lose by their accession. It is therefore a more challenging test of the NPT's appeal to examine its status among the non-aligned and neutral countries, and among those developed and less developed countries with substantial civilian nuclear industries and a realistic opportunity to develop nuclear weapons. In these categories a less encouraging situation emerges.

Among the European neutrals, Sweden, Finland, Switzerland, Austria, Ireland and Yugoslavia are parties to the Treaty, as are several leading States in the non-aligned movement among them Mexico, Venezuela, Libya, Syria, Iraq and Nigeria.

The inclusion of several militant 'rejectionist' Arab States within this category is especially encouraging. However, it is among other members of the non-aligned movement that the most persistent criticism of the NPT regime is found.

7.2.1.2. The Non-Parties

There were, on October 1st, 1980 a total of forty-four States which were not party to the NPT. To assess the extent to which these countries are subject to other safeguards agreements, the I.A.E.A. has made the following three fold classification.[8]

1) States with no significant nuclear activities being conducted within the State.
2) States with advanced nuclear activities, all of which are, in the I.A.E.A.'s estimation, subject to INFCIRC/66 type safeguards agreements.
3) States in which some part of their nuclear activities are not subject to any system of I.A.E.A. safeguards.

TABLE 1

Non-NPT States having No Significant Nuclear Activities

Albania	Equatorial Guinea	Papua New Guinea
Algeria	Guinea	Qatar
Angola	Guyana	Sao Tome and Principe
Bahrain	Kuwait	Saudi Arabia
Bhutan	Malawi	Seychelles
Burma	Mauritania	Trinidad and Tobago
Cape Verde	Monaco	Uganda
Comoros	Mozambique	United Arab Emirates
Cuba	Nauru	United Republic of Tanzania
Democratic People's Republic of Korea	Niger	Yemen Arab Republic
	Oman	Zambia

This first group of thirty-two States includes some of the poorest LDC's, which may be considered incapable of financing the development of even the most rudimentary nuclear research facilities. Examples may be found in Angola, Bhutan, Comoros, Equitorial Guinea, Sao Tome, etc. However, this group of States also includes a number of oil-revenue, surplus, OPEC members, Algeria, Kuwait, Oman, Qatar, Saudi Arabia and U.A.E, which would be capable of financing the rapid establishment of a civilian nuclear energy industry. Also, more controversially, such countries would be more readily able to finance the covert, or grey-market acquisition of the necessary

technical capacities and expertise to proceed to weapons manufacture. However, for the purposes of assessing the countries whose non-participation in the NPT raises the most immediately pressing cause for concern it is necessary to consider the following two categories of States. Firstly, the five non-signatories which, in the opinion of the I.A.E.A. are subject to pre-NPT, INFCIRC/66 type agreements on all activities. Secondly, there are the seven States in which certain activities are known to be un-safeguarded.

TABLE 2

I.A.E.A. Assessment of States with All Nuclear Activities Subject to Non-NPT Type Safeguards Agreements

Argentina

Brazil

Chile

Colombia

Pakistan *

* It should be noted that since 1979, Pakistan has been the subject of persistent speculation that significant nuclear facilities are being operated without the remit of INFCIRC/66 type safeguards currently in force on activities in that country.[9]

TABLE 3

I.A.E.A. Assessment of Non-NPT Parties in which Certain Nuclear Activities are not under I.A.E.A. Safeguards

China *

France *

Egypt +

India

Israel

South Africa

Spain

+ NPT signatory but still not subject to full safeguards.

* Nuclear Weapons States.

These latter two classifications enable the principal critics of the NPT regime, whose objections carry immediate conviction due to their advanced, civilian nuclear resources to be identified. There are twelve States with nuclear activities either wholly, partly or, in the case of France and China , not subject to pre-NPT, I.A.E.A. safeguards.

Despite their continued non-signature of the NPT, for all practical purposes both France and China have conducted policies wholly in accordance with its provisions. In the case of France this is attested in a specific and public undertaking.[10] In the case of China, despite frequent and vitriolic denunciation of the NPT, no evidence of the transfer of nuclear technology or weapons has been established or suggested.[11] The opposition of both governments to the NPT is a fundamental part of their foreign policy and military security philosophy. In France, opposition is attributable to the Gaullist policy of partial disengagement from NATO, and to the strategic doctrine associated with General Pierre Gallois.[12] The Chinese government attribute their acquisition of nuclear weapons to a purely defensive reaction to threats of nuclear aggression by other countries.[13]

The circumstances which surround the other ten non-parties with significant nuclear activities, has been extensively documented in the literature of military studies.[14] Therefore, only a very brief summary of those circumstances will be attempted here.

Given the present de-facto commitment to non-proliferation by the five established nuclear weapons States, the paths towards weapons acquisition by these ten are strictly limited. They may acquire weapons only by indigenous development, or by co-operation among themselves.[15] Seven of those States share four common features in their strategic position which give particular cause for concern. Firstly, by virtue of their economic development, resource base or geo-political location, they may be classified as emergent, second-order powers. Secondly, they are outside, or peripheral to those

alliances which include the U.S.A. or U.S.S.R. Thirdly, they are parties to intense regional conflicts. Fourthly, as will be shown, they possess a considerable capacity for the manufacture of fissile plutonium. This classification includes Pakistan and India, Egypt and Israel, and, with less emphasis upon regional conflict, also Brazil, Argentina and South Africa. The cases of Colombia and Chile are perhaps best explained by a combination of idiosyncratic factors and considerations of regional status vis-à-vis the hostility of Brazil and Argentina to the NPT.

The potential weapons manufacturing capability of these seven highest risk countries may be determined by examination of their projected production of separable plutonium, and spent-fuel accumulation derived from present installed and future planned generating capacity.

As can be seen from the Table 4 , with the exception of Spain, the two lower risk countries among the ten non-signatory, non-weapons States, possess an altogether less credible technical capability for weapons manufacture.

7.2.2. The Objections of the Non-Parties, and Demands Upon the I.A.E.A.; A Final Word

Now, more than a decade since the entry into force of the NPT, there remain some fifty non-signatories of the NPT. In particular the ten non-nuclear weapon States identified above seriously impair the credibility and effectiveness of the Treaty and the I.A.E.A. safeguards system established to uphold it.

In suggesting explanations for this state of affairs a further complication arises from the fact that, at risk of appearing tendentious, the reasons stated for non-accession are, in the main unacceptable, whereas the acceptable reasons remain unstated. The denunciation of the NPT on the grounds that it fails to offer security guarantees to the non-nuclear weapon states; or, that it fails to limit the vertical proliferation of the arms race between the U.S.A. and U.S.S.R.;

TABLE 4

Accumulation of Separable Plutonium for Selected Non-Signatories of NPT[1]

Projected Accumulation of Separable Pu (Kg)

	1975	1980	1985	1990
Argentina	0	350	1,228	2,898
Brazil	0	85	866	3,591
India	402	1,032	2,424	4,204
Pakistan	61	201	605	1,405
Israel	0	0	108	648
Egypt	0	0	216	756
South Africa	0	0	513	2,220
Spain	558	2,613	4,562	16,836
Chile	n.a.	n.a.	n.a.	n.a.
Colombia	n.a.	n.a.	n.a.	n.a.

Sources: A. Wohlsletter, ed. Swords From Ploughshares, Univ. of Chicago, 1979.

I.A.E.A.; Regional Nuclear Fuel Cycle Centres, Report; Vol. 1, 1977, Vienna.

1. Note Egypt is signatory but has yet to fully implement safeguards, see Table 3.

or, that it offers inadequate access to the peaceful uses of atomic energy, does not stand up to serious examination. In particular, these three criticisms are of least relevance to the concerns of "the ten."

The negative security assurances, that is, the assurances of the nuclear weapon states not to use nuclear weapons against the non-nuclear states, are of limited relevance to the regional confrontations central to the concerns of 'the ten.' Moreover, there can be no practical value in an assurance for which there is no redress against its violation. The regional problems of the ten States are similarly unresolvable simply by the regulation of the U.S.-U.S.S.R. arms race. Finally, by definition a State with sufficient technical expertise to be closer to the threshold of weapons acquisition is least likely to require technical assistance for peaceful uses.

Those States, in common with the highly developed States which have acceded to the NPT, do however have a legitimate interest in the argument that the acceptance of NPT safeguards may adversely affect commercial and research operations. The merit of this will be examined below.

Each of these ten States is, to a greater or lesser degree, confronted by the unenviable situation of being vulnerable to serious regional security problems, whilst increasingly doubting the reliability of their allies, or espousing the self-limiting doctrine of 'non-alignment.' Not unnaturally, for reasons of diplomatic discretion, the desire to maintain the nuclear weapons option is not an appropriate subject for public statement.[16]

This is the situation which has led the U.S. President's Special Advisor on nuclear energy affairs, Dr. Lawrence Sheinman to observe that,

> "An outright rejection of the concept of non-proliferation is politically and morally a difficult posture to take, and consequently substitute objections are being sought."[17]

This is well illustrated by the fact that as noted in the preceding Chapter, only Albania, Cuba, Tanzania and Zambia voted against the final NPT text contained in the U.N. General Assembly Resolution 2373 (XXII), of June 12th, 1968.[18]

Further evidence may be found in the fact that the two Conferences especially convened for the purpose of permitting the criticism and amendment of the Treaty; the Conference of the Non-Nuclear Weapons States, (N.N.W.S.) of 1968, and the NPT Review Conference of 1975, both failed to achieve the amendment of the NPT, any alteration of the nuclear weapons states' position on the security guarantees issue, or progress toward regulating the vertical proliferation of the U.S.-U.S.S.R. arms race. However, a useful reform of the I.A.E.A. Board of Governors, relevant to the non-nuclear weapons States' demands for access to peaceful uses of atomic energy, may be attributed to the first of these Conferences.

The origins of the Conference of the Non-Nuclear Weapons States, (C.N.N.W.S.) lay in a proposal put before the E.N.D.C. in July 1968. It convened at Geneva during August and September, 1968, attended by ninety-six states including, the four, nuclear weapons States, except China. These four were not permitted to vote, neither did they exercise their right to speak.[19]

On the subject of security assurances the C.N.N.W.S. was only able to adopt a draft resolution sponsored by the Federal Republic of Germany which called upon all States to respect the principles of the U.N. Charter.[20] The inclusion of references to the sovereign equality of States and to the principle of non-intervention ensured Warsaw Pact countries would vote against this bland and quite meaningless declaration; the Soviet led invasion of Czechoslovakia was launched during the period that the C.N.N.W.S. was in session.

On the subject of disarmament the C.N.N.W.S. balanced its call for specific measures to limit the vertical proliferation of nuclear weapons by noting that the security of all States

was endangered by the proliferation of nuclear weapons among countries not currently possessing them. In this the C.N.N.W.S. rejected the more extreme arguments, previously associated with India, that the control of the U.S.-U.S.S.R. arms race was in some sense, either logically or morally, a pre-condition of 'horizontal' non-proliferation.[21] On the subjects of security assurances and disarmament it would be appropriate to briefly mention the impasse which occurred at the 1975 Review Conference, convened under the provision contained in Article VIII of the Treaty, "... with a view to assuring the purposes of the Preamble and provisions of the Treaty are being realized."[22]

After a twenty-six day session, the Review Conference failed to reach agreement on any recommendations acceptable to all. In consequence, the Conference President, Inga Thorsson of Sweden drafted a compromise Final Declaration, which was adopted by consensus, and this without a vote. In its reference to security guarantees the Declaration simply noted that the nuclear weapons States had not been prepared to offer a legally binding commitment on any extension of the undertakings they had previously made in Security Council Resolution 255 (1968). President Thorsson's comments could only point out that the U.S. and U.S.S.R.'s defence of their SALT I, Vladivostock Accords and Threshold Test Ban Treaty, was considered inadequate by the non-nuclear States, including certain allies such as New Zealand and Rumania.[23]

To return to the C.N.N.W.S., the third major concern of the Conference was to secure access to the peaceful uses of nuclear energy. On this issue the Conference was itself divided between the priorities of the developed and less-developed States. The former emphasised the commercial aspects of peaceful uses, with a particular concern that the I.A.E.A. develop a safeguards system which would reduce interference and costs to a minimum. The less developed States expressed their greater interest in technical assistance, and in reform of the Agency's governing structure and expenditure priorities.

Common ground existed between all participants on the need to strictly regulate the costs of applying safeguards. Also, agreement existed upon the basic cause of their different misgivings concerning the discriminatory provisions of the NPT. Their common fear was of economic and technological dependence upon the nuclear weapon States for the provision of nuclear fuel supplies and the transfer of advanced technology. The nuclear weapon States not only enjoyed the commercial advantages of the historically more rapid development of their civilian nuclear industries. They were, and remain, able to reap the benefits of economies of scale derived from maintaining a military nuclear industry which conducts advanced research and development activities.

In order to offset any further disadvantages inherent in the imposition of NPT safeguards on the non-nuclear weapon States, the Conference adopted a Resolution which urged the greater use of non-intrusive instrumentation, surveillance and containment techniques in the application of safeguards. As seen above, this principle was embodied in INFCIRC/153. Its implications viz-a-viz the effectiveness of the safeguards system will be discussed in the third part of this Chapter.

The Conference adopted a further seven Resolutions concerning peaceful uses of importance to the I.A.E.A. The first called upon both the U.N. and the I.A.E.A. to initiate full studies on the potential contribution of all nuclear technologies to economic development in the less developed countries. Others called for the wider exchange of scientific and technical information, and in particular called upon the leading countries in the nuclear sciences to de-classify research materials of relevance to economic development. Other Resolutions called for greater financial support in the field of nuclear research. In addition to the I.A.E.A., both the U.N. Development Programme, and the World Bank were requested to organise a Special Nuclear Fund. It was further suggested that the I.A.E.A. might establish a fund of special fissionable materials to be placed at the disposal of the less developed countries.[24]

In addition to these re-distributional demands upon the budgetary programme of the I.A.E.A., a more fundamental criticism of the Agency's basic structure was advanced. The Conference adopted a Resolution calling for reform of the Board of Governors, to achieve a more equitable geographical distribution of Board members. It was suggested that the re-distributional demands placed before the Agency could be more vigorously pursued if new Board members, committed to the Agency's developmental tasks, were elected. This proposed reform was successfully implemented at the 1970 General Conference which voted to expand the Board from its then twenty-five members to its current thirty-four. This reform came into effect on June 1st, 1973.[25] More radical proposals, one to establish a separate organisation to pursue the application of peaceful nuclear explosions, and another to create a new organisation for technical assistance were not put to a vote. The great majority of C.N.N.W.S. participants therefore prevailed in their belief that access to the peaceful uses of nuclear energy was best pursued within a reformed I.A.E.A. They rejected any suggestion that the foundation of a 'have-nots' organisation, perhaps in the image of U.N.C.T.A.D. was of any practical importance.

By 1968 the I.A.E.A. was established as the single most important repository of technical assistance expertise. Such information and resources which lay beyond the Agency's competence was concentrated in the classified information and expertise of the nuclear-weapon States. The conditions upon which these States would favourably consider the dissemination of this information, and, or the expansion of their regular technical assistance programmes required the assurance that the recipients would pursue only peaceful uses. This was most readily assured through a policy of support for the one, near universal agency, already in existence. From the point of view of the non-nuclear weapon States, and in particular the less developed countries, the 1970-1973 reform of the Board of Governors provided the means to secure improved access to the established expertise and resources of the Agency.

In the light of these very real interests in the reform and expansion of the I.A.E.A. technical assistance role, compared to the basically less relevant issues of security assurances and superpower disarmament Scheinman asserts that through the ratification of the NPT the majority of States "... are giving up nothing for something."[26] By this he means that they are nominally foregoing an opportunity which in practice they could not put into effect. In return they are receiving guaranteed access to resources more useful to their economic development needs. This argument is supported from another influential American source. Dr. V. Gilinsky, of the Nuclear Regulatory Commission has remarked, vis-à-vis security assurances and disarmament,

> "I have never been very impressed when nations contend the answer to their security lies in superpower disarmament. I am more impressed by the obvious fact that they would be more secure if their neighbours didn't develop nuclear weapons."[27]

The Scheinman - Gilinsky argument is correct in its assertion that the great majority of non-parties to the NPT capable of weapons development are parties to regional conflicts in which the introduction of nuclear weapons would gravely jeopardise the prospects for settlement. However, the accuracy of that observation does nothing to resolve the security dilemma of a threshold State reluctant to make a unilateral commitment to non-proliferation for regional security reasons. The argument is also insensitive to the historical fact, clearly perceived by the non-nuclear States, that the U.S.A. remains the only country in the world to have used atomic weapons.

Scheinman is correct to suggest the weakness of certain objections to ratification of the NPT based upon the discriminatory application of safeguards. Both the U.S. and U.K. have consented to the application of safeguards upon their civilian nuclear industries. This offer demonstrates good faith to the non-nuclear States that the application of I.A.E.A. safeguards is an acceptable non-intrusive,

cost to even the most advanced nuclear industry. In fact, by greatly increasing the safeguards burden of the Agency, the U.S.-U.K. offer creates additional costs to be met from the Agency's Regular Budget.[28] The non-nuclear States might therefore regret their insistence upon demanding evidence of what one senior I.A.E.A. official has termed "... an equality of misery."[29] This, in conjunction with the derisory hard-cash contribution to the safeguards budget made by the lowest assessed contributing I.A.E.A. members ($750 p.a.), effectively undermines the 'discriminatory' arguments of the less developed States.[30] It is those countries most advanced in the development of civilian nuclear industries that suffer the greatest financial cost by accession to the NPT. This cost is the economies of scale and research experience forgone in being unable to offset research and development, and investment cost against the subsidies enjoyed by the civilian industries of the nuclear weapon States. As the review of the state of accession revealed,the great majority of these States are members of NATO, the Warsaw Pact or other security agreements with a nuclear weapon State, for example Japan. So long as their military security relations remain stable they may renounce the acquisition of nuclear weapons with little risk, and have done so. It is therefore among the ten non-parties, most nearly capable of developing nuclear weapons, and outside or peripheral to nuclear guaranteed military security agreements that the costs of accession to the NPT, in both commercial and military security terms are most concentrated. For these countries the risks of unilateral commitment to non-proliferation, are infinitely greater than the benefits of legitimacy, status and technical or commercial assistance, attached to ratification of the NPT.

Thus the greatest single obstacle to the wider acceptability of the NPT, that is, its acceptance among 'the ten', is the intractability of those regional conflicts in the Middle East, South Asia, Southern Africa and South America, in which they are involved.

7.3. The Effectiveness of the INFCIRC/153 Safeguards System

7.3.1. Introduction

The following account will analyse the effectiveness of the INFCIRC/153 system. Of those criteria set out in Chapter Two, some, namely the 'unified system' approach to the application of safeguards, the provisions for sanctions, and the provisions for amendment will be discussed very briefly. This is because, having set out their textual provisions in Chapter Six, and wishing to draw attention to the overall strengths and weaknesses of the system in the Conclusion to this Chapter, the major purpose of this section is to focus attention upon the inadequacies of the systems' extent and rigour of application. In the case of the former this will identify the loopholes which exist in the seemingly all-embracing provisions of the NPT and INFCIRC/153 document. The suggestion that the system is inadequately rigorous is based upon evidence that the material accountancy system is on the point of being physically overloaded. Other problems, such as the Inspectors' limited rights of access, are related to this, as well as to legal constraints in the INFCIRC/153 text.

7.3.2. The Unified System

The criterion established in Chapter 2 suggested

> "The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, the elaboration of a unified safeguards system applying common provisions, without discrimination, to all States accepting safeguards."

The acceptability of the NPT, and the I.A.E.A. safeguards system applied under its terms, has been criticised on the grounds of its discriminatory application to only the non-nuclear weapon States party to the Treaty. However, for the purpose of analysing the effectiveness of the safeguards system in practice, the non-discriminatory rules and procedures of the INFCIRC/153 system, applied to all those States which do accept the Treaty are an important and encouraging characteristic of the system. As Chapter Five has shown, the unified

approach to safeguards is not a novel feature of the I.A.E.A.-NPT system. The development of the I.A.E.A. safeguards procedures placed early emphasis upon the technical and political advantages of the unified approach. This is evidenced in both the INFCIRC/26 and INFCIRC/66 documents of 1961 and 1965 respectively. The particular importance of this concept for the I.A.E.A.-NPT system of 1971 is the scale of its application. The system is one unified set of rules and procedures applied to all civilian nuclear installations, that is, both research and production facilities. The latter involves particular problems of cost-effectiveness and respect for commercial secrecy that the I.A.E.A. only faced, substantially, as recently as the implementation of the 1965 safeguards system. The only exception to the unified system approach permitted under the NPT is of course the Euratom system. However, as the provisions of INFCIRC/193 reveal, the relationship between the I.A.E.A. and Euratom is not fundamentally different, ~~than~~ from the relationship obtaining between the Agency and a state safeguarded under INFCIRC/153. The practical significance of the Euratom anomaly is further reduced by the fact that the experience of Euratom in applying pre-NPT safeguards was greater than that of the I.A.E.A., due to the volume of nuclear materials and the advanced commercial nature of the nuclear industries in the Euratom countries. The more realistic basis upon which to criticise the special arrangements made for the Euratom countries is that they damage the political credibility of the NPT as a non-discriminatory Treaty, and the safeguards system as a potentially universal system. In particular, the Euratom arrangements undermine the sceptical, or adversary relationship which must exist between the safeguarding authority and the State.

7.3.3. The Extent of Application

> "The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, the fullest possible extension of the safeguards system through all stages and facilities of the nuclear fuel cycle at which diversion may occur."

The fundamental difference between the I.A.E.A.-NPT safeguards system and the preceding INFCIRC/66/Rev 2 system, is the extent to which former is applied, throughout the nuclear fuel cycle. The NPT requires the application of safeguards to all nuclear materials, in all peaceful activities within the territory of the State, or otherwise under its control. However, as shown in Chapter Six, a detailed examination of the INFCIRC/153 document reveals several exceptions to the all embracing terms contained in Article III of the NPT. It is therefore necessary to assess the importance of these exceptions in so far as they may impair the effectiveness of the safeguards system.

The first exemption to the full fuel cycle safeguards concept is that of materials in the mining and ore-processing stages. The State is merely obliged to report the existence of such materials to the Agency. By this exemption, the uranium producing countries which export ores and processed uranium to the nuclear weapon States are permitted to assist in the manufacture of nuclear weapons. This aspect of 'vertical' proliferation is of course outside the scope of Articles I and II of the NPT. Regarding the non-nuclear weapon States, the accumulation of stocks in the form of unconcentrated nuclear materials is not considered a viable path to the undetected diversion of fissile material.[31] The Agency is fully confident that the elaborate processing necessary to transform unconcentrated uranium into a viable fissile material effectively precludes this possibility.[32] However the incident in which it is suspected that the Israeli government secured 200 tonnes of uranium ore for use in an unsafeguarded research reactor by an act of piracy, illustrates the importance of maintaining more than national information concerning ore-movements.[33]

In the chronology of fuel cycle operations, the next stage at which materials may be exempted from safeguards is by deliberate or accidental error in taking the initial inventory upon which all subsequent material accountancy is based. As with the diversion of

any nuclear material other than plutonium or highly enriched uranium, substantial processing, including enrichment is necessary to yield weapons grade materials. For this reason the deliberate evasion or falsification of the initial inventory can not be considered a credible course of action to achieve undetected diversion. This judgement is shared by I.A.E.A., the U.S. and U.K. governments and independent sources.[34] However, a less optimistic interpretation of this situation is possible. The accession to the NPT of a State with an established, and substantial, domestic enrichment capacity renders the possibility of undetected diversion by setting aside weapons grade material more plausible. It is a possibility becoming more likely by the minuturisation of enrichment technologies associated with the centrifuge, and laser deflection techniques. A second problem concerning the initial inventory, genuine miscalculation, will be discussed below, as an aspect of material accountancy accuracy.

The provisions under which a State may remove materials from the application of safeguards, for use in non-proscribed military uses, deserves comment. The only legitimate, non-explosive military use for nuclear materials is in nuclear reactors for ship propulsion. Szasz suggests that the development programmes associated with nuclear powered ship propulsion would be so substantial that

> "... it is hard to conceive of them as merely covers for the diversion of some nuclear material to weapons use."[35]

The blandness of Szasz's judgement disguises the possibility that the diversion of nuclear materials can be conducted under the auspices of a legitimate propulsion research programme, by no means "merely" created with diversionary intentions. A more realistic, if disturbing, appraisal is that offered by a senior British Civil Servant; that the credibility of INFCIRC/153, paragraph 14, relies purely on the "... good word ..." of the State resorting to its provisions.[36] The other criteria upon which material may be exempted from safeguards, by use in non-nuclear activities, or on grounds of minimal quantities

do not offer a realistic opportunity for diversion to weapons manufacture. Similarly, the termination of safeguards on the grounds that materials have become irrecoverable through their transformation in use, can only be implemented with the consent of the Agency. In the event of uncertainty concerning possible future reprocessing of materials, safeguards remain in force.[37]

7.3.4. The Rigour of the System

> " The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, the fullest possible attainment of technical rigour in the application of safeguards procedures."

The rigour of the system will be examined under sub-headings for each stage of the fuel cycle.

7.3.4.1. Design Information

The notification of design information is included in the safeguards system to permit the Agency to determine the strategic points and material balance areas used for material accountancy and inspection. It is not anticipated that an otherwise undetected potential for the diversion of nuclear materials will be discovered. This limited purpose is reflected in the provisions of the I.A.E.A.-NPT system which does not even use the term "review" which occurs in the 1965 system. Neither system implements the rights contained in the Statute, which empowers the Agency to "approve" design information.[38] This restriction reflects primarily the sensitivity surrounding the examination of proprietary commercial information. If however the more utilitarian purpose for examination of design information is conceded, this diminution in the Agency's rights need not hamper the effectiveness of the safeguards system.

7.3.4.2. Material Accountancy

Material accountancy is the task of central importance to the effectiveness of the safeguards system. The limited purpose of

design information has been explained. The chief purpose of inspection is to identify and to verify the findings of material accountancy activities, with limited scope for independent inspection. The detailed provisions of the safeguards system viz-a-viz records, reports and containment are of course, component parts of the material accountancy effort. The most fundamental objection to the material accountancy procedures of the I.A.E.A.-NPT system is their reliance upon a national system of accountancy, which on the principle of 'strategic points' is verified by the Agency. Scheinman, in particular criticises the adoption of

> "... a strategic points inspection system ... without the technical feasibility of complete containment of nuclear fuels between the measuring points having been unimpeachably demonstrated."[39]

However, as Scheinman himself concedes, the adoption of such a system was basic to the acceptability of the NPT. Furthermore, the ideal-type which a safeguards system offering complete containment would constitute, transcends the boundaries of a system designed to detect diversion. It would become one based upon prevention. Realistically then, the effectiveness of the safeguards system relies upon the extent and rigour of the Agency's efforts to verify the national material accountancy system maintained by the State. In so doing, the use of mathematical and accounting techniques far removed from the physical presence of inspectors is essential. The Donnelly Report emphasised that the increasing scale of the Agency's operations and its financial constraints will encourage the increased use of these methods.[40] Those aspects of material accountancy examined here are; 1) the internal consistency of the accounts, 2) the statistical and methodological problems associated with the accounting system, 3) the accuracy of the accounting system, with particular reference to the problems associated with the increasing flow of materials subject to control (A subsidiary aspect of this problem would include the time taken to conclude accounting procedures.) 4) Finally,

the particular problems associated with applying accountancy techniques to different stages in the fuel cycle.

7.3.4.2.(1) Internal Consistency

The records from which material accountancy calculations are made are themselves audited for internal consistency. By this elementary precaution the attempted concealment of diversion based upon accountancy fraud can be detected.[41] However, within the bounds permitted by the safeguards system it is possible to substantially delay the submission of reports pertaining to material accountancy records. INFCIRC/66 permits thirty days between the movement of materials and the submission of routine reports, while INFCIRC/153, could permit a maximum of sixty-one days.[42] This is not so much a matter of material accountancy accuracy as a shortcoming in the requirement that the safeguards system should afford the "early detection" of diversion.[43] A State wishing to develop nuclear weapons, undeterred by the risk of detection, and so requiring only a short period of time before announcing its possession of nuclear weapons as a fait-accompli, is most likely to resort to the seemingly inconsequential tactics of frustration and delay, rather than elaborate diversion.

7.3.4.2.(2) Accuracy; Methodological and Statistical Problems

The use of random sampling and statistical analysis, supplemented by inspection enables the Agency to assess the accuracy of the States' accounts. However, this is only possible within the bounds of a known degree of uncertainty.

The I.A.E.A. operates its material accountancy procedures upon established values for the probability of detecting a significant quantity of diverted nuclear material. There is also an established value for the probability that this quantity has been correctly determined. In each case the probability is assessed at 95%.[44]

Using these probabilities, based upon the current limitations of accurate measurement and the volume of material recorded as passing through each material balance area, the Agency can therefore determine that significant quantity of material, which, if missing, could be detected. This significant quantity is then compared to the threshold quantity necessary to manufacture a nuclear explosive device. Current upper threshold limits are assessed as 8kg of plutonium and 25kg of uranium per year. On the basis of experiments conducted by the Agency the accuracy of the material balance may be expressed as a percentage error of the throughput, or inventory, of materials. These range from as low as $\pm$ 0.25% for processes such as fuel fabrication, to as high as $\pm$ 0.5% for the recovery of plutonium from reprocessing.[45] Using these best available accuracies for closing the material balance, the Agency is able to determine the need for additional safeguards procedures. Where the significant quantity for an annual material balance is judged to be well below the threshold quantity, safeguards are applied in a graded manner depending upon the materials concerned. Where the significant quantity exceeds the threshold other safeguards in addition to material accountancy are introduced, such as physical inspections and the use of containment and surveillance. The final comparison of the Agency's verification of the national accounting system, with the physical inventory, yields the figure of material unaccounted for. The Donnelly Report's assessment of this procedure notes;

> "The effectiveness of the I.A.E.A.'s accounting, sampling, measurement and analysis all depend upon the state of instrumentation and methodology, while the judgement whether or not diversion has occurred must rest heavily upon probability theory and practice."[46]

It is beyond the competence of this study to pass comment or judgement upon the findings of the technical panels and Working Groups responsible for formulating these probabilities and accuracies. The effectiveness of the safeguards systems depends upon their representing 'the state of the art' and keeping pace with relevant

technical and methodological innovations, as required in the text of the safeguards agreement.[47] A senior Agency official, Mr. B. Sanders has commented

> "a "confidence level" of 95 percent or more may still leave a considerable gap and large quantities of material not accounted for. But there is reason to expect that this gap will narrow with improved measurement techniques and more effective measures for physical security. In any case, there would seem to be no alternative."[48]

However, a reduction in the "confidence level" may still be more than offset by an increase in the absolute volume of materials passing through the system.

7.3.4.2.(3) Accuracy: The Volume of Materials

The entry into force of the NPT has greatly increased the quantity of materials subject to safeguards as can be seen in the following tables. In addition to the tripling recorded between 1972-1975, particular attention should be paid to the effects of Japanese accession to the NPT in 1976, and the entry into force of the I.A.E.A.-Euratom agreement of February 1977.

Volume of Materials Subject to I.A.E.A. Safeguards in Selected Areas/ Years.

Year	Plutonium (Kg.)	Enriched Uranium (Kg.)
1972	2,900	25,163
1975	9,035	80,263
1976	14,553	n.a.
1978	66,000 (approx)	10,000,000 (approx.)

Sources I.A.E.A. Annual Report 1976, 1977.
I.A.E.A. Bulletin 21; 4; 1979.

In addition to those increased responsibilities resulting from NPT ratifications there is the growth of nuclear generating capacity that can be expected within the States already party to the treaty. Accurate prediction in this matter is impossible. Despite the post October 1973 oil price and supply dislocations, the high-growth estimates made at that time of nuclear installed capacity, by both the I.A.E.A. and U.S.A.E.C. appear most unlikely to be realised.[49] Capital costs, operating efficiency, articulate opposition on environmental grounds, and economic recession, have reduced and postponed nuclear construction programmes. Also, additional concern for the risks of nuclear proliferation has constrained the commercial policies of the major supplier States. A recent example may be seen in the intervention of the U.S. government in a planned German-Brazilian reactor sales contract.[50]

However, from the perspective of safeguards preparedness, it is necessary to adopt the prudent course and give some consideration to the higher estimates. An eminent authority Dr. Imai, Special Assistant to the Japanese Minister for Foreign Affairs, suggests the possibility that the nuclear energy programmes of the developed countries could each be producing plutonium in the order of ten tonnes annually. He has made the judgement concerning the material accountancy system that, on the basis of controlling plutonium material unaccounted for within the threshold quantity of 7kg annually for each material balance area,

> "... the system will very soon come to the end of its effectiveness."[51]

Also, the Donnelly Report is emphatic in its opinion that the I.A.E.A. safeguards system will be inadequate to cope with the flow of materials expected by the 1980's.[52]

7.3.4.2.(4) Fuel Cycle Stages

The final aspect of material accountancy accuracy to be considered here is the particular problem associated with applying

safeguards to those complex stages of the fuel cycle, identified in 2.3.2.

Due to the nature of the nuclear material contained within reactor fuel rods, and the difficulties associated with gaining access to them for the purposes of diversion, reactors are one of the less difficult facilities to safeguard. The reactor fuel is inserted in the form of sealed rods, and these only in their later stages of irradiation yield plutonium suitable for weapons manufacture. Furthermore, for environmental and political reasons associated with the consequences of radiation hazards, safety and physical security measures are in operation at reactor facilities. For these reasons, and in keeping with the doctrine of strategic points, attention is therefore directed towards other facilities.

In the operation of an enrichment facility the possibility exists that the pipework of the diffusion plant may be modified so as to pass the flow of UF_6 gas through repeated stages, so producing material enriched to military use grades (up to 93%) rather than the usual commercial grades. (3-6 %) The centrifuge method of enrichment, currently being developed in U.K., Netherlands and West Germany can also be adopted for misuse.[53] Compared to the operation of a gaseous diffusion facility, far fewer enrichment stages are necessary. Also the centrifuge system is cheaper, both to construct and to operate. The technical problems involved in achieving diversion from an enrichment facility are complex and many vulnerable stages exist at which diversion may be affected. However, the extreme commercial sensitivity of the enrichment technology gives cause for concern that diversion, however difficult, might evade early detection. The U.S. Congress, Office of Technology Assessment Report notes,

> "The I.A.E.A. inspector is currently denied access to the cascade area (that is, where enrichment takes place), and is not allowed to monitor any new equipment that goes in and out of this area. Reconfiguration of the plant would have to be deduced from measurements of other inputs and outputs to the cascade area.

> Furthermore, materials accounting is currently not accurate enough for a large plant to assure the inspector that diversion has not occurred."[54]

A similar problem of inaccessibility attends the application of material accountancy to fuel fabrication plants, although in this case the cause is technical rather than the political and commercial sensitivity noted above. Materials in fabrication facilities are stored in diverse and frequently inaccessible forms such as powder in drums, and fabricated fuel rods awaiting shipment. Also, fuel pellets will be distributed throughout the plant in different stages of fuel-rod manufacture. The Agency has therefore concentrated upon the development of on the spot techniques of chemical analysis to identify materials, and on the use of containment seals to simplify stockholding accountancy.[55]

It is after irradiation in a reactor that nuclear fuel enters the stage in the fuel cycle most vulnerable to diversion; that is, reprocessing. The vulnerability of this stage is derived from two principle factors. First, as most succinctly stated by the I.A.E.A.

> "These plants are designed to produce plutonium . . . . . so that diversion now involves only misuse of the end product, which with a little further work could perhaps be used to produce a weapon."[56]

Secondly, the accuracy of material accountancy is at its greatest margin of error at this stage in the fuel cycle, that is $\pm$ 0.5%. Indeed, other sources suggest a higher figure, up to $\pm$ 1%.[57] Furthermore, the reprocessing plant is unique in that the input is less readily accounted for than the output. This is because the composition of the fuel rods entering the plant can only be calculated from reactor operating records. Direct measurement of the fissile content of the fuel is therefore the first priority. This is achieved by taking samples from the solution produced by dissolving the fuel rods in acid, in the first stage of reprocessing. This is the key measurement point upon which all subsequent accountancy procedures rely. Thereafter the problems of accountancy derive from the

complexity and inaccessibility of the stream of materials and of the equipment. The extreme radio-activity and consequent elaborate shielding compel the use of remote and automatic measurements, more susceptible to falsification than direct measurement. Therefore, further safeguards techniques such as containment by leaded seals and automatic T.V. or photographic surveillance are employed.

These observations on the problems of material accountancy demonstrate the necessity of maintaining techniques which attain the utmost rigour in their application. They also demonstrate the inadequacies of the techniques available to the Agency for material accountancy alone to uphold the integrity of the safeguards system. However, the full conclusions to be derived from this examination will be presented in the last section of this Chapter, subsequent to a detailed review of the remaining criteria by which the safeguards system may be judged.

7.3.4.3. Inspection

This analysis of the contribution made to the rigour of the safeguards systems by routine, ad-hoc and special inspections will consider morale, and other human dimensions, as well as an interpretation of the powers of the inspectors under the terms of the Safeguards Agreements.

7.3.4.3.(1) The Personal Dimension

The central tension between the requirements of acceptibility and credibility that governs all safeguards activities is especially acute in the task of inspection. The need to find an effective compromise between the co-operative and adversary approaches impinges directly upon the working life of the Inspectors, and hence upon their morale and effectiveness. The morale of the Agency Inspectors must be sustained throughout a period of time in which it is sincerely hoped by all that no evidence of attempted diversion will be found. They must steadfastly and rigorously search for something they hope they will never find. The tension between these two

requirements also creates a very practical problem for the Inspectors' morale, that of advancement within a career structure. Inspectors are appointed for probationary terms of two years, thereafter extendable to a maximum fixed-term of five years. A series of five year terms may be renewed, but the Inspectors cannot aspire to tenured posts. The places the Inspector who wishes, or may have to, enter or re-enter the commercial or government sector upon completion of his Agency contract in a vulnerable position. He may become subject to corrupt advances or become the victim of personal blackmail to secure a tenured appointment outside the Agency. This refers not only to the discharge of his official duties but also to commercial and conventional espionage that the Inspector may be able to perpetrate.

In view of the restrictive commercial policies adopted by the leading supplier-State since 1974, and especially since Mr. Carter's election to the U.S. Presidency, the prevention of commercial espionage has become a serious pre-occupation for U.S. officials.[58]

The clear lesson for the I.A.E.A. is that to sustain the morale and espirit de corps of the Inspectors, a high priority must be given to maintaining the status and remuneration of Inspectors commensurate with the arduous nature of their responsibilities.

In addition to the morale and loyalty of the Inspectors, another qualitative dimension of the acceptibility/credibility problem is the technical competence of recruits. The Statutory requirement that the recruitment of Agency staff reflect the Functionalist criterion of technical competence, conflicts with the political need to represent the geographical distribution of the Agency's membership. This is exacerbated by the desire to make up the numbers from new Member-States and to apply so-called positive discrimination to recruitment from Third World members. Furthermore, for domestic reasons, less developed States may be reluctant to release highly-trained nationals for Agency service, when their absence might adversely affect nuclear development programmes. Szasz notes,

> "If geographic diversity is pushed too far, and the recruitment of inspectors from countries having no nuclear programmes or only rudimentary ones is required, these candidates will not have the proficiency necessary for a truly elite corps."[59]

The U.S. G.A.O. report further emphasised the limited practical experience of some Inspectors, occasional instances of placing under-qualified staff in positions of responsibility, and the inadequate prior training of Inspectors.[60]

7.3.4.3.(2) The Rights of Access

Concerning the rights of access and the powers of investigation which the Agency's Inspectors are permitted, there can be no substantial objection to the restrictions placed upon ad-hoc and routine inspections. These reflect the reasonable requirements of operating efficiency demanded by the facility owners and operators. By these restrictions, the Inspectors are limited in their rights of access to materials and locations specified in the initial report and Subsidiary Arrangements.[61] These inspections are undertaken to confirm the findings of other verification techniques, principally material accountancy.

However, the investigative powers of the Inspectors are those detailed in the provision for Special Inspections, and in this mode, the restrictions placed upon the Inspectors effectively annul the ambitious Statutory provisions for, "... access at all times to all places ... and data, and to any person ... or facility."[62] The Agency's powers to investigate circumstances in which inadequate information is forthcoming from the State, and to gain access to locations in addition to those specified in the Subsidiary Arrangements is limited. Investigation may only proceed with the agreement of the State.[63] A refusal by the State can only be resolved by invoking the Agency's arbitration procedures, or its sanctions. Further provisions oblige the Agency to conform with "extended limitations on

access ..." in the event of the State concluding that "unusual circumstances ..." require such a restriction.[64] Also, the Agency is obliged to consult with the State in the event of complaint that "... the inspection effort is being deployed with undue concentration on particular facilities."[65] Finally, the State may refuse to accept the designation of Inspectors made by the Agency, or withdraw its approval any time.[66]

These restrictions are damaging to the credibility of the Inspectors independence of investigation and hence to the credibility of the safeguards system. The possibility exists that these provisions might be invoked to prevent access to locations, records and materials. It is insufficient to suggest that their use implies guilt and therefore sufficient grounds for the implementation of sanctions, meagre as ~~they~~ these are. Crucially, these restrictions may serve to obstruct the early detection of attempted diversion. It is the promptness as well as certitude of detection which ~~are both~~ is needed to ensure the deterrent effect of safeguards. Most succinctly, the G.A.O. has reported that the I.A.E.A. Inspectors do ...

> "... not have authority to seek out undeclared or clandestine nuclear facilities and cannot pursue or retrieve diverted nuclear material."[67]

The Inspectors do not have the legal power to sequestrate materials, issue writs for the release of information or subpoena individuals to give account of their actions. The transfer of authority to the Agency is restricted in a manner which leaves the legal sovereignty of the State essentially unaffected in respect of the Agency's jurisdiction.

Another aspect of the restricted access of Inspectors is the confidential nature of their findings. The Statutory obligation of the Agency to respect the confidentiality of information gathered through safeguards procedures has been over zealously implemented. Under the "Safeguards Confidential" classification scheme, relevant information is restricted to the Inspectors directly concerned, and the

Inspector General of the Agency.[68] Therefore, neither the details of safeguards application procedures, nor the Agency's estimation of material unaccounted for may be published. The G.A.O. report notes ...

> "Just because the I.A.E.A. has never publicly reported that material was diverted or unaccounted for is no real proof that (the) I.A.E.A.'s safeguards system is effective."[69]

7.3.5. Sanctions

> "The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, the elaboration and enforcement of effective sanctions against States which fail to uphold their agreed obligations under the terms of the safeguards system."

It can therefore be seen that the effectiveness of Inspectors, and the ultimate responsibility to uphold the integrity of I.A.E.A. safeguards rests upon the Board of Governors. The Board must decide when to request the State to grant access to restricted locations;[70] when to challenge the recalcitrant State with the threat of initiating arbitration; and when to take the final decision that the Agency is unable to verify the non diversion of materials and hence publish this statement. The Board is thereafter responsible for the application of sanctions.

Besides the administrative and procedural problems associated with convening a Board meeting at seventy-two hours notice, as laid down in its own rules,[71] there is a fundamental political objection to this system. It places with the Board the ultimate right to decide upon a technical matter, namely the conclusiveness or otherwise of the Agency's verification activities. This not only raises the issue of technical competence, but, as noted by the O.T.A.,

> "Although it should not be the case, the response of the Board to such an announcement might be conditioned by the identity of the State, and whether or not it was a member of the Board."[72]

This would suggest that the integrity of the safeguards system would be enhanced by transferring this particular aspect of the Board's responsibility to the Inspector General of Safeguards or the Director General himself.

The circumstances under which the I.A.E.A. Board may invoke its Statutory sanctions are restricted to two classes of dispute. First, in the event of an open defiance by the State of the Board's call to take remedial action and fully explain the circumstances of material unaccounted for. Secondly, the Board may implement sanctions in the event of the State impeding the access of a special inspection.[73] The sanctions available, discussed in Chapter Three, may be summarised as follows. The Board may;

1. Inform the Agency's member states and the Security Council and General Assembly of the United Nations.
2. Suspend assistance to that country and call for the return of material and technical assistance already supplied.
3. Suspend any non-complying State from I.A.E.A. membership.

Clearly, these sanctions are devoid of effective, preventive authority. The only positive action that may be effected is made the responsibility of another organisation; the U.N. Security Council. In principle, the Security Council could take action under its powers to investigate "... any situation which might lead to international friction or give rise to a dispute."[74] Such action might include economic sanctions, as applied to Rhodesia, and ultimately, military intervention.[75]

This is an entirely inadequate arrangement. Given the importance of early detection, any action that the U.N. Security Council contemplated would in effect, be in response to the fait-accompli of nuclear weapons possession by the State concerned, so

defeating the deterrent purpose of safeguards.

The Agency has no powers of seizure in respect of materials and the threat that subsequent assistance would be curtailed does not pose a credible deterrent to a State that has committed diverted resources to weapons manufacture. The inadequacy of current Agency sanctions is strongly emphasised in several official U.S. investigations, although as one notes ...

> "... If the world community lacks the interest, will or ability to respond to a significant diversion it is futile to propose that the I.A.E.A. do the job for them ..."[76]

However, the inadequacy of the Agency's present safeguards are not simply the result of Statutory and political inhibition. The Agency's powers, established in 1957 envisaged a greater development of the I.A.E.A. fuel-supply role as suggested in Eisenhower's "Atoms for Peace" address. The atrophy of the Article XII sanctions is therefore directly related to the non-use of the Article IX fuel supply and storage provisions. The political, commercial and technical reasons for this are discussed above in Chapter Five.

This directs attention to the fact, now recognised by the major supplier states, that only commercial sanctions in the form of export controls can act as a preventive measure. This was highlighted when the Suppliers Group "trigger list" was adopted by the Agency as INFCIRC/209.[77]

Therefore, the only sanction remaining entirely under the Agency's control is the pre-emptive deterrent of early detection, the efficacy of which depends, on the one hand, upon the effectiveness of material accountancy and inspection, and on the other, upon the extent to which early discovery, or suspicion, would obstruct a States plans for diversion. On the evidence examined in this Chapter it must be considered extremely unlikely that the latter factor is a serious obstacle to the determined State willing to reveal its acquisition of nuclear capability as a fait-accompli.

7.3.6. Provision for Review and Amendment

> "The successful implementation of safeguards against the diversion of nuclear materials from peaceful purposes to the manufacture of nuclear weapons, requires, provision to be made for the review of the safeguards systems' effectiveness in anticipation of technical innovation and in response to the experience of application."

A feature common to the I.A.E.A. safeguards agreements that were developed prior to INFCIRC/153 was the inclusion of provisions for review, amendment and extension in the light of operating experience and technological innovation.[78] These provisions had the effect of binding both the State, and the I.A.E.A., to a recognition of the inadequacy of the safeguards applied, and pledged both to seek and accept reform. In contrast, the possibility of amendment to the NPT is in practice confined to the cumbersome five-yearly Review Conference procedure. Review of INFCIRC/153 is restricted to amendments negotiated on an ad-hoc, bilateral basis between each State and the Agency.[79] That the amendment of the NPT can only be achieved by such a protracted procedure is most probably a strong argument in its defence. However the possibility of making ad-hoc amendment to INFCIRC/153, without the provision for automatic review is unfortunate. It may permit a breach of the 'unified system approach, so important in maintaining the credibility of the system's non-discriminatory provisions. Finally, the absence of automatic, and binding review weakens the ability of the Agency and the States to effect across the Board reforms in the light of technical innovations and operating experience.

7.4. Conclusions

7.4.1. The NPT

The NPT and the I.A.E.A.-NPT safeguards system cannot offer an absolute assurance that the diversion of nuclear materials from peaceful purposes will be prevented. Nor is this the objective of the system. Despite the NPT's reference to the prevention of

diversion the safeguards system is explicit in its self-limitation. Its objective is the "... timely detection ..." of diversion, and the deterrence of such diversion by the risk of "... early detection."[80] However, on the basis of the technical and politico-legal limitations of the safeguards system discussed in this Chapter, serious doubt must be raised concerning the ability of the safeguards system to attain its stated objectives.

1. The most fundamental limitation upon the effectiveness of the NPT, and I.A.E.A.-NPT safeguards regime is the limited scope of NPT ratification. This is the a-priori condition for the subsequent application of INFCIRC/153 safeguards.

2. In particular, among the non-nuclear weapons States not party to the NPT, the ten States identified as possessing significant nuclear activities give the greatest cause for concern. The more so, in the case of those five States in which certain nuclear activities are not subject to I.A.E.A. safeguards under INFCIRC/66/Rev 2 - type agreements. These are Egypt, Israel, India, South Africa and Spain. In addition, recent evidence suggests that the I.A.E.A. classification of Pakistan as a State in which INFCIRC/66/Rev 2 - type agreements are in force on all nuclear activities, may be inaccurate, a possibility clearly considered by the government of India.

3. Although objections to the text, to the discriminatory provisions regarding the application of safeguards, and to the financial and long-term commercial implications of accepting safeguards have been made, these are not central to the objections of those non-parties to the NPT, most able to acquire nuclear weapons. For these States the most important reasons for their continuing abstention from the NPT regime remain military and political, and inextricably connected to their perceived regional environment. For them, the renunciation of the option to acquire nuclear weapons is quite simply an unacceptable risk to be carried, relative to the limited benefits of accession to the Treaty.

Although additional ratifications of the NPT would be welcome , they are not likely from among the ten non-parties whose ratifications would be most significant. It must therefore be concluded that the single most important obstacle to the furtherance of adherence to the NPT remains the intractability of regional conflicts within and between the States of the Middle East, Southern Africa, the Indian sub-continent and Latin America.

7.4.2. INFCIRC/153

1. The Unified System

There are both technical and political advantages to be gained from promulgating one initial set of rules and procedures for the application of common safeguards provisions to all States. INFCIRC/153 is to be praised for the very nearly full implementation of this criterion. The one permitted exception, the INFCIRC/209 Euratom arrangement is an unfortunate breach of the unified system criterion. However its significance is of political rather than technical importance. The significance of its politically damaging consequences is reduced by the fact, as noted immediately above , that the more serious objections of the ten most significant objectors to the NPT are not centrally related to the Euratom anomaly.

2. The Extent of Application

Concerning the application of the Agency's safeguards, those limitations and problems arising from the extent of the systems application through the fuel cycle(that is, the exemptions, initial inventory, and termination clauses) are of little relative significance, compared to the inadequacies of rigour arising from the limited accuracy and overload of material accountancy, and the limited role of special inspections.

The provisions relating to non-proscribed military usage must be

deemed completely inadequate, and permissive of potentially covert weapons manufacturing activities.

The unsafeguarded trade in ores is an unprincipled exception to the safeguards on all other nuclear materials and as shown in the case of the Israeli's alleged piracy, a potential source of significant diversion for a State willing to resort to so flagrant a breach of international law.

3. Rigour or Application

The material-accountancy system cannot be considered a sufficiently reliable instrument of control to cope with the load, and technical complexity of those safeguards demands anticipated in the 1980's. This is especially significant with regard to plutonium management in the re-processing stages of the fuel cycle.

The limits of technical credibility which material accountancy is approaching are not only a matter of the increased probability that the diversion of materials will evade detection. As this review has emphasised, a most crucial, additional criterion is that detection should be early. A State determined upon the acquisition of a nuclear device may prepare many stages in that process prior to the actual diversion of fissile materials from civilian nuclear facilities. Thereafter, depending upon the materials diverted, the de-facto possession of a device may be effected within days, or at most three months. The cumbersome nature of the records inventory and reporting systems, provides adequate opportunity for such a diversion to occur undetected within that period of time. The national deterrent is political; that is the unwillingness of the State to be detected ex-poste-facto, as the possessor of a nuclear device. In the context of those regional disputes deemed most likely to produce the incentives for 'nth country' proliferation, such a deterrent is unlikely to be an effective constraint.

The I.A.E.A. inspectors do not have the necessary authority to seek out and pursue diverted materials in the event of circumstances arising which prompt a special inspection. It is to be remembered that the I.A.E.A. need not prove that diversion has occurred. It need only report that it is unable to establish that diversion has not occurred. However, effective and early counter measures to back up this generous concept of acting upon suspicion alone are lacking.

4. Sanctions

The I.A.E.A.'s sanctions powers are too weak, too slow, and, most crucially, their implementation remains subject to the discretion of the Board of Governors; rather than the Director General, or the Inspector General of Safeguards and Inspections. Therefore, as with the material accountancy system, it is the delay, and seemingly innocent or routine explanations that may be advanced for limited access to facilities and information that provide the less dramatic, yet more realistic opportunities to evade the early detection of diversion. These are further reinforced in the issue of sanctions by the Board's understandable reluctance to sound a false alarm.

5. Review and Amendment

The NPT is protected by the fact that the provisions for its amendment are both limited and complex. However, INFCIRC/153 is weakened by its provisions for ad-hoc, bilateral amendment, which may breach the unified system criterion. In so far as this reflects the need for flexibility in the light of technical innovations and operating experience, it would have been preferable to have included in INFCIRC/153 a clause, similar to those in all previous safeguards systems, INFCIRC'S/3,/26 and /66, providing for periodic and automatic review, with a view to amendment. This would serve to keep the sensitive issues of inspectors' access and the de-classification of certain safeguards findings under more nearly constant attention.

INFCIRC/153 represents the logical conclusion of safeguards development possible within the confines of the political framework established by the 'Atoms For Peace' proposals. This framework separates the regulation of nuclear materials from the ownership and management of these materials, and the development and application of safeguards from the related activities of physical protection and environmental health and safety standards. It has rested, ultimately upon the emphatic belief that the peaceful uses of nuclear energy may be successfully separated from military purposes. The fuller implications of these constraints are more properly discussed in the Conclusion to this thesis. This Chapter must conclude with the judgement that even within the constraints just mentioned, the current provisions of the NPT and INFCIRC/153 system must be considered inadequate to uphold, into the 1980's, the systems own stated objective, the deterrence of diversion by the risk of early detection.

Footnotes to Chapter Seven

1. For example the possibility must be considered that Iran may wish to reconsider her continued accession to the Treaty.

2. President Carter's announcement of April 7th, 1977 confirmed a continuation of President Ford's export licensing policy, contained in "Executive Order 11902." February 2nd, 1976. See Federal Register Vol. 41, No. 23, February 3rd, 1976. Also Economist (London) April 9th, 1977, pp. 9-10, 25-27.

3. Materials gathered in confidential interviews are indicated by footnotes as Interview I, or II etc. See Acknowledgements.

4. See; Comptroller General of the United States; Report to Committee on International Relations House of Representatives; Role of the International Atomic Energy Agency in Safeguarding Nuclear Material; General Accounting Office, July 3rd, 1975, hereinafter referred to as; GAO 1975.
   Also Committee on Government Operations, United States Senate; Nuclear Weapons Proliferation and the International Atomic Energy Agency; An Analytical Report prepared by Congressional Research Service, U.S. G.P.O. March 1976 hereinafter referred to as; Donnelly 1976
   Also, Congress of the United States; Office of Technology Assessment; Nuclear Proliferation and Safeguards; O.T.A. and Praeger Publishers, New York, 1977. hereinafter referred to as OTA 1977.

5. The Report is identified by the serial number IAEA/GOV/1842, 1977.

6. For current status of NPT see Appendix
   See also I.A.E.A. Bulletin Vol. 22, No. 5/6, October 1980, pp.136-138.

7. I.A.E.A. Bulletin, Vol. 19, No. 5, October 1977, pp.30-31. ibid. also Vol. 21, No. 2/3, June 1979, pp.80-81.

8. ibid.

9. See below, footnote 16.

10. On June 12th, 1968, the French representative in the E.N.D.C. stated that France would "... behave in the future in this field exactly as the States adhering to the Treaty." On November 23rd, 1973 this was re-affirmed in the General Assembly by the statement that the French government's intention was "... in no way to encourage any undertaking that might lead to the proliferation of nuclear weapons." See U.N.; The United Nations and Disarmament 1970-1975; U.N. 1976, p.75.

11. November 23rd, 1973, Statement of Chinese delegation to U.N. General Assembly. See ibid., pp.75-76, also Note 10 above.

12. See Aron, R., The Great Debate, Doubleday, New York, 1965, pp.101-102.

13. Statement of the Government of the People's Republic of China; Foreign Languages Press, Peking, July 30th, 1971.

14. For a 'classic' statement on the 'nth' country problem see; Buchan, A; A World of Nuclear Powers? Prentice Hall; 1966.
Also, Endicott, J.E., Japan's Nuclear Option. Praeger, 1975.
Marwah and Shultz, Nuclear Proliferation and the New Nuclear Countries, Ballinger, 1976.
Quester, G. The Politics of Nuclear Proliferation, Johns Hopkins, 1973.
Wohlstetter, A., 'Swords From Ploughshares', University of Chicago, 1979.

15. The limited although challenging scope for nuclear co-operation between the Third World countries is assessed in Meyer-Wobse, G. "Nuclear Co-operation in the Third World", Aussenpolitik, Vol. 29, 1, 1978, pp.65-74.

16. Note the consistent denial of weapons acquisition intentions made by S. Africa, and Israel 1979-80, see Economist (London) April 27th, 1979, pp.54-56, also April 27th, 1977, p.45.
Also the insistence upon a peaceful nuclear explosion made by India on May 18th, 1974..
See Annual Report of the Department of Atomic Energy, 1974-75 Government of India, Bombay, 1975 pp.7, 31-33, in which the test detonation is referred to as a "successful peaceful nuclear experiment."
On speculation concerning Pakistan see; Economist, August 11th, 1979, pp.6-7.

17. Scheinman, L. "Nuclear Safeguards, The Peaceful Atom and the I.A.E.A. International Conciliation; March 1969, No.572, p.63.
See also Scheinman's comments in Cox and Jacobson, eds; Anatomy of Influence; Yale, 1973, pp.231-233. Also Scheinman's testimony in Senate Hearings; Export Reorganisation Act 1976, Hearings before the Committee on Government Operations; United States Senate, Ninety Fourth Congress, January 19, 20, 29, 30, March 9th, 1976; USGPO; S1439, pp.73-80.

18. See Chapter 6, footnote 34.

19. It was initially intended that the C.N.N.W.S. would convene before the NPT was opened for signature, so that it might offer a platform for the N.N.W.S. to put forward their particular views and interests before the consolidation of the final text. However, both the U.S.A. and U.S.S.R. preferred that their elaborately negotiated draft treaty be opened for signature first, citing in their defence the fact that the N.N.W.S. had contributed both formally and informally to the negotiation of the draft in the E.N.D.C. and U.N. General Assembly debates. The U.S.-U.S.S.R. view prevailed.

See Epstein, W., The Last Chance, Free Press, New York, 1976, Ch. 9. pp. 126-134.

20. Epstein, op.cit., 1976, p.129.

21. ibid. p.130.

22. See SIPRI, Postures for Non Proliferation, Taylor and Francis, London, 1979, Ch. 4. pp.130-145.

23. SIPRI; 1979, op.cit., pp.132-134.

24. Epstein, op.cit., 1976, pp.130-131.

25. I.A.E.A., Statute, Article VI.

26. Scheinman, L., op.cit., 1969, p.63.

27. Gilinsky, V., Plutonium, Proliferation and Policy; Boston, MIT, November 1st, 1976, p.11 (text of speech).

28. Interview I.

29. Interview I.

30. In 1971 the I.A.E.A. Board and General Conference agreed that contributions to the Agency Regular Budget should be adjusted to take account of those countries with low per capita incomes. Those LDC's which were assessed in 1971 to make a 0.04% contribution to the budget were charged an annual sum of $750 for safeguards expenses. Szasz notes that the effect of this "is to relieve about 70 percent of the membership from most NPT - related safeguards costs". Szasz, P., "I.A.E.A. Safeguards", Ch. 4 of Willrich, op.cit., 1973, p.129.
See also I.A.E.A., International Nuclear Safeguards, March 1976, 76-0209, p.8.

31. Szasz, P. in Willrich, M. ed. op.cit. 1973, p.91.

32. Interview I , II.

33. Mr. Paul Leventhal, a former advisor to a U.S. Senate Committee on Nuclear Proliferation has alleged that in 1968 the Israelis' committed an act of piracy against a West German freighter carrying 200 tonnes of natural uranium in transit from Antwerp bound for Genoa. A Euratom spokesman subsequently admitted the disappearance of the cargo. See Economist, London, May 7th, 1977.

34. Interview I and III.

35. Szasz, P. in Willrich M. op. cit. 1973, p.95.

36. Interview IV.

37. I.A.E.A., INFCIRC/153, para 35.

38. ibid., para 42, compare with INFCIRC/66/Rev 2; paras 30-32 and with I.A.E.A. Statute, XII, A, 1.

39. Scheinman, L. and Pendly, R.; "International Safeguarding as Institutionalised Collective Behaviour"; International Organisation 29; 3; 1975, p.613.

40. Donnelly, op.cit. 1976, pp.12-13.

41. Sanders, B. and Rometsch, R. "Safeguards Against the Use of Nuclear Materials for Weapons." Nuclear Engineering International, September 1975, p.684.

42. I.A.E.A.; INFCIRC/153, paras. 62, 63 and INFCIRC/66/Rev 2, para 55.

43. I.A.E.A.; INFCIRC/153, para 28.

44. Sanders and Rometsch; op.cit., 1975, pp.683-685.

45. Rometsch, Accountancy, Control and Protection of Nuclear Materials; I.A.E.A., October 1975, p.4.

46. Donnelly, op.cit., 1976, p.115.

47. I.A.E.A., INFCIRC/153, para 6.

48. Sanders, B., Safeguards Against Nuclear Proliferation; SIPRI, MIT, 1975, p.56. Note however that Dr. H. Grumm, Deputy Director General of the Department of Safeguards, I.A.E.A. suggests that the detection probability used varies between 90-95%.
See Grumm, H., "I.A.E.A. Safeguards, Where Do We Stand Today?" I.A.E.A. Bulletin, Vol. 21, No. 4, August 1979, p.36.

49. I.A.E.A., Market Survey for Nuclear Power in Developing Countries, 1973.
U.S. Atomic Energy Commission; Nuclear Power Growth 1974-2000. WASH 1139 (74) U.S. AEC, Washington D.C. 1974.

50. See Nye, J.S., "Non Proliferation; A Long Term Strategy" Foreign Affairs, Vol. 56, No.3, April 1978, p.613.

51. Imai, R., "Nuclear Materials Safeguards and the Fuel Cycle Industry"; Nuclear Engineering International, September, 1975, p.681.

52. Donnelly, op.cit., 1976, p.2.

53. O.T.A., op.cit. 1977, pp.40-41, also pp.252-253.

54. ibid., p.41.

55. I.A.E.A., "The Application of Safeguards Procedures", Bulletin, 19, 5, October 1977, pp.9-13.

56. ibid. p.30.

57. Johnson, B., Whose Power to Choose? I.I.E.D., London, 1977, p.33.

58. Interview III

59. Szasz, P., in Willrich, M. op.cit., 1973, p.117.
60. G.A.O., op.cit., 1975, pp. 24-26.
61. I.A.E.A., INFCIRC/153, paras. 76, 78, 79.
62. I.A.E.A., Statute, Art. XII.A.6.
63. I.A.E.A., INFCIRC/153, para 77.
64. ibid. para 76d.
65. ibid. para 82.
66. ibid. para 85.
67. G.A.O., op.cit., 1975, p.32.
68. Interview I and II.
69. G.A.O., op.cit. 1975, p.16.
70. I.A.E.A., Statute, Article 7F.
71. I.A.E.A., Provisional Rules of Procedure of the Board of Governors, GOV/INF/60, October 1976, Rule 13.
72. OTA., op.cit., 1977, p.216.
73. I.A.E.A., INFCIRC/153, paras 18, 19, 77.
74. U.N., Charter, Article 34.
75. ibid., Articles 41, 42.
76. Donnelly, op.cit., 1976, pp.138-139.
    See also OTA, op.cit., 1977, pp.20-21 and G.A.O., op.cit. 1975, p.16.
77. I.A.E.A., INFCIRC/209, September 3rd, 1974 and additions of October 24th, 1974. See also, Survival XX, No. 2, March-April 1978, pp.85-87.
78. I.A.E.A., INFCIRC/3, Art. 3, para 2, see also INFCIRC/26, para 4, and INFCIRC/66/Rev 2, para 8.
79. NPT., Art. III, and I.A.E.A., INFCIRC/153, para 23.

CHAPTER EIGHT

Conclusions

8.1. Introduction

The conclusions to this thesis will be presented in two parts. The purpose of both is to relate the findings of the case study undertaken between Chapters Two and Seven to the theoretcial discussion of Mitrany's Functionalism undertaken in Chapter One. In the first part of this Chapter the five propositions presented at the conclusion of Chapter One will be subjected to individual evaluation (see 1.4.). In this, the emphasis will be placed upon identifying the political process which has underlain each development of the I.A.E.A.'s safeguards. To obviate the repetition of evidence, references will be made to the relevant parts of the chapter concerned.

In the second part of this chapter an overall assessment of Mitrany's Functionalism will be made. It will be argued that Mitrany's approach is best understood by reference to the primacy of politics, yet it will be shown that the encouragement of co-operation between States is in no way precluded by this perspective. Furthermore, the reconciliation of these two apparently divergent arguments will serve to clarify certain methodological problems that obscure the consistency of the Functional approach and which particularly obscure the interpretation of Proposition Five.

8.2. Evaluation of Propositions for Research

8.2.1. Proposition One

> "Functionalism proposes that it is possible to identify certain responsibilities of national government in the field of welfare and technical administration that can be more efficiently organised through intergovernmental co-operation."

To establish the extent to which this proposition may be validated or refuted, or indeed be adjudged to be compromised, it is necessary to consider the rationale of the decision taken to establish the I.A.E.A. This must determine to what extent, and for what reasons, the governments principally involved came to agree that the development of the peaceful uses of atomic energy was a suitable matter to entrust to the responsibility of an international organisation. In the foregoing narrative, this decision was seen to fall into two stages. The first, and unsuccessful, stage may be seen in the period 1945-1952 during which the U.N.A.E.C. deliberated upon various proposals put forward by the U.S. and Soviet governments (see Chapter 3). The second, and partially successful, stage may be seen to have occupied the period 1953 1957 following President Eisenhower's "Atoms For Peace" address (see 4.1. - 4.3.). It may appear awkward to suggest that a "decision" can fall into "stages". Indeed, if viewed simplistically, the stalemate of the period 1945-52 may be attributed to Soviet intransigence. Therefore, the partial success of the latter period may be said to have turned crucially upon the Soviet government's decision of November 15th, 1954, to join in the eight-nation group negotiating the draft I.A.E.A. Statute. For the purpose of identifying a cut-off point for the presentation of these propositions, this will be considered crucial. The reason for having placed this Soviet volte-face within the second stage of the negotiations, rather than at its initiation, is more complex. The foregoing narrative considered the Eisenhower initiative to be crucial because of two factors, (and hence the division of the narrative between Chapters Three and Four at that stage). In the first place, anticipating Soviet hostility to any revival of quasi-Baruch proposals, Eisenhower put forward a plan which effectively conceded Gromyko's criticisms of the responsibilities that could be given to an intergovernmental organisation. Eisenhower proposed a control mechanism for the regulation of nationally-owned nuclear programmes. Although Atoms For Peace encouraged the advanced States to contribute nuclear materials to an international clearing-house, the crucial factor for the Soviets was that it did not <u>prohibit</u> national ownership of nuclear materials.

Secondly, the impetus for this compromise lay within a complex of revised technical opinions concerning the separability of civilian and military uses of atomic energy. Furthermore, the political opportunities presented by Stalin's death created a situation in which there was a genuine expectation of a more co-operative Soviet response.

The salient points to establish may therefore be stated as follows.

1. The period between 1945-1953 in which the U.N.A.E.C. was in session saw no agreement between the parties involved as to the suitability of the Functional approach to the control of the nuclear energy industry. No organisation was created with responsibility for any of the four tasks identified in the terms of reference of the Commission, namely control, the dissemination of information, disarmament and safeguards. (see 3.1. 3.7.)

2. This was not solely attributable to the disagreement between the U.S. and U.S.S.R. concerning their respective insistence upon whether control should precede disarmament, or vice-versa. (see 3.3.)

3. Even if the U.N.A.E.C. negotiations had resolved this dispute, the Baruch and Gromyko plans advocated the creation of international organisations with radically different responsibilities. All the U.N.A.E.C. participants expressed their commitment to the objectives of preserving atomic energy for peaceful purposes and to disseminate technical information to assist in this purpose. However, in contrast to Baruch's plans for the ownership of all the world's nuclear materials by an "International Atomic Development Agency" the "International Control Commission" proposed by Gromyko would have been restricted to the role of observing the fulfilment of such rules as would be set by the I.C.C., itself responsible to the U.N. Security Council and its Soviet veto-powers. The Soviet concept of control was to merely monitor the national ownership and control of atomic energy development programmes in the Member States. Gromyko's rejection of the Functional approach was most succinctly put, and may be repeated here;

> "the situation prevailing at the present time... brought about by the discovery of the means of applying atomic energy and using them for the production of atomic weapons precludes the possibility of normal scientific co-operation between the States of the world."

(emphases added, see Ch. 3, note 25).

4. The "... situation prevailing at the moment" was, of course, the security dilemma faced by the U.S.S.R. as a consequence of the U.S. possession and proven willingness to use atomic weapons. One can hardly deny that under these circumstances the furtherance of Soviet national interests was better served by seeking to rapidly acquire an equivalence of arms rather than trusting to the vagaries of a promised, future U.S. disarmament. (see 3.7. - 3.8.).

5. During this period, the Functionalist approach found some vindication in the deliberations of U.N.A.E.C. Committee No. 2. This was responsible for drafting a safeguards system to be applied to whatever variety of control mechanism might be established. It was therefore agreed that an inspection system would be an appropriate responsibility for an international organisation to perform. The First Report of the U.N.A.E.C. referred to the principle of "unrestricted access to all equipment and operations." (see 3.4. note 32). Although the elaboration of this point is more appropriate to discussion of Propostion Two, it serves to establish that the minimum responsibility of any proposed safeguards system would have had to involve a substantial breach of state sovereignty in a highly sensitive field. It can be seen that the requirements of acceptability and credibility were thus present from the first, and in conflict with each other. In addition to identifying the principle of safeguards, the detailed technical requirements of safeguards were also established at the earliest opportunity. (see 3.4.). Committee 2 may be said to have demonstrated the logic of Functionalism in conducting its negotiations separately from the more explicitly political negotiations concerning a control body. That is, it emphasised the technical requirements, and continued to negotiate on such common ground as could be found.

6. The second stage in the process whereby the U.S. and the Soviet Union agreed to the creation of an international organisation with safeguarding responsibilities, depended upon fundamental U.S. and West European concessions to the Soviet's preferred control scheme. (see 4.2. and 4.3.).

7. The technical basis of Eisenhower's change in U.S. policy was the renunciation of the Baruch Plan's insistence upon the inseparability of the military and civilian uses of nuclear energy. (see 4.2.). Eisenhower argued that certain peaceful uses did not involve weapons grade material. Furthermore, he recognised that a reluctance by the U.S. to exploit the commercial opportunities for nuclear development within a framework of controlled dissemination, would only increase the incentives for each state to pursue its own, uncontrolled, development programme. The logic of such a scheme rested upon two requirements. Firstly the U.S. must control the distribution of nuclear fuel supplies through the intermediary of the proposed I.A.E.A. Secondly, the American scheme used the concept of safeguards as the single key mechanism whereby the civil-military distinction could be maintained.

8. The Soviet decision to participate in the eight, later twelve, nation group negotiations must be seen to derive from two altered circumstances. Firstly, the Soviets' acquisition of nuclear weapons in 1949 had nullified their a priori insistence upon nuclear disarmament. Secondly, the Eisenhower proposals conceded all of the Soviets' long held views on the dangers, to them, of Baruch-type ownership and control schemes. Although occasionally the Soviets reiterated their objections to the principle of safeguards, in the context of India as late as 1963, the Vyshinki statement of November 15th, 1954, commending safeguards was the turning point in the process of negotiations.

Proposition One is therefore validated in that the evidence summarised above has clearly demonstrated the a-priori need for two types of political agreement to precede the adoption of the Functional approach. Firstly the adoption Functional scheme should not prejudice the satisfactory management of related political disputes. In the

case of the I.A.E.A. this meant that international co-operation in the promotion of the peaceful uses of atomic energy could not be pursued if it placed in jeopardy the widely endorsed priority to limit nuclear weapons proliferation. Secondly, the adoption of the Functional approach should not threaten the high priority national interest of the States participating. In the case of the I.A.E.A. this was most clearly seen in the Soviet's determination to secure a national, nuclear weapons development programme before agreeing to participate in a control scheme which would seek to deny other States the possibility of using international assistance to their civilian programmes, for weapons development. The apparent contradiction between simultaneously advancing the objective of non-proliferation, with the need to concede the acquisition of nuclear weapons to the Soviet Union is resolved in considering the mandate of I.A.E.A. as it was finally agreed, namely, that Agency was not endowed with Baruch-like powers in respect of purely national research and development programmes of either civilian or military intent.

However, this does raise an important caveat to the validation of Proposition One. In practice it is not possible to separate the discussion of principles of Functionalism from detailed consideration of the type of organisation that might be called into being, and its powers vis-à-vis the Member States. This is demonstrated by the fact that the final decision of the U.S.S.R. to accept the principle of a Functional approach in fact followed Western concessions on the detailed provisions of the I.A.E.A. draft Statute. Therefore, although the Proposition One is validated it must be noted that the agreement required to fulfil that Proposition is dependant to a very great extent upon the validation of Proposition Two.

8.2.2. Proposition Two

> " Functionalism proposes the foundation of inter-governmental organisations, each mandated to undertake the specific and limited responsibilities assigned to it by the express instruction of the member governments. The mandate will also bestow upon the organisation limited powers of executive discretion in respect of technical administration."

The evaluation of this second proposition must consider three factors. It is first necessary to establish the terms of the mandate granted to the I.A.E.A. This requires consideration of the objectives of the Agency. This may be determined, most obviously from the Statute. However, it has been demonstrated in 4.5. that the decision of the U.S.S.R. to co-operate in the foundation of the Agency did not end disputes as to its mandate. Therefore, matters crucial to the future development of safeguards were agreed at this stage.

The second matter relating to this proposition is to consider the specific issue of the Agency's Statutory mandate viz-a-viz safeguards. The subsequent implementation, or otherwise, of these provisions is, of course, the subject to be examined under Proposition Three.

Thirdly, this Proposition draws attention to the matter of the relationship established between the Agency and its Member States. Here it is required that the Statutory provisions for control be compared to the five-part system proposed by Mitrany and discussed elsewhere (see 1.4.3.). In this, the competing arguments between "sovereign" and "Functional" equality will be considered. Also the bounds of the Agencies, executive discretion may be defined.

The most significant points may be suggested as follows.

1. The negotiations conducted to draft the Statute of the I.A.E.A. imposed limitations upon its mandate, in addition to those concessions made previously in order to secure Soviet co-operation. These limitations related directly to the Agency's proposed safeguards powers, and were a direct result of the creation of the Agency Projects concept. By this means safeguards would only be required on technical assistance and other projects using Agency-supplied materials or equipment. Outside "Agency Projects", the application of safeguards to bilateral trade agreements was to be voluntary. As will be discussed below, under Proposition Three, the non-use of the Agency's fuel supply role therefore gravely hindered the growth of its safeguards role.

A second limitation of the Agency mandate to be created prior to the agreement of the Conference of Eighty-One on the Statute. This concerned the control of materials produced as by-products of Agency Projects. This dispute, involving India, centred upon whether such by-products should be retained as the property of the State, or returned to the Agency. The weak and ambiguous compromise eventually reached favoured the Indian case, and so further limited the Agency's mandate viz-a-viz the intentions of the eight-nation group. By this agreement States were henceforth permitted to retain such by-products as they might consider useful to their research programmes (see Ch. 4, note 33). The Conference of Eighty-One itself consented to place constraints upon the activities of safeguards inspectors and upon the utility of the design review rights of the Agency (see Ch. 4, note 34).

2. The I.A.E.A.'s mandate, contained in Articles II and III of the Statute is compatible with the Functionalist approach. It requires the Agency to promote social welfare; also to advance peaceful relations between States. It proposes that both may be secured by the Agency assisting in the development and application of the peaceful uses of atomic energy. Specifically, the Agency is charged with responsibility for technical assistance, nuclear fuel supply and the maintenance of safeguards against the diversion of nuclear materials (see 4.5.1.).

3. The Agency's mandate with regard to safeguards specifies the technical aspects of the procedures to be used. It furthermore empowers the inspectors to perform unambiguously independent duties; that is the now familiar commitment to "... access at all times, to all places and data and to any person." (see 4.5.2.3.).

As noted above, however, the safeguards mandate only applies compulsion to Agency Projects.

Finally as noted, the safeguards mandate does not extend to the provision of safety standards nor to measures for the physical protection of nuclear materials, that is, para-military provisions for nuclear-plant security. (see Ch.4, note 72).

4. Mitrany's five-part scheme for control of the organisation by its members may be related to the I.A.E.A. Statute as follows; (see 1.4.3.).

4.1. The requirement that the organisation be endowed with a grant of "requisite powers" to discharge its mandate is fulfilled.

4.2. The requirement that the organisations powers may only be extended "in council by all of the governments concerned" is partially fulfilled. It is fulfilled in so far as the provision that Statutory ammendments can only be approved by the General Conference of all members. This is qualified by noting that Article XVIII Ci requires a two-thirds majority, not unanimity.

4.3. There is no provision in the Agency's Statute for the creation of any representative body involving the parliamentarians of the Member State.

4.4. There is no provision for consultation of or by non-governmental organisations. There are however provisions for collaboration with other intergovernmental agencies. These have been successfully utilised in the joint I.A.E.A-F.A.O. and W.H.O. projects.

4.5. Mitrany's concept of functional equality, argues that States should take a measure of responsibility in the control of international organisations commensurate with their contribution to its work. By this means Mitrany hoped to preserve the technical, operational work of each agency from overtly political interference, although it has been noted previously that this separation is a matter of degree, not an absolute category (Ch. 1, 4.2.). The Statutory provisions relating to the selection, election and respective powers of the Board of Governors and General Conference makes only one concession to this principle. This is the provision that the outgoing Board may select, on technical criteria, nine new members "most advanced in the technology of atomic energy" (see 4.5.4.2.). Thereafter, the more conventional priorities of geographical/political-

bloc representation are used. Similarly, the recruitment of staff to the Agency considers that "technical competence" should be the "paramount consideration." However, this is compromised to some extent by reference to financial contributions and geographical representation. (see 4.5.4.2.).

4.6. Concerning the actual policy-making of the Agency, for all except budgetary issues, a simple majority decision of the Board is sufficient. This is close to normal parliamentary practice, compared to unanimity or weighted voting. It is consistent with the Functionalist approach to "working democracy." Simple majority voting will almost guarantee that a substantial number of States, will be in the minority on any one issue. To accept this system therefore tests both the utility of the organisation, and the political maturity of the membership.

The findings of Proposition Two validate that part of Mitrany's control scheme concerned with the primacy of Member States rights. However, the refutation of certain of his other suggestions; non-governmental organisation consultation, parliamentary consultation and Member States' concessions to a notion of "functional equality" are consistent with Proposition One. In his use of analogies to support his argument, Mitrany shows signs of an exuberant optimism with regard to the extent that functional organisations might be endowed with permissive task-masters. It will be recalled that Mitrany frequently invoked the New Deal, also instances of Anglo-American economic collaboration in World War II, as exemplary of the functional approach.[1] Mitrany's error was to suppose that Roosevelt's policies commanded uncritical support. As the history of Supreme Court interventions demonstrates, the New Deal legislation was contentious, and was only enacted with the assistance of centralised federal government power. It is here that Mitrany's less than explicit references to "working democracy" "controlled democracy" and "delegated legislation" reveal his naivete with regard to accountable government; a naivete amplified in the

suggestion that functional international organisations might be partly controlled by a representative body drawn from the parliaments of the Member States.[2]

The example of the International Labour Organisation, as the one organisation with an element of parliamentary control is unfortunate. As Cox and others have demonstrated, the abuse of the I.L.O.'s "tripartite" form of control involving trades-unions and employers as well as government delegates is primarily responsible for the organisations' present crisis. The U.S. withdrew from the I.L.O. in 1977 taking with it 25% of the organisation's subscription income, as a consequence of former Secretary of State Kissinger's accusations that Soviet and Third World abuse of "tripartism" led to a selective concern for human-rights which condoned malpractices in the Soviet bloc and the less developed countries.[3]

In the case of Anglo-American wartime co-operation it would not be denied that under the impetus of war many Functional type arrangements, such as Lend-Lease, were created. Mitrany's error lies in the fact that these arrangements were for the most part dismantled after the war, although Marshall Aid, The Organisation for European Economic Co-operation and the I.M.F. were created. A lesson can be drawn from Mitrany's two misapplied analogies and the I.L.O. experience. He presumed that once the initial decision to apply the Functional approach had been made, members would permit the creation of pluralist procedures of control for the subsequent development of such organisations. Mitrany's optimism is not supported by the findings of this study. However, as has been shown this does, ironically, serve to support the central argument which is to cast Mitrany's work in a pragmatic tradition.

At the core of this pragmatic interpretation is the requirement discussed above (8.2.2. 4.2.) that the powers of Functional organisations may only be extended "in council by all of the governments concerned."[4] With this requirement foremost, Mitrany's other provisions,

namely those which, on the basis of the evidence presented here, have not been implemented, are seen to be contingent upon the satisfaction of this prior condition. With this caveat noted, Proposition Two can therefore be seen to be validated.

8.2.3. Proposition Three

> "The authority of the organisation will be extended by the Member States consenting to be bound by such rules and operating procedures as may be adopted by the organisation in furtherance of its mandate."

It is not intended to reproduce here the final evaluation of I.A.E.A.-NPT safeguards effectiveness contained in Chapter Seven. Similarly, the critique of limited safeguards developments undertaken between 1957-1968 may be found at the Conclusion of Chapter Five (5.7. - 5.9.). Rather, it is appropriate here to identify the processes by which those developments were achieved. Also, to identify the principal factors which constrained that development, and so created those considerable inadequacies in the safeguards system noted in those Chapters.

1. It has been established in discussing Proposition One that from the earliest opportunity the negotiation of safeguards was conducted separately from negotiation of politico-institutional questions. This conforms to Functionalist recommendation. This technique was maintained, with considerable benefits, in the Preparatory Commission work on safeguards. (see 5.2.).

2. The U.S. policy of bi-lateral fuel supply and safeguards agreements which occurred between 1957 and 1963 curtailed the development of the Agency's responsibilities in the years immediately following its inception. In view of the U.S. commitment to the Agency's foundation this is, at least, ironic. More substantially it reflected a conscious act of U.S. policy. The claim that tri-lateralisation was delayed until a safeguards system had been developed is frankly disingenuous. Prior to tri-lateralisation there was very little material to which safeguards could have been applied thanks to the U.S. preference

for bi-lateral aid. In fact the Americans' new-found intransigence derived partly from the commercial priorities of the I.A.E.A. Participation Act. By subsidies, this ensured lower prices to those States entering into bi-lateral fuel supply contracts with the U.S. than could have been obtained on the open market. (see 5.1.). In fact, it will be recalled that as early as the February-April 1956 meetings of the twelve nation group, the U.S. put forward the suggestion that the several supplier States "explore the possibility of reaching uniform safeguards for bi-lateral agreements no less comprehensive than the present ones of the Agency." (see Ch. 4, note 31).

3. The political explanation of the changed U.S. policy lay in countering the effects of the Soviets withdrawal of co-operation. This followed their September 1957 rejection of western disarmament proposals. These advocated reducing the production of fissionable materials. It is therefore probable that the Agency would have been called upon to administer some form of safeguards and inspection to uphold these agreements. This implied an extension of I.A.E.A. powers that was quite inimical to Soviet interests, and did not conform to the "Agency Project" concept.

4. It was therefore the deliberate initiative of the Canadian and Japanese governments which was responsible for the Agency extending its rules and procedures in the first safeguards agreement of 1959. (see 5.3. and 5.9.). INFCIRC/3 established a precedent in that the Agency was endowed with wide discretionary powers. However, this concession to the demands of technical expertise was not sustained in the more detailed provisions of subsequent safeguards agreements. Furthermore, the Canada-Japan fuel supply arrangement, in which the Agency acted as a retailer to Japan, was not repeated on a commercial scale.

5. The post-INFCIRC/3 development of safeguards was promoted by the coincidence of favourable political and technical changes that occurred in 1963. These derived from the new-found commercial viability of the nuclear energy industry, which required that the scope

of safeguards application be extended to large scale commercial reactors. This permitted, and encouraged the U.S. in the trilateralisation of its bilateral safeguards agreements. However this did not extend to encouraging the I.A.E.A. in its fuel supply role. Furthermore, the U.S. policy encouraged the separate development of EURATOM in both its research and safeguards role. This deprived the I.A.E.A. of both its aspiration to universality, and its claim to lead rather than follow in research and technical assistance. It also deprived the I.A.E.A. of any responsibility for safeguarding over 80% of the fissionable materials outside of U.S., U.K. or Soviet internal use (see 5.9.).

6. The political context in which these technical-commercial developments took place was the re-establishment of a U.S.-Soviet consensus on the priority of regulating transfers of nuclear materials. From the Soviet perspective the Sino-Soviet split and Chinese A-bomb development provided a salutory warning against faith in unregulated assistance to potential nuclear-weapons States.

7. The re-establishment of U.S.-Soviet consensus then encouraged a bi-partisan and comprehensive approach to non-proliferation. The successful negotiation of the NPT relied upon U.S.-Soviet agreement to resist the demands of certain non-aligned, non-nuclear weapons States. The approach adopted favoured a narrow definition of proliferation. This was taken to mean actual possession of tested nuclear weapons. By this means the U.S.-Soviet coalition was able to (a) allay the suspicions of each other and of their allies on the MLF question, (b) close the P.N.E. loophole, and (c) resist attempts to link the NPT to more than a nominal commitment to limit so-called vertical proliferation. (see 6.1. - 6.2.).

8. Further commitments to institute non-intrusive safeguards encouraged the co-operation of those industrially advanced countries with substantial commercial interests in nuclear materials and equipment exports. (see 6.4.1.).

9. The establishment of the "Safeguards Committee" in the I.A.E.A. departed from the strictly technical, and low-key approach used in the negotiation of pre-NPT agreements. Both the "Safeguards Working Group" or Randers Committee and Dr. Eklund's leadership had minimised political intrusions into establishing the technical requirements of effective safeguards. Forming a committee of the whole membership may have allayed the suspicions of the non-nuclear weapons States, but, it complicated, and politicised, the drafting of INFCIRC/153.

10. The five most crucial institutional shortcomings of the INFCIRC/153 rules and procedures are; a) the permissive and special treatment of EURATOM, b) the laxity of controls on source and non-proscribable military uses, c) restrictions upon inspectors rights of access, d) generous time-allowances for the submission of records and reports and e) the paucity of provisions for amendment. These all compound the underlying technical problem; of the physically overburdened state of the material accountancy system relative to the needs for threshold quantity accuracy.

11. In each of these institutional failures the protection of State-sovereignty has proven so compelling that the acceptability of the system has triumphed at the cost of seriously undermining its credibility.

The findings of Proposition Three demonstrate that the extension of a Functional organisation's authority vis-à-vis its members depends upon a permissive political environment. In the case of I.A.E.A. safeguards, with Soviet-American agreement on the priority of limiting nuclear proliferation, and its narrow definition so as not to encumber super-power strategic relations, it was then possible for those powers to advocate what J.P. Sewell would describe as "task-expansion" for the I.A.E.A. This is not to deny the significance of the initial Canada-Japan agreement which launched the development of safeguards prior to the NPT. However, the development of the I.A.E.A.'s responsibilities beyond the "Agency Projects" format would not have occurred without

the all-embracing safeguards requirements of the NPT. That done, it has been noted that the growth of legal responsibility was not matched by an equal growth in performance. The shortfall between the requirements of INFCIRC/153 and its implementation, compared to those technical criteria by which the system has been judged, reveals dangerous inadequacies. In this light "task-expansion" becomes a highly problematic concept. An absolute "expansion" reveals a relative failure in so far as fully implementing the enlarged mandate is concerned, compared to the INFCIRC/66/Rev 2 system which was better able to fulfil its, albeit more limited role, than is INFCIRC/153 (see 5.9).

It is in this light that the methodological and linguistic errors of simplistic "task-expansion" become apparent. This study of the I.A.E.A.'s safeguards has hopefully indicated that some of the more obvious dangers of confusing on the one hand the act of delegating responsibility, with, on the other hand, presuming the fulfilment of that responsibility. In this sense the Statutory provisions relating to safeguards have become confused in emphasising their aspirational rather than operational status. It is dangerous to set aspirations beyond what is operationally attainable. In the case of the I.A.E.A. this is evidenced in the blandness with which the near-exhaustion of INFCIRC/153's credibility is accepted by the governments principally involved. Therefore Proposition Three is validated, yet, only to the extent that the rules and operating procedures adopted by the organisation are clearly seen to have their genesis in opportunities for organisational development created by a deliberate policy of major Member States to use that organisation as a vehicle for specific programmes of co-operation.

8.2.4. Proposition Number Four

> "Functionalism proposes that each international organisation be endowed with enforceable sanctions by which means those Member States which act in breach of the rules and procedures of the organisation may be penalised. These sanctions will take the form of debarring the State from the benefits of membership."

There is in fact little which can be said of the I.A.E.A.'s sanctions powers that has not already been established. This derives from two factors. Firstly, the sanctions provisions have never been invoked. Secondly, there has been no amendment to extend sanctions powers beyond those contained in the Statute of 1957. Both factors beg the question, 'how useful would they have been in the event of their being invoked'? This will be considered below, after the formal statement of those two, prior, limiting factors.

1. The sanctions contained in the I.A.E.A. Statute have never been invoked. The positive conclusion to be inferred from this is that no attempted breach of the Agency's safeguards has yet been detected.

2. However, and less enthusiastically, it could be suggested that the sanctions available are irrelevant in so far as they relate to the curtailment of fuel supplies. Secondly, it should be noted that the procedure to invoke sanctions is too cumbersome to be timely. Thirdly, the provisions whereby responsibility for invoking sanctions rests with the Board of Governors is politically suspect. That is to say that the detection of diversion, a technical decision by the Director General, should be matched by placing with him the right of decision to invoke sanctions. On the contrary, Articles XIIC and XIX invest that right of decision in the Board, and indeed, require a two-thirds majority for expulsion. (see Ch. 7, 3.5.). These three factors highlight the urgent need for the review of both sanctions penalties and procedures.

3. At the heart of these inadequacies identified above is the fact that the Agency's fuel supply provisions have atrophied. (see 8.2.1. and 8.2.2.).

4. Some measure of the irrelevance of the sanctions' provisions can be obtained from the Soviet aquiescence to them. It had been a consistent feature of early Soviet criticisms that the Agency should be in a strictly subordinate relationship to the U.N. Security Council. This was principally to ensure Soviet veto powers over any drastic sanctions the

Agency might have been empowered to impose. (see 3.5., 3.7, also 4.4.). In the event, the Statute created only a minimum reporting obligation between the Agency and the Security Council, (see 4.5.1.), as there was clearly no particularly drastic measures available to the Agency to be the cause for dispute. Furthermore, by way of double-indemnity, the right to take any subsequent action on upholding sanctions was invested in the Security Council. (Art. XIIC).

The Fourth Proposition concerning the right and ability of Functional organisations to impose sanctions on their members is therefore refuted, although it is admitted that in the case of the I.A.E.A. these have not been invoked. As with the qualifications made in respect to the latter components of Proposition Two and Three, although the refutation of Proposition Four creates problems for the consistency of Mitrany's argument, it serves to strengthen the central element shown in Propositions One to Three. In view of the findings drawn from these propositions, it would have been more surprising had Proposition Four been verified. Charles Rothwell provides an illuminating contribution;

> "Whatever the motives that may have prompted the creation of international bodies, states have tended to regard the advantages of membership in them as outweighing any surrender of the capacity for independent decision (sovereignty) that might be involved. The surrender has been tentative in all events, since Member States have in almost every case reserved explicitly or implicitly the right to refuse compliance with what an organisation decides, or to withdraw from it and regain freedom of decision."[5]

Mitrany's expectation that Member States would permit and encourage the credibility of international organisation sanctions reflects a similar error as that concerning non-governmental organisations and parliamentary participation in their control. Partly it derives from his opinion that the initial decision to adopt the functional approach, if not a once and for all decision, would at least generate very generous and consistent support for the sanctions' powers involved. A further

partial explanation draws attention to the limitations of this study rather than to those of Mitrany's thinking. It will be recalled from 1.3. that the division of Mitrany's arguments to five sequential parts did some violence to the overlapping nature of the developments he proposed. Clearly in this case effective sanctions are part and parcel of the "working peace system.", We are therefore faced with the dependent variable problem. Before addressing that issue, it should be noted, with respect to sanctions, that the I.A.E.A. is by no means unique in the paucity of its powers. Sohn's study of international organisational sanctions reveals a pattern of minimal statutory powers in this regard.[6] Furthermore, the case-studies of sanctions usage also tend to further refute Mitrany's expectations. Sohn establishes that among the Specialised Agency's, seven have no provisions for expulsion, and three link expulsion from the Agency with expulsion from the U.N. Only the International Bank for Reconstruction and Development and its offspring, the International Finance Corporation and the International Development Association have provision for expulsion. Of the four cases extant, Spain withdrew from the International Civil Aviation Organisation before expulsion was formalised. A similar sequence attended Czechoslovakia's withdrawal from I.M.F. and I.B.R.D. following their rejection of Marshall Aid. Somewhat more support for Mitrany's case may be seen in the partial success of International Labour Organisation and the U.N. Economic Commission for Africa's sanctions against Portugal and South Africa in the early 1960's.[7]

8.2.5. Proposition Number Five

> "Functionalism proposes that the successful implementation of each organisations mandate will create positive incentives for each Member State to refrain from the threat or use of force in the conduct of relations with other members."

This proposition can only be answered in terms of the impact of I.A.E.A. safeguards by posing two or more specific questions. These would be;

a) "Has any one party cited the acceptance of I.A.E.A. safeguards, by a second party as the reason for improved relations between them?" Alternatively, this may be posed in the corollary form;
b) "Has any one party cited the absence of, or breach of I.A.E.A. safeguards by a second party as the reason of deterioration in their relations, to the point of invoking the threat or use of force?"

In light of the analysis thus far, it would seem extremely unlikely that the single issue of I.A.E.A. safeguards could be isolated as the crucial independent variable to which such fundamental changes in a states foreign-policy could be attributed. The acceptance or otherwise of I.A.E.A. safeguards is seen to be a decision contingent upon other more substantial considerations. It is possible, however, to cite some particular instances which support the proposition in its two-part form above.

1. The ratification of the NPT, and hence the acceptance of I.A.E.A. safeguards, by the Federal Republic of Germany contributed directly to the process of detente in Europe. It confirmed the 'rehabilitation' of the F.R.G. first set in motion in 1949. It also served to confirm the subordination of the F.R.G. to reliance upon the U.S. nuclear guarantee. This served to re-assure Soviet misgivings concerning the F.R.G.'s rearmament by finally indicating the termination of any serious U.S. interest in M.L.F. proposals. (see 6.2.2.).

2. A less explicit, yet supporting inference, may be drawn from the Japanese decision to ratify the NPT, so similarly confirming the subordination of Japanese military-security policy to U.S. interests. However, this has undergone revision in the light of Sino-Japanese rapprochement, and Japanese acceptance of the so-called "anti-hegemonist" clause in the Peace Treaty signed in 1977. This is viewed by the U.S.S.R. as a coalition, threatening encirclement, and signalling the onset of a more vigorous, independent Japanese foreign-policy.

3. In addition to these two particular instances, the most significant evidence supporting the proposition may be found in the

scope of NPT ratification by over 100 countries. (see Ch. 7.2.). By their ratification of the Treaty, these States may be taken to have confirmed the analysis and argument contained in the Treaty's Preamble, also in the text of the supporting Resolution 2373 (XXII). (see 6.3.).

4. The corollary form of the proposition suggested above can only be supported by circumstantial evidence of acts of omission. No one State has specifically attributed a deterioration in any particular set of bi-lateral relations, to the non-acceptance or breach of I.A.E.A. safeguards by the other party. However, it is possible to infer from certain instances of persistent non-ratification of the NPT that mutual suspicions of nuclear weapons acquisition are a self-perpetuating part of certain regional conflicts. (see 7.2.). This is most clearly evidenced in the continuing Indo-Pakistan confrontation, in which Pakistan's widely publicised efforts to acquire a potential nuclear weapons manufacturing capacity were stimulated by the May 1974 Indian test detonation. A similar situation obtains in the Middle East. In respect of relations between Israel and her Arab neighbours. Also, a similar predicament faces South Africa. Although vilified for its use of force in Angola and the former Rhodesia, from the South African perspective they are beleaguered by the arms-embargo of former allies while faced by a declared O.A.U. policy to promote armed insurgency against the Republic. Maintaining its nuclear option is clearly central to South Africa's security policy and is unlikely to be modified by the extent of NPT ratification among its hostile neighbours, especially since, in deference to Chinese wishes, two of the African front-line States, Zambia and Tanzania, are hostile, non-parties to the NPT. (6.2. and 7.2.).

Thus it can be said that although on the evidence presented, Proposition Five is supported it is not possible to be more positive than this. The hesitancy of this qualified judgement is related to the problem first mentioned in the Introduction to this Chapter (see 8.1.). The verification or falsification of this Proposition is rendered more complicated than in the preceding cases, by a methodological problem

fundamental to any study of Mitrany's Functionalism, namely the dependant variable problem.

This arises in any attempt to explain the relationship between structural changes in the international system and behavioural changes in the policies of its members. In the case of Mitrany's Functionalism the problem may be stated thus; 'can the structural changes in the international system advocated by Mitrany, namely, the foundation of functional international organisations, induce behavioural changes in State conduct, encouraging co-operation, in specific tasks and reducing the use of force between States?' In this formulation Mitrany's "working-peace system" is cast as the dependent variable and the foundation of functional international organisation as the independent variable. The pragmatic interpretation of Mitrany's work advanced here would suggest that the relationship between these variables is reversed. If this is the case then it is no longer possible to continue discussion of Proposition Five as a separate issue. It will be shown in the conclusion of this Chapter that the dependent variable problem and other related issues of methodology can only be discussed, together as part of a final review of Mitrany's Functionalism. In this it will be suggested that to cast the dependent and independent variables as mutually exclusive categories is neither necessary nor desirable. It will be suggested that a constructive dialectic may exist between the promotion of structural and behavioural changes in the international political system.

8.3. Final Remarks

8.3.1. The Primacy of Politics

The insights derived from each of the five research propositions discussed above may now contribute to the final assessment of Mitrany's Functional approach. Each proposition was drafted to summarise as succinctly and fairly as possible the five-part presentation of Mitrany's arguments made in 1.2. To assist this, each proposition also reflects the clarification of the arguments made in the critical appraisal of

Mitrany's scheme. (1.3.). It will be remembered that the four controversial aspects identified there were as follows; that Mitrany's work was grounded upon an explicitly liberal ideology, that problems of definition arose in establishing the so-called separability of political and functional processes, that, thirdly, these difficulties were reflected in the five-part mechanism for the control of functional organisations that Mitrany advocated, and finally, certain problems arose in disentangling Mitrany's approach from some critics suggestions that it was flawed by reliance upon determinism in its process and teleology in argument. These issues, and other problems of method that have arisen from this particular case study, provide the guidelines for this final appraisal.

In Chapter One, Mitrany's Functionalism was interpreted as an essentially pragmatic approach to international organisation, one whose premises might be accommodated within the so-called realist tradition, albeit the liberal part of that tradition. This is to say that Mitrany recognised the primacy of real-politik constraints upon the promotion of welfare and development co-operation. He conceded that whatever potential for welfare might exist in functional co-operation, this would continue to lie dormant until such time as the governments principally concerned chose to act.

As Charles Rothwell has argued;

> "Essentially the States of the world, large and small, have looked upon international organisations as instrumentalities through which they could further some aspects of their respective national interests. In many cases these national interests have been narrowly conceived in terms of prestige, protection or immediate advantage. On other occasions, such as the founding of the League of Nations and United Nations, states have evinced more genuinely international and altruistic concepts of national interest. Even in these instances, the identification of national aspirations with improved world order and well being through collective effort has usually reflected a calculated decision that the States interest would be better served in this manner." [8]

The findings presented in the preceding part of this Chapter largely confirm this interpretation. The validation of the first three propositions, although each subject to detailed reservations, supports the contention that (1) the identification of potential functional responsibilities, (2) the foundation of the relevant agency, and (3) its development, are each subject to prior political agreement among the States concerned on both the objectives and methods of co-operation. The qualifications attached to Proposition Two concerning the non-implementation of the latter three of Mitrany's five-part control scheme is consistent with this. Also the refutation of Proposition Four, regarding sanctions is consistent with the logic of the preceding three propositions. However, this would suggest an inconsistency in Mitrany's argument. The possible explanations of this over-enthusiastic optimism will be discussed below. Similarly, the ambiguity surrounding the findings of Proposition Five will be subjected to more detailed consideration .

8.3.2. Encouraging Co-operation

Mitrany's Functionalism would not have endured as such a persuasive and influential approach to international organisation if it were unable to identify the rationale for co-operation upon which its adoption depends. The key to identifying this is the distinction that Mitrany makes between the functional and the political processes. If, as Claude suggests the problem of "separability-priority" rested upon an absolute distinction between these processes there would be little encouragement to co-operation. However, as has been shown, (see 1.4.1.) the distinction is one of relative emphasis. This opens the possibility that co-operation and the primacy of politics can co-exist and indeed make cautious progress together. This possibility for mutual reinforcement between the Functional and the political further serves to resolve the issue left outstanding from this study. This is to explain the relationship between functional co-operation, as evidenced in discussion of Propositions One to Four, and the prospect of the "working peace system," envisaged in Proposition Five.

It was noted (see 1.2.) that the "stages" of Mitrany's argument were more properly overlapping phases. Their strictly consecutive treatment in that Chapter has no doubt aided clarity if at the cost of suggesting a somewhat elephantine process of development; each step taken singly and irrevocably. The emphasis upon strict political control argued in the preceding section of this Chapter does not preclude a more adventurous approach to encouraging co-operation. Indeed, it may assist it by re-assuring State authorities that contrary to suggestions from some quarters there is nothing automatic about Functional co-operation.[9] Functional co-operation is encouraged by the anticipation that success will bring the desired reward. This prospect is most tantalisingly held before State authorities when the product of functional co-operation is a pure "public good." That is something that can only be realised by co-operation, and therefore only enjoyed after the act has been committed. This Functionalism is of an unusually pure variety, and it is one that has clearly driven such critics as Haas to despair in the search, or caused them to counter with suggestions of teleology and determinism. When the benefits to be derived from Functional co-operation are clearly apparent risk taking becomes easier, and hence more likely. Also, when as in the case of controlling nuclear proliferation, the costs of failure are so devastating and irrevocable, authorities pledged to defend sovereignty can exhibit great prescience and ingenuity in surrendering part of that sovereignty under controlled conditions. As Goodwin suggests;

> "Instead of either anarchy or Leviathan there would a a 'half-way house' of a continuing and close association of sovereign states as the basis for an orderly and peaceful society."[10]

Or, as Taylor notes, some encouragement to seek co-operative solutions is afforded by recognising that less value attaches to undiluted sovereignty when authorities come to recognise the "equality of limitations" by which they are thus constrained.[11] When mutual limitation is compounded by mutual vulnerability a powerful incentive to measured political co-operation and institutional innovation is created.

In the case of the I.A.E.A.'s foundation, and most particularly its post-NPT development, both the limitations and vulnerability of failing to implement a co-operative solution are evident. For the non-nuclear States the acceptance of safeguards must be seen to constitute a minor irritation compared to the limitations incurred by the denial of access to peaceful uses. The more so if we recall Scheinman's blunt but not inappropriate judgement that the less developed countries, party to the NPT "are giving up nothing for something."[12]

From the perspective of the sponsoring super-powers, the I.A.E.A. and the NPT fulfilled the requirement that international organisations may help to stabilise the balance of power. Both the Agency and the Treaty permitted an adjustment in the distribution of power to be made without resort to the use of force. This argument belongs in the 1930's tradition, from which Mitrany arose, that international organisations can promote peaceful change.[13]

This reference to peaceful change begs the question, 'is functional co-operation the mid-wife or child of "the working peace system"?' Both Mitrany, who argued for the former interpretation, and Claude for the latter, have become ensnared upon an unnecessary argument.

The foregoing account has emphasised the demonstrable benefits of international co-operation in the nuclear energy industry. This has drawn attention to both the benefits of success, and the irrevocable consequence that would follow upon a failure to regulate the distinction between the civilian and military applications of nuclear energy. Under these circumstances it is inappropriate to make too rigid a distinction between the means and ends of international co-operation. When the end to which international co-operation is directed can be perceived with such clarity and certainty this can itself act as an encouragement to the means for its attainment. This does not constitute a descent into the murky waters of teleology. Rather, it is an affirmation of the pragmatic tradition in political endeavour, that a creative dialectic may exist between ends and means. The "working peace system" may therefore

be considered partly as an end of the Functional approach and, partly as the means to promote it. In politics, an unambiguous statement of the desired end can serve as a stimulus to the means. The "working peace system" may be viewed as defining a structural change in the international system, in which the threat and use of force are renounced as legitimate instruments of State-policy. In this it serves as a stimulus to co-operation. Yet in so doing, it reveals another aspect of "the working peace system," the behavioural aspect. That is to say that the term, "the working peace system" may also be applied to the incremental process of international co-operation through the work of international organisations. This may be a presumptious use of Mitrany's language but it is consistent with the pragmatic rather than deterministic spirit of his work revealed here.

This, more adaptable, mutually reinforcing relationship between functional co-operation and "the working peace" is supported by Mitrany's faith in the concept of "positive security."[14] (see 1.2.). "Positive security" is a mixed-sum concept, which enlarges the primacy of military security to include social and economic factors. In both the foundation of the I.A.E.A. and the entry into force of the NPT, economic and commercial advantages were obtained from regulating an otherwise uncontrolled nuclear proliferation.

Therefore, although this study has drawn attention to the inadequacies of current safeguards provisions and practices their purpose in attempting to maintain the civil-military distinction remains vital. It is an inescapable conclusion that the difficulties faced by the I.A.E.A. in relation to upholding the NPT are not the due to any failure of the organisation, but are attributable to the founding States which drafted the Statute and those which subsequently drafted the NPT and INFCIRC/153. The I.A.E.A. cannot be expected to prevent the diversion of nuclear materials, its raison d'etre is the detection of diversion. Furthermore, when, as suggested in Chapter Seven, the Agency's ability to perform this task is jeopardised by the physical and technical overloading of the material accountancy system, it is clearly

the responsibility of the Member States to effect the necessary reforms of the Agency's powers, especially in regard to special inspections, controls on source materials and non-proscribable military uses and the overly generous time-allowances for the submission of records and reports. In each of these instances the reforms necessary are beyond the range of those limited powers of executive discretion which rest with the Agency's Secretariat. They would require a fundamental re-appraisal of the Member-State's attitude to the question of where the dividing line between national and international authority should be re-drawn. In other words it is urgently necessary to redress the imbalance between the credibility and acceptibility of international nuclear safeguards, which has recently and rapidly swung away from the former in deference to the latter.

This study largely confirms the vitality and relevance of Mitrany's Functionalism to the study of international organisations. The pragmatic interpretation of the Functional approach made here suggests that if suitably alerted to the pre-requisite of political agreement upon both the objectives and methods of international co-operation, then Mitrany's scheme can serve as a valuable guide to the management of those technological innovations which harbour the capacity for both creativity and misuse. It would be both a false aspiration, and one contrary to the Functional approach, to claim any greater role than this.

Footnotes to Chapter Eight

1. Mitrany, D., A Working Peace System, Chicago, Quadrangle, 1966, pp.56-57, and p.85.

2. ibid. p.69.

3. See Cox, R., "Labour and Hegemony" International Organisation, Vol. 31, No. 3, 1977, pp.385-424.
And N.M. (Anon.) "International Labour In Crisis" Foreign Affairs, Vol. 49, No. 3, pp.519-531,
and Economist, London, October 1st 1977, pp.49-52,
also November 5th, p.1977, pp.101-102.

4. See Ch. 1 footnote 78.

5. Rothwell, C.E., "International Organisation and World Politics", from D. Goodrich, L. and Kay, D. International Organisation, Politics and Process, Winsconsin, U.P. 1973, p.28.

6. Sohn, L.B., "Expulsion or Forced Withdrawal from an International Organisation", Harvard Law Review, 77, (8), 1964, pp.1401-1416.

7. Bliecher, S.A., "The U.N. versus the I.B.R.D. a Dilemma of Functionalism", International Organisation, 24, (1), 1970, pp.31-47.

8. Rothwell, C.E., op.cit., 1973, p.28.

9. See for example
Taylor, P., "The Functionalist Approach to World Order A Defence", Political Studies, Vol. 16, No. 3, 1968, pp.393-410.
Also Taylor and Groom, International Organisation, London, Frances Pinter, 1978, Ch. 11, pp.236-252.

10. Goodwin, G., "International Institutions and International Order" from James, A. The Bases of International Order, London, OUP, 1973, p.157.

11. Taylor, P., International Co-operation Today, London, Elek, 1971, p.118.

12. Schienman, L., "Nuclear Safeguards; The Peaceful Atom and the I.A.E.A." International Conciliation, March 1969, No.572, p.63.

13. See for example, L. Woolf's The Intelligent Man's Way to Prevent War, London, Gollancz, 1933, pp.9-18.

14. Mitrany, D., op.cit. 1966, p.66.

APPENDIX A THE CURRENT STATUS OF N.P.T. RATIFICATION AND SAFEGUARDS.

NOTE; Bold: States having NPT safeguards agreements in force.
Italics: States not having NPT safeguards agreements in force.
*: Safeguards agreement approved (completed) and awaiting entry into force.
Date indicates date of entry into force

NON-NUCLEAR WEAPON STATES PARTY TO NPT

1. Afghanistan
2. Australia
3. Austria
4. *Bahamas (10 January 75)*
5. *Bangladesh (27 March 81)*
6. *Barbados (21 August 81)*
7. Belgium
8. *Benin (30 April 74)*
9. *Bolivia* (5 March 72)*
10. *Botswana (5 March 72)*
11. Bulgaria
12. *Burundi (19 September 72)*
13. Canada
14. *Central African Republic (25 April 72)*
15. *Chad (10 September 72)*
16. *Congo (23 April 80)*
17. Costa Rica
18. Cyprus
19. Czechoslovakia
20. *Democratic Kampuchea (2 December 73)*
21. *Democratic Yemen (1 December 80)*
22. Denmark
23. Dominican Republic
24. Ecuador
25. El Salvador
26. Ethiopia
27. Fiji
28. Finland
29. *Gabon* (7 August 75)*
30. Gambia
31. German Democratic Republic
32. Germany, Federal Republic of
33. Ghana
34. Greece
35. *Grenada (19 February 76)*
36. *Guatemala* (22 March 72)*
37. *Guinea Bissau (20 February 78)*
38. *Haiti* (2 June 72)*
39. Holy See
40. Honduras
41. Hungary
42. Iceland
43. Indonesia
44. Iran
45. Iraq
46. Ireland
47. Italy

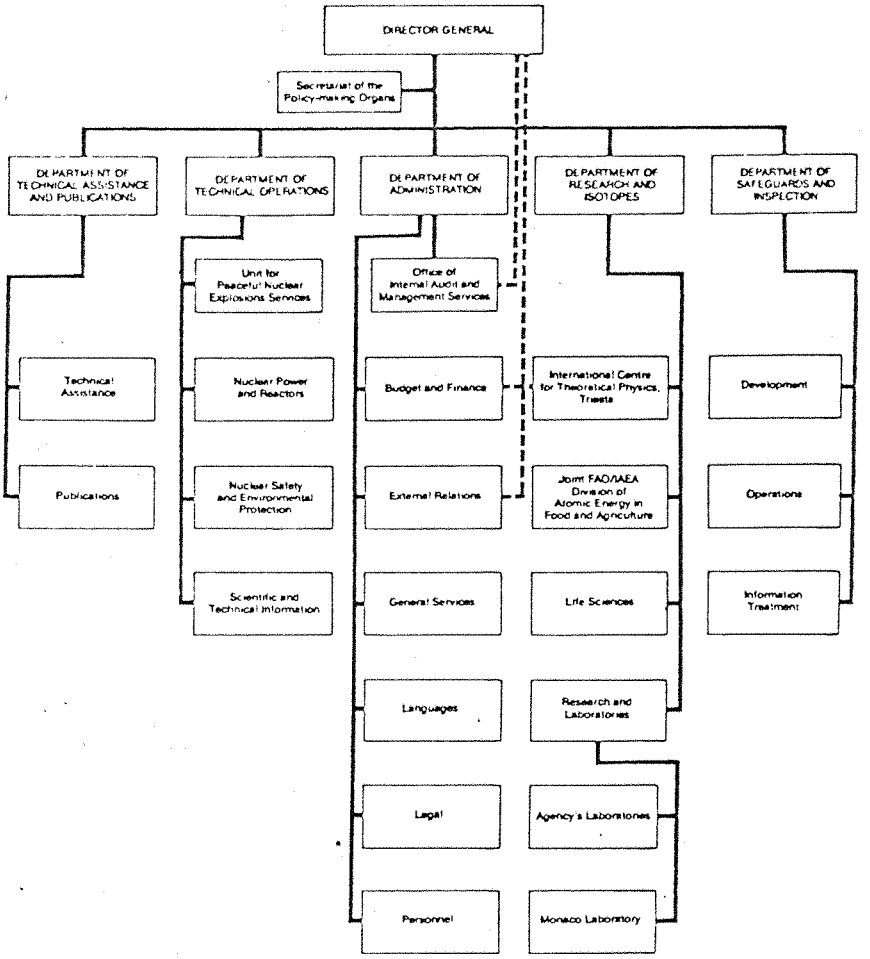
APPENDIX A CONTINUED;

48. *Ivory Coast (6 September 74)*
49. Jamaica
50. Japan
51. Jordan
52. *Kenya (5 March 72)*
53. Korea, Republic of
54. *Lao People's Democratic Republic (5 March 72)*
55. Lebanon
56. Lesotho
57. *Liberia (5 March 72)*
58. Libyan Arab Jamahiriya
59. Liechtenstein
60. Luxembourg
61. Madagascar
62. Malaysia
63. Maldives
64. *Mali (5 March 72)*
65. *Malta (5 March 72)*
66. Mauritius
67. Mexico
68. Mongolia
69. Morocco
70. Nepal
71. Netherlands
72. New Zealand
73. Nicaragua
74. *Nigeria (5 March 72)*
75. Norway
76. *Panama (13 July 78)*
77. Paraguay
78. Peru
79. Philippines
80. Poland
81. Portugal
82. Romania
83. *Rwanda (20 November 76)*
84. *St. Lucia (29 June 81)*
85. Samoa
86. *San Marino* (5 March 72)*
87. Senegal
88. *Sierra Leone* (26 August 76)*
89. Singapore
90. *Somalia (5 March 72)*
91. *Sri Lanka* (5 September 80)*
92. Sudan
93. Suriname
94. Swaziland
95. Sweden
96. Switzerland
97. *Syrian Arab Republic (5 March 72)*
98. Thailand
99. *Togo (5 March 72)*
100. *Tonga* (7 January 73)*
101. *Tunisia (5 March 72)*
102. *Turkey (17 October 81)*
103. *Tuvalu (19 July 80)*
104. *United Republic of Cameroon (5 March 72)*
105. *Upper Volta (5 March 72)*
106. Uruguay
107. *Venezuela* (26 March 77)*
108. Yugoslavia
109. Zaire
110. *"Republic of China" – 5 March 72)*

Source; IAEA Bulletin October 1980

The Republic of South Vietnam was a fully safeguarded NPT party before incorporation into the Democratic Republic of Vietnam in 1975. The goverment of the D.R. Vietnam is currently reviewing its obligations under the NPT

APPENDIX B IAEA, ORGANISATION CHART.



SOURCE, IAEA.

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