ORNL/Sub-7605/9
December, 1979

INTERNATIONAL
ENERGY
ASSOCIATES
LIMITED



# INSTITUTIONAL ARRANGEMENTS FOR THE REDUCTION OF PROLIFERATION RISKS FORMULATION, EVALUATION, AND IMPLEMENTATION OF INSTITUTIONAL CONCEPTS

## APPENDICES

Report prepared by

INTERNATIONAL ENERGY ASSOCIATES LIMITED

under Subcontract Number 7605

for

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830

Operated by

UNION CARBIDE CORPORATION

for the

DEPARTMENT OF ENERGY

Contract Number W-7405-eng-26

600 NEW HAMPSHIRE AVENUE, N.W.
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## DISCLAIMER

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# APPENDIX A

## Institutional Precedents

by

B. M. Jones

## INTRODUCTION

The purpose of this supporting analysis is to provide a foundation for developing a model, an international or multinational institution capable of accomodating the back end of the fuel cycle, while meeting U.S. nonproliferation goals. The analysis is based on a review of selected, defunct and extant institutions which, although not necessarily concerned with nonproliferation, have faced a trade-off between acceptability and effectiveness in meeting their objectives.

Discussion of the various institutions is divided into three categories, international organizations, multinational consortia and cartels or producer associations.

Examples of international organizations include the International Seabed Authority, Intelsat, the United Nations and the International Atomic Energy Agency (IAEA). The International Seabed Authority is discussed in detail in Section 1.1.

Multinational consortia are organizations that have been developed primarily to meet common commercial objectives. Membership includes at least three member nations. Examples include the Scandinavian Airline System (SAS), URENCO, Unilever, Royal Dutch Shell, Eurochemic, Eurodif, Euratom, European Coal and Steel Community, and Serena. SAS and URENCO are outlined in detail in Sections 2.1 and 2.2, respectively.

Cartels or producer associations are multinational agreements that restrict market forces; viz, production, market share, customers or prices. Examples include the Intergovernmental Council of Copper Exporting Countries (CIPEC), the Organization of Petroleum Exporting Countries (OPEC), and the Fifth International Tin Agreement (ITA), as well as agreements governing diamonds and uranium, bauxite and coffee.* OPEC, CIPEC and ITA are discussed in detail in Sections 3.1, 3.2, and 3.3 respectively.

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*See Addendum A, "Major Trade Agreements."

## 1.0 INTERNATIONAL ORGANIZATIONS

## 1.1 INTERNATIONAL SEABED AUTHORITY

### 1.1.1 Description

Form and Charter. The proposed International Seabed Authority is the international regulatory and operating body of the proposed Law of the Sea Treaty.* The Sixth Session of the Third United Nations Conference on the Law of the Sea** issued the Informal Composite Negotiating Text (ICNT)*** which details the overall regime, the powers and functions of the Authority and the system for seabed exploration and exploitation.

The Authority is modeled after the United Nations (UN) and would be of comparable size and composition. In two important respects, however, it differs from the UN. First its supreme organ, the Assembly, would have general legislative powers, including enactment of rules binding on its members. Second, the Council's members would have no veto powers. The Authority would be comprised of an executive branch, the Council; a legislative branch, the Assembly; an administrative branch, the Secretariat; a judicial mechanism, the Seabed Disputes Chamber of the Law of the Sea Tribunal (SDC); and finally an operating company, the Enterprise. The following section outlines the composition, voting procedures, and powers and functions of the above organs, including the Authority itself.

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*Also known as the "Law of the Sea Convention," (see the History and Evolution section for a discussion of the status of the proposed agreement).

**Held in New York, 23 May to 15 July 1977.

***Sixth Session of the International Law of the Seas Convention. AI Conference 62/Working Paper no. 10. May 23 - July 15, 1977.

Organizational Structure.* The Authority is the organization through which States Parties organize and control the activities undertaken in the Area. It is based on the principle of the sovereign equality of all members. The principle organs of the Authority are the Assembly, the Council and the Secretariat. The secondary organ is the Enterprise through which the Authority directly carries out its functions. The functions of the Authority include:

- o Exercise control over activities in the Area** and take any measures as necessary to secure compliance with Convention;
- o Promote, coordinate, carry out and/or contract for marine scientific research in the Area;
- o Acquire technology and scientific knowledge relating to activities in the area;
- o Promote the transfer of such technology so that all States benefit therefrom;
- o Establish a system for equitable sharing of benefits;
- o Regulate production of minerals from the area;
- o Take measures necessary to achieve growth efficiency and stability of markets for commodities produced from the Area;
- o Enhance opportunities for all States Parties to parcipate in development of Area's resources and prevent monopolization of exploration and exploitation.

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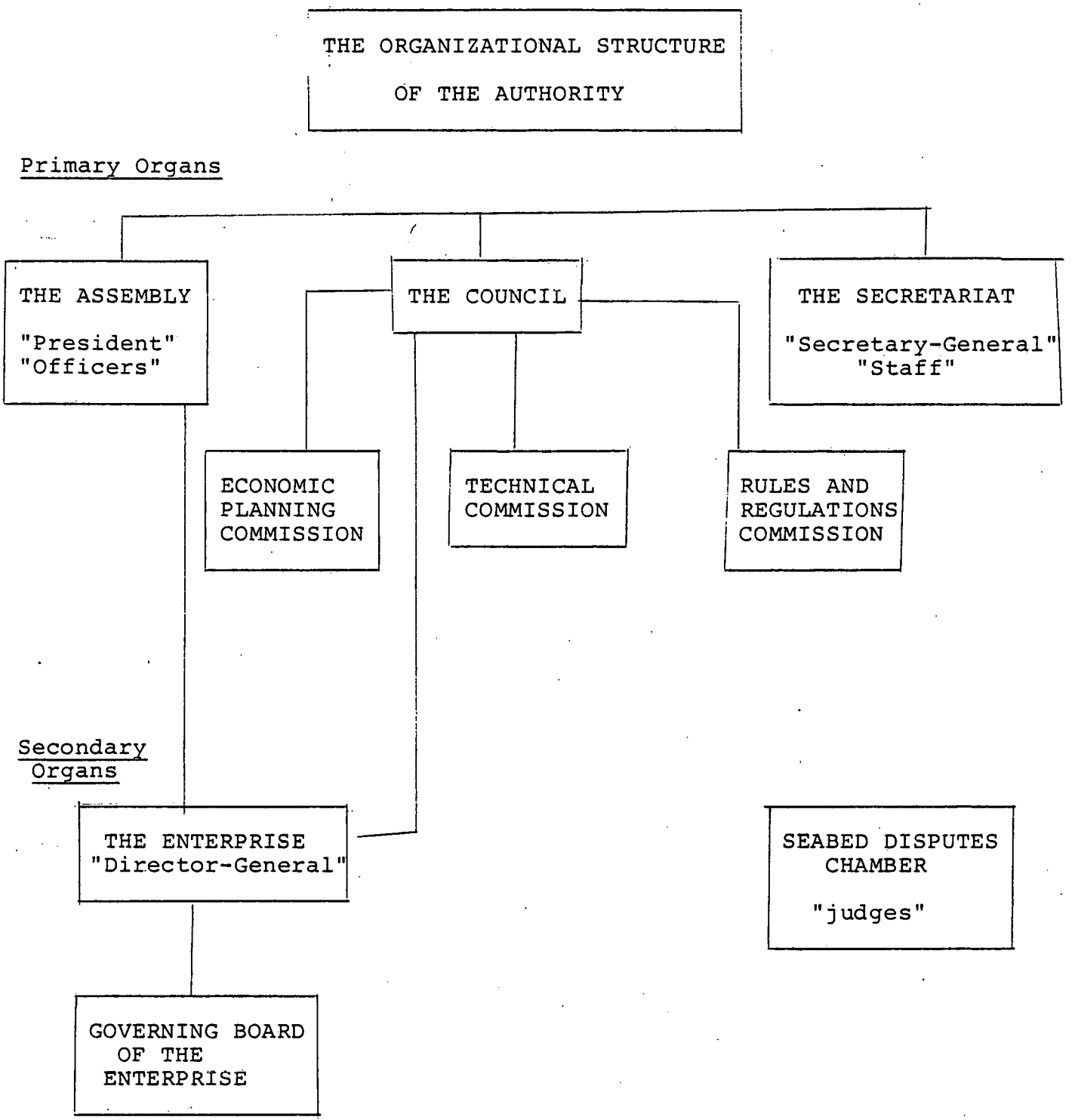
* See Figure 1.

Figure 1


THE ORGANIZATIONAL STRUCTURE
OF THE AUTHORITY
Primary Organs
THE ASSEMBLY
"President"
"Officers"
THE COUNCIL
THE SECRETARIAT
"Secretary-General"
"Staff"
ECONOMIC PLANNING COMMISSION
TECHNICAL COMMISSION
RULES AND REGULATIONS COMMISSION
Secondary Organs
THE ENTERPRISE
"Director-General"
SEABED DISPUTES CHAMBER
"judges"
GOVERNING BOARD OF THE ENTERPRISE

The Assembly is composed of all Authority members. Each member has one vote. Questions of substance are decided by a two-thirds majority of the members present and voting. Questions of procedure are decided by a majority of members present and voting.

As the supreme organ of the Authority, the Assembly sets the general policies of the Authority and considers problems of a general nature. Other functions of the Assembly include:

- o Elects Council, Secretary General, 11 judges of SDC, appoint Director General of Enterprise and Governing Board of Enterprise
- o Establishes appropriate subsidiary organs
- o Assesses members contributions to Administrative budget
- o Adopts financial regulations
- o Approves budget (submitted to Council)
- o Adopts rules or procedure
- o Examines Council and Enterprise and special reports
- o Studies and recommends re promotion of international cooperation in Area and encouragement of development of international law;
- o Adopts rules, regulations, and procedures for equitable sharing of financial and other economic benefits;
- o Considers problems of a general nature;
- o Establishes a system of compensation upon recommendation of the Council on basis of Economic Planning Commission's advice;
- o Suspends members;
- o Final adoption of rules, regulations and procedures provisionally adopted by the Council.

The Council is composed of thirty-six members elected by the Assembly. The members are elected according to the following representation formula:

- o Four countries making greatest contributions, including one State from Eastern (Socialist) European region;
- o Four countries, major importers, including one State from Eastern (Socialist) European region;
- o Four countries, major exporters;
- o Six developing countries representing special interests;
- o Eighteen countries to ensure equitable geographical distribution of seats.

The Council is further divided into the Economic, Planning, and Rules and Regulations Commissions.

The Council is the executive organ with powers to establish specific Authority policies. Other functions include:

- o Supervise and coordinate implementation of Convention and invite the Assembly's attention to cases of noncompliance;
- o Provide Assembly with candidate lists for Secretary-General, Governing Board, Director-General;
- o Enter into agreements with UN or other intergovernmental organization, subject to Assembly's approval;
- o Issue directives and exercise control over Enterprise's activities;
- o Make recommendations to and implement those accepted by Assembly based upon advice of Economic Planning Commission;
- o Review collection of all payments to Authority;
- o Submit budget to Authority;
- o Make recommendations to Assembly re suspension of privileges and rights of membership for gross and persistent violations upon a finding of Seabed Disputes Chamber.

The Secretariat is comprised of a Secretary-General (S-G), the Authority's Chief administrative officer, and necessary staff. The Secretariat appoints the Authority's staff and submits an annual report to the Assembly regarding the Authority's activities. The S-G, with the Council's consent, makes arrangements for consultation and cooperation with other nongovernmental organizations.

The Enterprise carries out the exploration and mining activities in the Area directly in accordance with the general policies laid out by the Assembly and subject to the directives and control of the Council. The treaty provides for the necessary funding and specifies the legal characteristics and functions of the Enterprise.

See the following section for a complete description of the Seabed Disputes Chamber of the Law of the Sea Tribunal.

Mechanism for Resolution of Disputes Within the Institution. The ICNT established a Special Chamber of the Law of the Sea Tribunal, the Seabed Disputes Chamber (SDC), so that settlement of disputes would be integrated into the Law of the Sea Treaty's general system of dispute settlement. The link between the Authority and the Law of the Sea Tribunal is maintained whereby the Assembly elects the SDC's eleven judges (of the Tribunal's 21 judges).

Important characteristics and functions of the SDC are the following:

- its jurisdiction is confined to the application of the Authority's rules, regulations, and procedures to individual cases;
- the SDC does not have the authority to question the discretionary and legislative powers of the Authority;
- the Technical Commission represents the Authority before the SDC;

- o the Council may invite the attention of the Assembly to cases of noncompliance;
- o the Assembly must accept the recommendations of the Council re suspension of members' rights and privileges based upon a SDC finding; and finally,
- o the decisions of the SDC are enforceable in the States Parties' territories in the same manner as judgments of their highest courts.

The question of the choice of procedure for settlement of disputes may be complicated by provisions that a State Party may choose among the following procedures:

- The Law of the Sea Tribunal
- The International Court of Justice
- an arbitral tribunal
- a special arbitral tribunal, e.g., the SDC.

On the other hand, submission of disputes to the SDC is mandated for all disputes between States Parties and/or their nationals and the Authority.

Provisions for Raising Capital, Operating Funds, and Addressing Related Financial Issues. Provisions regarding the Authority in general are:

- o the Assembly assesses the contribution of members to the Authority's Administrative budget;
- o the Assembly to establishes a General Fund to be comprised of all receipts of the Authority arising from the Area's activities, including a proportion (to be determined) of the Enterprise's excess revenues;
- o members may voluntarily contribute to an Assembly's Special Fund;
- o the Council may exercise borrowing powers on behalf of the Authority;
- o and furthermore, as an example of the source of contributions to the General Fund, Article 82 states that Coastal States Parties* must make contributions in payment or in kind with respect to exploitation of the continental shelf (beyond 200 nautical miles from the baseline of the territorial sea).

* With the exemption of net importer developing countries.

Provisions related to financing the Enterprise's operations are among the most controversial. The Enterprise's operations aim to be self-supporting through the exploration and exploitation of the Area's nonliving resources. The ICNT calls for a "parallel-system" of exploration and exploitation; i.e., operations would be undertaken by both the Enterprise and States Parties (or their representatives, e.g., private companies) in association with the Authority.

The exploration and exploitation of the Area, thereby raising capital, would be undertaken through a complex, joint arrangement between a "contractor" and the Enterprise. For example, a contractor representing a State Party must obtain a contract permitting him to mine a specific area. However, in order to obtain the contract, the contractor must tender two mine sites to the Enterprise, which will keep one (the better of the two). In addition, the Enterprise would be authorized to impose a fixed annual charge plus a production charge related to volume of production, and to take a share of the net proceeds.* Other powers enabling the Enterprise to raise capital include the power to impose production and marketing controls and to require the transfer of the contractor's technology to the Enterprise. The Enterprise would also have the legal authority to borrow funds.

In the event that the Enterprise could not cover its costs of exploration, development, and exploitation, the States Parties must guarantee debts incurred to finance such costs. To the extent necessary for securing such loans, States Parties must advance as

*After several years of negotiation the amounts still remain in question.

refundable paid-in capital up to an, as yet, undetermined percent of the liability incurred.

Provisions for Establishing Pricing Policy. The Economic Planning Commission (EPC) of the Council initiates recommendations re the Authority's pricing policy which would be submitted to the Council upon an affirmative vote of two-thirds of members present and voting. The Council then recommends a pricing policy to the Assembly which in turn adopts such a policy.

It is important to note that the ICNT calls for the Economic Planning Commission to consult the competent organs of the United Nations in the process of developing financial policies particularly with regard to the prices of raw materials to be obtained from the Area. The EPC must bear in mind the interests of both importing and exporting countries, and in particular the developing countries among them.

Provisions Governing Market-Sharing. The ICNT has taken a position re market-sharing. The ICNT* states the Enterprise's policy:

> While the inclusion of a quota or anti-monopoly provisions appears to be acceptable in principle, its detailed formulation has yet to be fully negotiated.

Provisions for Dealing with Competition. Accession to a Law of the Sea Treaty (the necessary condition for establishment of the Authority) would necessarily preclude competition. Article 136 states "The Area and its resources are the common heritage of mankind". Furthermore, "All rights in the resources of the Area are

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* ICNT, Article 140.

vested in mankind as a whole, on whose behalf the Authority shall act. These resources are not subject to alienation."

Further strengthening the regime against any competition is the UN Resolution 2749 (XXV) of 17 December 1970, "Declaration of Principles Governing the Seabed and the Ocean Floor, and the Subsoil Thereof." Resolution 2749 affirms that the Seabed and its resources, beyond the limits of national jurisdiction, are the "common heritage of mankind".

Provisions for Dealing with Member Infractions of Rules. The competence of the SDC for establishing that a member has violated the Authority's provisions is outlined in the section on the Mechanism for Resolution of Disputes, p.8.

If the DC has found that a State Party has grossly and persistently violated the rules, the Assembly may suspend that State Party's privileges and its rights of membership.

A State Party may not vote in the Assembly if it is in arrears in payment of its financial contributions to the Authority.

Staff infractions of the Authority's rules are considered to be a "grave disciplinary offence", and entails personal liability for damages (such as the disclosure of industrial state or secrets). Penalties are to be set by the SDC and executed by the Secretary General.

Mechanism for Planning New Facilities and Services. Although the Enterprise conducts the Authority's operations and the Governing Board is directly responsible in these matters, the Enterprise is

subject to the general policies laid down by the Assembly and the directives and control of the Council. Within the Council the Technical Commission would have the responsibility for review of work plans re planning new facilities and services. Proposed work plans would be developed between the Enterprise and the Contractor.

Mechanism for Regulating, Auditing and Assuring Accountability. All records, books and accounts of the Authority would be subject to an annual audit by a recognized, independent auditor.

In addition, the Technical Commission of the Council is empowered to undertake the following internal control and inspection procedures:

- o supervise on a regular basis all of the Authority's operations;
- o inspect and audit all books, records and accounts related to financial obligations; and
- o direct and supervise a staff of inspectors to inspect all activities in the Area.

Provisions for Staffing. See the section on Organizational structure, P.4, for composition and election procedure for the Authority's staff members.

With regard to the Authority's staff the following principles govern:

- o the Authority must be composed of the necessary qualified scientific and technical personnel to carry out its administrative functions;
- o the staff shall be kept to a minimum;
- o the paramount considerations shall be the highest standards of efficiency, competence and integrity; and finally,

- due regard shall be paid to recruiting staff on as wide a geographical basis as possible.

With regard to the Secretariat's staff, the Secretary General shall ensure its "international character". "International character" refers to the fact that the staff shall not seek or receive instructions from any government or source external to the Authority nor shall it have any financial interest whatsoever in activities relating to the exploration or exploitation of the Area.

Facilities and Siting for Initial Formation of the Institution. The section on Provisions for Raising Capital, p.9, details the procedure for providing the facilities and services necessary to make both the Authority and the Enterprise viable institutions at the outset.

Equally important are the ICNT'S provisions for compensation of the States Parties.

The governing principles re the Authority's compensation policy are the following:

- the Authority would establish a system for the equitable sharing of benefits derived from the Area, taking into special consideration the interests and needs of
  - developing countries and in particular land-locked and geographically disadvantaged developing countries;
  - countries which have not attained full independence;
- the Authority would establish a compensation system for developing countries suffering from adverse effects on their export earnings or economies.

The specific system, yet to be developed, would be the responsibility of the Council's Economic Planning Commission.

Initial Participants and Initially Planned Expansion of Participants. The Law of the Sea Convention would remain open for accession by any State.

Provisions for Adjusting to Future Conditions, Alterations in Membership, Addition of New Services. The ICNT contains several provisions which outline a procedure to adjust to the dynamics of international relations and the state-of-the-art.

First, a review process would be initiated by the Assembly five years from the entry into force of the LOS Convention. In light of the review, the Assembly may adopt those measures which would lead to the improvement of the Authority's operation.

Second, the ICNT mandates establishment of a "Review Conference" twenty years from the entry into force of the LOS Convention. The aim of the Review Conference as stated in the ICNT would determine whether the aims of the Authority have been achieved.

> In particular, the Conference shall consider whether, during the 20-year period, a balance has been maintained between the area reserved for the Authority and developing countries, and the contract areas exploited by the States, States entities, natural or juridical persons in association with the Authority.*

1.1.2 History and Evolution. In November 1967 the United Nations General Assembly first turned its attention to the international exploration and exploitation of ocean mineral resources of the high

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* ICNT, Article 152.

seas beyond the limits of national jurisdiction. Since that time, the proposed institutional framework, the International Seabed Authority, has undergone several major changes.

Between 1970 and 1972 eleven draft treaties or outlines for the international seabed area were submitted in the course of the proceedings before the U.N. Seabed Committee. From 1972 onward, efforts were made to narrow the differences or at least to establish precisely where points of difference lay. In 1973 when the Seabed Committee held its last session, a lengthy text was produced that brought to light the range of alternatives posed under the various headings. The task has been continued at the LOS Convention. The following chronology summarizes the milestones relevant to the major developments in the International Seabed Treaty negotiations:

| | |
|---|---|
| 17 December 1970 | UN Resolution 2749 |
| 1974 Caracas | UN Conference on the Law of the Sea Convention |
| 1975 Geneva | UN Conference: Informal Single Negotiating Text (ISNT) |
| 1976 New York | UN Conference: Revised Single Negotiating Text (RSNT) |
| 1977 New York | UN Conference: Informal Composite Negotiating Text (ICNT) |
| 1978 New York | UN Conference: ICNT still operational, minor changes proposed |

1974 Caracas Conference - Three approaches were proposed for the establishment of the Seabed Authority. One school advocated an authority with five organs: 1) an Assembly with plenary functions; 2) a Council to serve as the executive branch; 3) an Enterprise as the operational organ; 4) a Tribunal for the settlement of disputes;

and 5) a Secretariat to carry out administrative duties. A second group of delegates believed that the Authority should be composed of only four organs, but could not concur on which ones were most important. The third school favored only three principal organs, the Enterprise, Tribunal and Secretariat.

In the formative stages of the Caracas session, the differences in the basic approach between developing and developed country positions were evident. The developing nationas (Group of 77) viewed the Assembly as the supreme organ of the Authority and the Council as the body to execute and implement the Assembly's policies. The Council would be in permanent session; yet its membership would be limited with geographical position as a major factor in deciding who should sit.

The position of the developed countries at the Caracas Session differed radically from the Group of 77. The industrialized states favored a system whereby the technologically advanced states with the financial means would be privileged to special rights to improve their mining methods and technology. In addition, the developed states pressed for weighted or cumulative voting both in the Assembly and the Council. The industrialized nations did not view the Assembly as the superior organ; they saw no hierarchy among the components of the Authority. Hence, the industrialized states called for a check and balance relationship among the organs of the Authority.

1975 Geneva Conference - The institutional changes in the structure of the Authority were merged into one document, known as the Informal Single Negotiating Text (ISNT). The developing nations

continued to support an Authority composed of five main organs, and stressed the point that the Authority's responsibilities would "deal with all activities related to the exploration and exploitation of the common heritage of mankind..." Furthermore, the Group of 77 pressed for a "single" system of exploitation whereby the authority could directly or indirectly govern the exploitation of the Area, either through "State Parties to [the] Convention, or State Enterprises..."

The ISNT established five organs to perform the duties related to exploration and exploitation of the seabed and ocean floor: an Assembly, a Council, a Tribunal, an Enterprise, and a Secretariat. The Assembly was designated as the superior organ by the Group of 77. The Council was established as the other decision-making organ. It was the Enterprise's role to explore and exploit the Area on behalf of the Authority. Thus, the Enterprise became the active vehicle through which the Authority would exercise its right to mine the seabed and ocean floor. The Tribunal was the organ responsible for settlement of disputes on issues of interpretation, disputes between States, and also between a State or private contractor and the Authority. Finally, the Secretariat of the Authority would handle the Administrative responsibilities.

1976 New York Conference - At this session several major textual alterations emerged in the new version, the RSNT. An important change in the RSNT's wording referred to the Authority as "the organization through which States parties shall organize and control activities in the area". The previous text described the Authority as the organization "through which States parties should administer the area and

manage its resources".

In the RSNT, the power of the Authority was reduced by de-emphasizing its role as the organization responsible for direct exploitation of the seabed. Instead of relegating sole jurisdiction of mining activities to the Authority, the RSNT envisaged participation by State enterprises, or a combined effort of the Authority and States Parties in seabed exploitation. This approach, known as the "parallel system", was unacceptable to the Group of 77. That Group favored a "unitary system", whereby the Authority would remain the principal actor in contracting rights to exploit the Area.

Additional shifts in the functions and policies of the Authority were those which described the Assembly's and Council's responsibilities. For example, the Assembly was no longer planned as the executive policy making body; instead, its role would be related to legal questions of proposed action in mining activity.

On the subject of dispute settlements, there was no general agreement on the nature and scope of a Seabed Tribunal. Some countries favored a Tribunal with extensive duties, including the power to review the decisions taken by the other branches of the Authority and settlement of contractual disputes. Others viewed the Tribunal as a tool for settlement of disputes only for purposes of the Law of the Sea Convention.

The following accomodations were made by the Group of 77 by the end of the 1976 Session in New York:

- o Acceptance of representation of special interests in the Council, so long as no veto or weighted voting could preclude the Council's decision-making function;

- o Agreement to include State enterprises and States to enter joint arrangements with the Authority to mine the Area.

1977 New York Conference - The ICNT represents the diverse positions expressed by member countries in the creation of the Sea-bed Authority. In the ICNT, the functions of the Authority are clearly described; the roles of the Authority's organizations defined, and a method of settling disputes is proposed.

One major change institutionalized by the ICNT was the decision to integrate settlement of disputes regarding the Authority into the Convention's Tribunal system as a whole.

In the ICNT, progress was made on the questions of who should conduct mining activities in the Area, and how those activities should be carried out. The ICNT established the "parallel system", under which activities would be conducted in the Authority's behalf by the Enterprise and States parties. A review provision for international mining activities was instituted in the ICNT. The enhanced role of the Assembly was a means of sweetening the idea of "parallel" mining to the Group of 77, whose view had consistently supported a superior Assembly function.

As for the Council, the ICNT adopted a voting formula which represented a compromise between the positions of the industrialized nations and the Group of 77. The voting system would not be weighted, nor would it require a two-thirds majority. The members were permitted one vote, while only susbstantive issues would require a three-fourths majority of those present and voting.

## 2.0 MULTINATIONAL CONSORTIA

### 2.1 SCANDANAVIAN AIRLINE SYSTEM

#### 2.1.1 Description

Form and Charter of Institution. The Scandinavian Airline System (SAS) consortium is founded on two constituents, the SAS Concessions and the Consortium Agreement. Of the first, the respective governments have granted the three parent Companies DDL (Danish Airlines), DNL (Norwegian airlines), and ABA (Swedish airlines) or Concessions which in turn form the basis for SAS.* Primarily, the Concessions standardize the legal/regulatory framework of the parent companies by extending their individual rules to each other. In addition, provisions limit the activities of each company which might conflict with current or future international agreements signed by the three companies.

Second, the Consortium Agreement defines the operating conditions for SAS. The multinational agreement places the consortium in a private venture situation to be managed according to standard business rules. It delineates general management principles and responsibilities in such areas as: third party liability, business allocations among partners, equity contributions for capital formation, distribution of benefits, the decision-making structure (Board of Directors), and the management control procedures (Assembly of Representatives, Board of Representatives, accounts and audit procedures). Finally,

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* DDL -- Det Danske Luftfartselskab A/S; DNL -- Det Norske Luftfartsselskap A/S.

solutions are identified for typical situations such as the with drawal of parties from the consortium, liquidation, and arbitration.

Organizational Structure.* The affairs of the Consortium are managed by an Assembly of Representatives, a Board of Directors, and a General Manager (President) assisted by several Managers. Control functions (See the section on Mechanism for Regulating Auditing and Otherwise Assuring Accountability, p.30, for further discussion of the auditing team.)

The Assembly of Representative

The Assembly of Representatives consists of the members of the boards of the three parent companies (ABA, DDL, and DNL). No more than eight representatives from each party, however, may take part as voting members (Figure 2, p 23). A quorum is formed with at least five members present from each of the parties. Each voting member is entitled to one vote only when present at Assembly meetings. A decision is taken upon either by a majority of those voting, or if the vote is equal, by the opinion of the Chairman.

The powers and functions of the Assembly of Representatives include:

- o Elect Chairman, Vice Chairman, and Deputies;
- o Annually appoint members of the Board of Directors; appoint their Deputies;
- o Approve the report presented by the Board of Directors for each fiscal year on the management of Consortium business;

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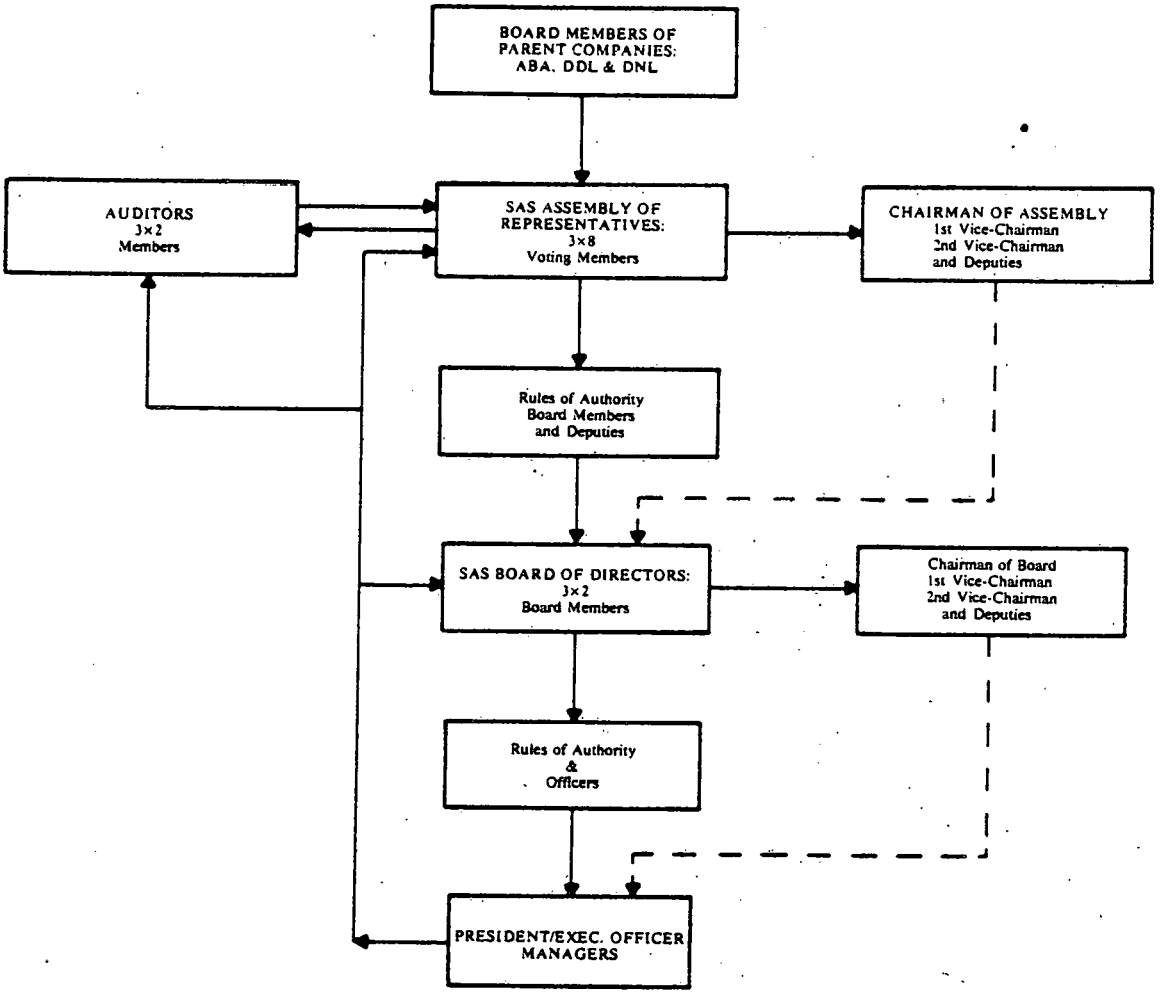
* See Figure 2, p.23.

FIGURE 2

THE MANAGEMENT ORGANIZATION OF SAS



- o Approve the yearly accounts and audits of the Consortium as prepared by the Auditors;
- o Define the rules of authority for the Board of Directors;
- o Discharge from liability as against the Assembly to the Members of the Board for the period covered by the annual reports;
- o Decide on any matter referred to the Assembly by the Board of Directors; and
- o Decide on any matter referred to the Assembly by four members of the Assembly.

The Board of Directors

The Consortium's Board of Directors consists of six members with six deputies appointed by the Assembly; the Contracting Parties propose two members and two deputies. A quorum is formed with at least four members present representing each of the parties. If the Board is not complete, a valid decision can be reached only if at least three members present agree. In such a case, a decision may not be made against the wish to any member present in a matter which was not indicated in the Notice of the meeting.

The powers and functions of the Board of Directors are similar to those normally assigned to a board of a Corporation. Other duties, as specified in the Consortium Agreement, include:

- o appoint the General Manager and other Managers; and
- o decide which person(s) shall have the authority to represent and sign for the Consortium.

The General Manager

The General Manager, appointed by the Board is the Chief Executive Officer of the Consortium and has the same powers and

duties as are normally held by a General Manager of a Company.

Mechanism for Resolution of Disputes Within the Institution. Any disputes regarding the interpretation or application of the Consortium Agreement cannot be made the subject of a law suit, but must be referred to arbitration for final and conclusive decision. If the parties cannot agree on the appointment of one or several arbitrations to decide the dispute, an Arbitral Tribunal (composed of the Presidents of the High Justice Courts in the three countries) makes a decision. The Arbitral Tribunal would then elect its own Chairman and settle its own rules of procedure, including the question of which national's legal rules apply in the case. Finally, the Tribunal would see that the decision is executed in accordance with the applicable national law.

Provisions for Raising Capital, Operating Funds, and Addressing Related Financial Issues.* The three parent companies are owned 50 percent by private shareholders and 50 percent by their respective national governments. In turn, the capital shares for the equity financing of the Consortium are 3/7 for ABA (Sweden) and 2/7 each for DDL (Denmark) and DNL (Norway). The assets and liabilities assigned and taken over by the Consortium include:

- o All properties, rights and liabilities jointly incurred by the parties;
- o All aircraft owned, and other physical assets (i.e., aircrafts, buildings, other equipment,

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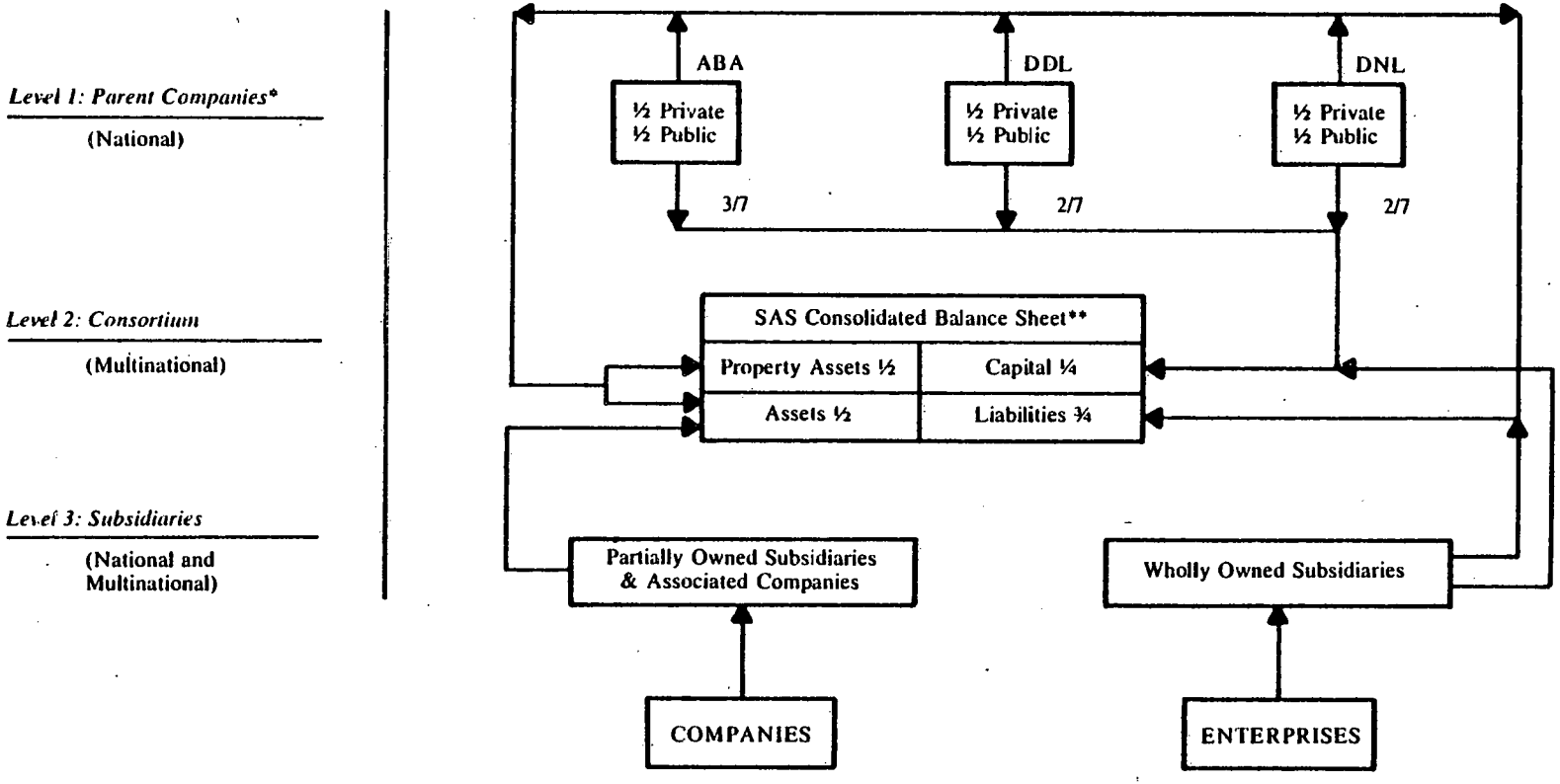
* See Figure 3, p.26.

FIGURE 3

**THE FINANCIAL STRUCTURE OF SAS**




*Ownership of assets and property assets remains at level 1
**Representative of FY 1976

etc.) which the parties own individually, except real estate located in the three countries;

- o Specific liabilities, agreed to by the parties on a case-by-case basis, for which any of the Contracting Parties is responsible; and

- o Cash funds needed by the Consortium to satisfy the requirements of respective equity shares and/or for new, needed capital.

One of the most important financial features is that the ownership of assets and property assets remains in the hands of the parent companies, and is therefore retained at the national level. According to the Consortium Agreement with regard to third parties, however, the Consortium can exercise ownership rights pertaining to the control, use, lease, and disposal of assets. Specifically, according to the terms of the Consortium Agreement:

> ....all the assets and property assets shall internally among the parties be reported as owned by the Consortium which... shall, with regard to third parties exercise any and all the powers appertaining to ownership...including - without limiting the generality hereof - the power to control, use...and lease, as well as to dispose of some by sale or otherwise.*

From a partnership standpoint, this disposal allows maximum flexibility and simplicity of transactions in eliminating all the complex procedures of international title and ownership transfers to and from the Consortium.

All financial decisions at the Consortium level are made in principle in accordance with sound business principles, which eliminates provisions or exemptions for the application of such

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* Consortium Agreement (as amended March 26, 1962, resp. April 1, 1974), Article 4, paragraph 3.

principles to particular activities on the basis of public management requirements or other administrative criteria. Distribution of benefits, payments on account to the parties, and future contributions are likewise governed by the rule of private business practice.

Provisions for Establishing Pricing Policy. The governing principle regarding pricing policy is that all activities of the Consortium shall be governed by sound business considerations, practice, and policy. The Consortium Agreement does not address pricing policy specifically.

Provisions Governing Market Sharing and Restrictions. The SAS's participation formula represents the Consortium's market sharing scheme. The 2-2-3 formula, with Sweden's ABA holding the largest share, reflects the initial contributions as well as the superior resources, and experience held by Sweden. Such a formula, however, represents more their share of costs and profits rather than an area of the market to which each participant would be entitled.

SAS also operates under an internal "market sharing" principle in that the Consortium makes every effort to allocate its business activities among the three participants. For example, although rational operations for fleet maintenance would call for concentration in one place, each country is very conscious of the national importance of having a trained and skilled corps of aircraft mechanics. Therefore, the Consortium Agreement bows to the expression of national interest and encourages a 2-2-3 distribution of activities.

The success in allocating workshop activities is apparent. However, a committee appointed by the Scandanavian governments concludes that:

> It appears that the Consortium has suffered from a tug-of-war between the three partners on allocation of the Consortium's activities in the member countries. The Committee wishes to stress as strongly as it can that there is no reason whatsoever why national prestige and patriotism should enter into such minor questions as to where to place head offfice workshops and other activities.*

Provisions for Dealing with Competition. The Consortium Agreement does not contain provisions forbidding or encouraging competition. Gradually, the governmental authorities have granted traffic concessions to other carriers on domestic routes. In the case of Sweden and Denmark, SAS and/or one of its parent companies own at least 51 percent interest in the domestic carries. All carriers' routes are well coordinated and work towards each others' mutual benefit.

Provisions for Dealing with Member Infractions of Rules. See section on Mechanism for Resolution of Disputes p.26.

Mechanism for Planning New Facilities and Services. The planning function is the responsibility of the Board of Directors and the Assembly. The Consortium's process is similar to that of a corporation. The Assembly receives periodic forecasts of activities and the Board has the planning and decision-making duties.

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* p. 91 Scandanavian Airlines System, The Making of SAS: A Triumvirate in World Aviation. A/S N. & F: Oslo, Norway; 1973.

Mechanism for Regulating, Auditing, and Otherwise Assuring Accountability. The accounts of the Consortium are audited by six auditors: Contracting Parties appoint two of these auditors and a deputy for each of the auditors, while two deputies who have been elected at the Parties' General Shareholders' Meeting. The auditors appoint a Chairman among themselves for one year; he alternates among the Contracting Parties. The Assembly reviews the Auditor's Report and approves the final accounts.

Provisions for Staffing. It is the responsibility of the Consortium to hire all staff members. (Refer to the section on the History and Evolution of SAS, p. 33, for a detailed discussion over acceptance of this principle.) The Board and General Manager must take into consideration the following considerations when appointing personnel:

- o achieve an organization which is as rational and as efficient as possible; and
- o achieve a reasonable proportion between Danes, Norwegians, and Swedes

Facilities and Siting for Initial Formation of Institution. The Consortium Agreement addresses considerations of compensation, distribution, payment on account to the Parties, and future contributions. First, a cash payment clearing mechanism was instituted among the parties so that the contributions made by the Parties (valued as agreed upon among the Parties) will become adjusted to the shares defined in the international agreement. Second, the Assembly decides to what extent profits will

be distributed among the parties or remain in the Consortium. Finally, the Assembly decides if and to what extent cash funds can be placed at the disposal of the parties.

Initial Participants; Initially Planned Expansion of Participants. Not applicable

Provisions for Adjusting to Future Conditions. The conditions and procedures relevant to a change in membership of SAS, for example, withdrawal of a party, are defined within the Consortium Agreement.

The SAS Agreement specifies the circumstances under which the value of assets of the withdrawing party can be estimated at a normal and properly carried out liquidation. These include:

- The failure of one of the parties to fulfill its obligations (unless failure is of minor importance);
- A situation where the financial capability of one of the parties becomes so weakened that it burdens the group's joint liabilities to third parties;
- A situation where one of the parties would not be willing to join a decision of the Consortium, or conversely to substantially reduce the field of its activities;
- A situation where a party withdraws due to circumstances beyond his control (i.e., government intervention, financial crises in the party's own country).

In other cases, the general rule of assets valuation still applies, but the estimated value of the assets of the Consortium cannot exceed the net value of the assets specified in the last approved balance sheet of the Consortium unless the assets or liabilities are computed solely on the basis of current official quotations.

Two of the parties may request the withdrawal of the third one, but only in a situation arising due to circumstances beyond the third partner's control. The third member would then be entitled to re-enter the Consortium at a later date when the circumstances which caused its withdrawal have ceased to prevail.

In the event the parties do not agree whether a member is obligated, or entitled, or should be requested to withdraw from the Consortium according to the provisions of the Agreement, the arbitration channel would be used when a disagreement occurred about the valuation of the share of the net assets of the Consortium, or simply about the allocation of property in the settlement.

When the Consortium is liquidated for other reasons than those mentioned in the case of withdrawal, a final settlement can be made on the basis of the respective initial shares in the Consortium unless the parties agree on another allocation, or approve to sell the assets for joint account. An interesting feature is also provided by the Agreement for liquidation during the first five years of the Consortium. During this period, each of the parties has the right and obligation to receive all the physical assets which the party had contributed to the Consortium in connection with its formation. The assets thus received are to be estimated at the same value, minus the normal depreciation placed on them when they were contributed. Any litigation that occurs during and for the liquidation process of the Consortium would also be solved through the arbitration procedure set up by the Agreement.

### 2.1.2 History and Evolution of SAS

The creation of SAS in 1946 was the endeavor of three men: Per Kampmann, of Denmark; Thomas S. Falck, Jr., of Norway; and Dr. Marcus Wallenburg, of Sweden. The date and place of the first meeting which initiated Scandanavian cooperation on trans-Atlantic flights was on February 2, 1946 in Copenhagen.

Preliminary discussions passed through two stages. In the first, the Swedes maintained that the Svensk Interkontinental Lufttrafik A/B (SILA)* should be wholly in charge, at least in the initial period. On the other hand, DDC and DNL favored a pool arrangement according to which the partners would each fly their own aircraft under a joint emblem and share the income in proportion to the contributions made.

Negotiations entered into their second phase after Wallenberg announced that the Swedes would accept a pool arrangement. (Denmark had warned that it would pull out of the negotiations if the Swedes maintained their previous position.)

Gradually the idea of forming a consortium matured. The Consortium in its first substantive form (discussed June 7, 1946) contained the following main points:

- participation formula of 2-2-3;
- the Consortium would be an independent economic unit with its own Board and President;
- all staff would be appointed and paid by the Consortium;

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* The SILA was later taken over by the ABA.

- o the aircraft fleet would be placed at the Consortiums's disposal by the three airlines on a pro-rata basis and the airlines would, in return, be paid for their utilization; and finally,

- o profits and losses would be divided among the partners according to their shares.

In the ensuing discussions, the major issues and conflicting positions were the following:

- o Transportation activities. The Swedes wanted SILA to run the company's activities on behalf of all three countries. The Danes and the Norwegians insisted on one organization and on a consortium which would itself be responsible for all transportation activities.

- o Participation formula. The Danes and the Norwegians wanted the three countries' shares to be 2-2-3, corresponding to 28.5 percent each to Denmark and Norway and 43 percent to Sweden. The Swedes demanded that their share should properly reflect their country's resources and population.

- o Personnel. The Swedes wanted DDL and DNL to put personnel at the disposal of SILA. The two others wanted the personnel to be appointed by a SAS consortium itself under a single management.

- o Composition of the Board. The Swedes wanted a Board of seven members, one of whom should be president. The Danes and the Norwegians insisted on equality, with two members representing each country, for a total of six.

- o Termination. SILA wanted the right to terminate the agreement on serving due notice. DDL and DNL could agree on termination only if very extraordinary reasons warranted.

- o Workshop services. SILA wanted all repair and maintenance to be debited to the company that owned the plane. DDL and DNL wanted the consortium itself to be responsible for all such costs.

The final compromise was reached on July 31, 1976. The debate on the participation formula ended in a complete victory

for the Denmark-Norway position. On the personnel question, the compromise was a half-victory for each. The personnel would remain in the employ of the respective companies (DDL, DNL, SILA), but the consortium would be responsible for wages and salaries. The staff would be under the exclusive authority of the consortium.

The financial troubles of the SAS in 1947 provided the catalyst for the three companies to take SAS into its next phase. Dampening prospects for an increase in international air traffic and a SAS deficit in 1947 encouraged SAS parties to cooperate on all domestic routes. To this end the European SAS (ESAS), was formed.

From the start, ESAS cooperation had been hesitant due to external factors. The Scandanavian Defense Union collapsed in 1949 and Sweden decided to maintain its neutrality while Denmark and Norway joined NATO; thus, relations between Sweden and its two partners became tenuous. Furthermore, the first year of ESAS, 1948, ended with a substantial deficit for DDL.

Events then moved toward the dissolution of the ESAS and the creation of an all-inclusive (domestic and international air traffic) SAS. In October of 1950, the decisive meeting took place just outside of Oslo. The Norwegians insisted on an agreement ensuring them 2/7's of the maintenance responsibilities and other activities.

Although the text of the new consortium document contained a provision that activities "shall to a reasonable degree be

shared among the three countries," Norway did not consider this precise enough. Finally, an Aide Memoire was agreed to. It stated the following principles:

- o conduct affairs in a businesslike manner;
- o "it is, however, understood... the purely business point of view will have to give way to considerations relating to strengthening the Scandanavian character of the consortium and to national interests;" and
- o distribute maintenance work as closely as possible in accordance with the 2-2-3 formula.

SAS has grown markedly in thirty years, expanding its initial airline transport activity to now include hotels, restaurants, catering, inclusive tours, car rentals, convention arrangements, and other related services. About fifty companies are totally or partially owned by SAS. Close to half of these subsidiaries and associated companies are active; the rest may be holding companies, real estate companies, or simply registered names that are dormant for the time being.

In conclusion, SAS is generally acknowledged to be one of the world's major airlines. It is among the world's top twenty in many categories, in passengers, in air freight, in fleet size, and in employment.

## 2.2 URENCO/CENTEC CENTRIFUGE ENRICHMENT ORGANIZATION

### 2.2.1 Description

Form and Charter of Institution. Urenco/Centec is a tripartite organization of British, Dutch, and German companies,

that is devoted to development and exploitation of gas centrifuge technology for the enrichment of uranium. The signing of the Treaty of Almelo in 1970 and its subsequent ratification in 1971 marks the conception of the Urenco/Centec organization.*

The five governing principles and purposes of the Contracting Parties' cooperative agreement are:

- to collaborate with the view to the enrichment of uranium by the gas centrifuge process and to the manufacture of gas centrifuges;
- to establish and operate joint industrial enterprises to build enrichment plants and to operate such plants on a commercial basis;
- to promote integration of research and development carried out by the joint industrial enterprises, with a view to achieve and maintain a competitive position;
- to exercise appropriate governmental control of sensitive political issues; and finally,
- to keep process information secure in the interest of the nonproliferation of nuclear weapons.

Organizational Structure. (See Figure 4 on next page). Urenco is equally owned, one-third each by the three Contracting Parties through four organizations, Uranit** (Uran-Isotopentrennings Gesselschaft mbH), BNFL (British Nuclear Fuels,

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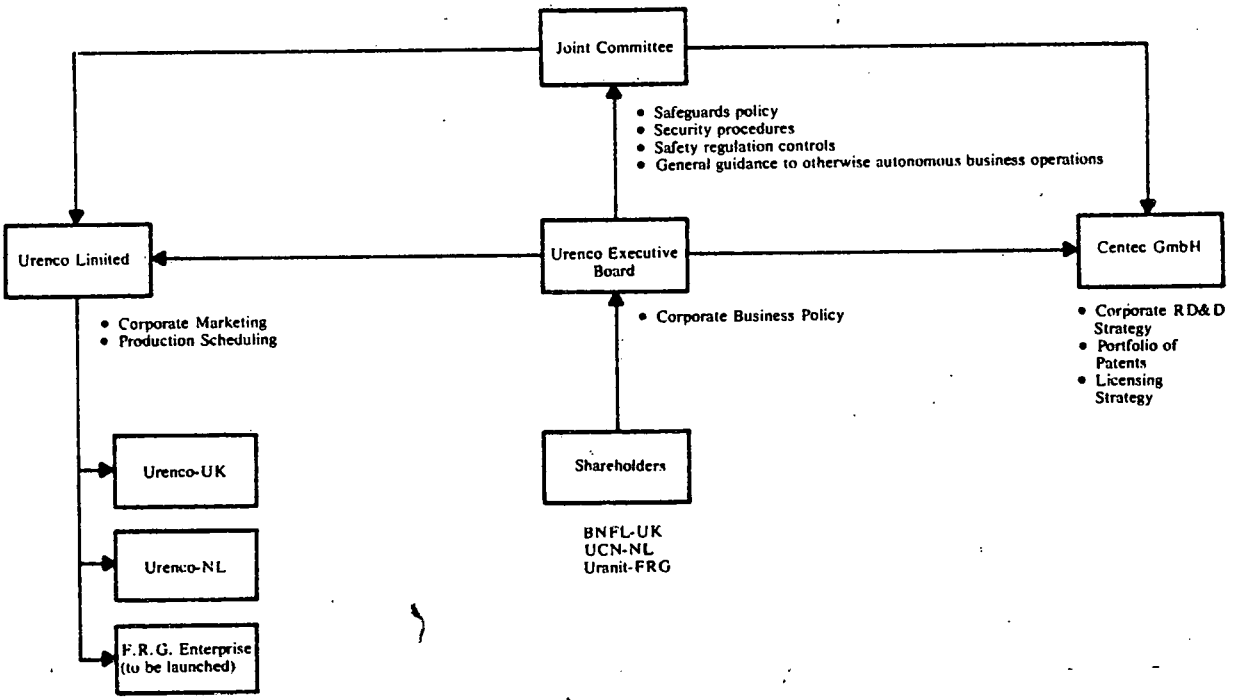
*Specifically the agreement is titled, "Agreement Between the United Kingdom of Great Britain and Northern Ireland, The Federal Republic of Germany and the Kingdom Of The Netherlands On Collaboration In The Development And Exploitation Of The Gas Centrifuge Process For Producing Enriched Uranium."

** Preussen Elektra AG, West Germany's second largest utility has recently joined RWE, the largest utility and previously only utility participant.

# FIGURE 4

DISTRIBUTION OF FUNCTIONS IN THE URENCO ARRANGEMENT

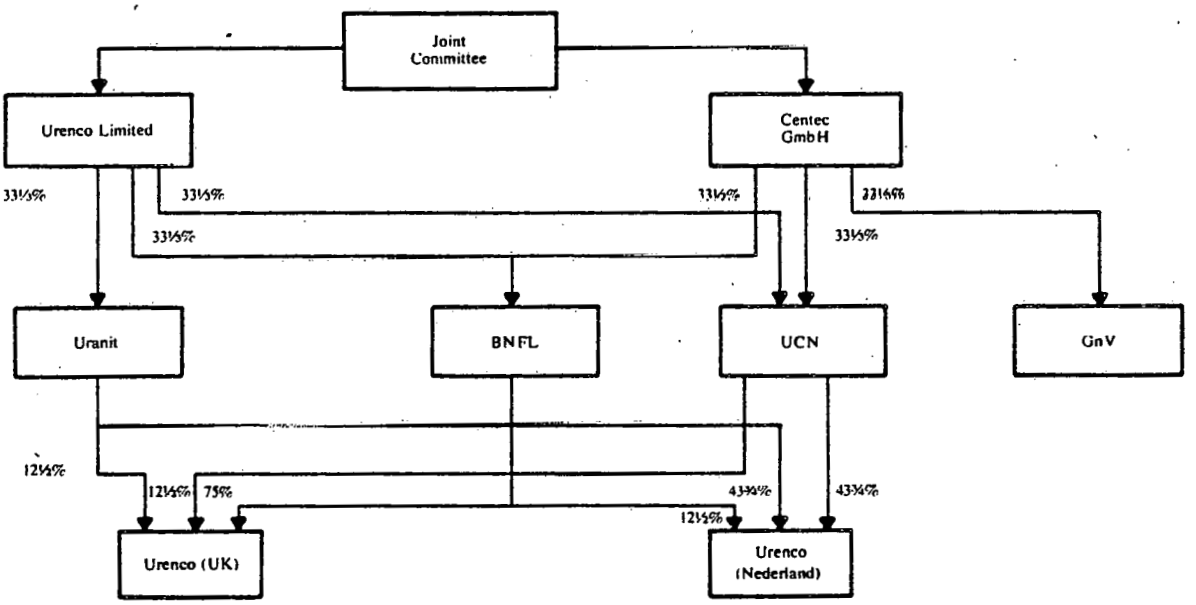


Ltd.), UCN (Ultra-Centrifuge Nederland, N.V.) and GnV (Gesellschaft fur Nukleare Verahrenstechnik mbh). Uranit (FRG) is made up of private companies only; BNFL (UK) is entirely owned by the United Kingdom Energy Authority, thus is government-controlled. UCN (The Netherlands) is a combination of public and private companies. Staat der Nederlanden Reactor Centrum Nederland and Staatsmijnen are government companies while those remaining are private. GnV (FRG) ownership is divided equally between two private companies.

Figure 5 below, illustrates the decision-making organizations of Urenco/Centec.

FIGURE 5

URENCO/CENTEC: BASIC ORGANIZATION



Functions of Urenco Ltd. and Centec GmbH. Urenco Ltd and Centec Gmbh provide the central services required by the collaboration. They are controlled by their respective boards, but regular joint meetings are held to discuss mutual problems. Both companies' activities are based at Marlow, England, under the direction of a common management.

The responsibilities of Urenco Ltd. are:

- to provide a central marketing service as the agent of the production enterprises;
- to assist in mutual scheduling of production; and finally,
- to represent the shareholders in respect of investment in enrichment projects with parties outside the tripartite enrichment organization.

The responsibilities of Centec GmbH are threefold:

- to coordinate the research and development program and information exchange between the shareholders;
- to control the overall portfolio of centrifuge technology and patents; and finally,
- to represent the shareholders with respect to dealings with parties outside the tripartite enrichment organization for the sale or licensing of technology, or of enrichment plant or equipment.

The Joint Committee. Its composition and voting procedures are:

- The Joint Committee is composed of an accredited representative of each Contracting Party (who may be accompanied by advisors);
- The Chairmanship is held in turn by the representative of each Contracting Party for a period of one year;

- Each representative has one vote; and finally,

- The Joint Committee takes all decisions by unanimous vote.

The functions of the Joint Committee include:

- consider and decide upon any questions concerning safeguards;

- consider and decide upon questions arising out of the classification arrangements and security procedures;

- advise the Contracting Parties as to the conditions for agreement with other states or international organizations and to consider and decide upon any proposals for:

  - the transfer of information derived as a result of collaboration outside of the territories of the Contracting Parties

  - in granting of licenses or sub-licenses for the territories of the Contracting Parties

  - the export outside the territories of the Contracting Parties of equipment or material developed, produced or processed under the collaboration;

- approve the instruments establishing the joint industrial enterprises;

- approve proposals of the joint industrial enterprises for the siting of major installations;

- make arrangements for the assessment and payment of royalties in regard to patents and other industrial rights;

- approve such research and development programes as are to be financed in whole or in part by joint government grants of the Contracting Parties, and consider any proposals from the joint industrial enterprises for varying the proportion of the cost of research and development to be borne jointly by the Contracting Parties;

- decide upon or recommend to the Contracting Parties appropriate measures to be taken if technical or economic developments occur which are likely to affect significantly the commercial exploitation of the gas centrifuge process by the joint industrial enterprises; and finally,

- o determine any question concerning the interpretation of the agreement put before it by the joint industrial enterprises in connection with the exercise of their functions.

Mechanism for Resolution of Disputes Within the Institution. The Urenco/Centec arrangement provides for three methods of dispute settlement. First, disputes arising between Contracting Parties which concern the interpretation or application of the Agreement, Joint Committee decisions, or implementation arrangements are referred to the Joint Committee for settlement.

Second, upon failure of resolution by the Joint Committee, the Contracting Parties endeavor to settle the dispute.

Third, failure of Contracting Parties to settle would set in motion the Arbitral Commission mechanism. The ad hoc Arbitral Commission is formed at the request of the Contracting Party involved unless any other Contracting Party objects on national security grounds.

The Arbitral Commission is comprised of members appointed, one each, by the Contracting Parties involved. If three Parties are involved, however, the two in the same interest may only appoint one member in common. The Arbitral Commission members then nominate the third member, who serves as the Chairman. The President of the European Court of Human Rights is invited to make the necessary appointments only in the event that they are not made by the Contracting Parties within the prescribed time limit.

The Arbitral Commission reaches a decision by a majority vote on the basis of international law and the Agreement itself. There is no right of appeal against the Arbitral Commission's decision. It is the Commission's duty, if requested, to interpret the decision's import or scope.

Provisions for Raising Capital, Operating Funds, and Addressing Related Financial Issues.* Commercial collaboration is based upon an arrangement such that the managing partner(s) of each enterprise is (are) responsible for the investment decisions of the enterprise and for design and operation of the plants. Such individual decisions, however, are made with the full knowledge of the others' technical information, development plans, economic studies, and actual plant costs, etc.

See the section on organizational structure for further discussion concerning the division of responsibilities between Urenco Limited and Centec GmbH.

Provisions for Establishing Pricing Policy. Urenco prices are contractually fixed for the term of the contract, normally ten years of deliveries, by a formula which makes them subject only to escalation on the basis of established and published indices in the three participating countries. In view of the multinational character of Urenco, the basic price is a composite of the three different currencies of the participating nations.**

* More specific information is not publically available.

** Urenco Enrichment Services - A New Departure. Presented by Dr. J. Asyee to the Atomic Industrial Forum International Conference on Uranium Enrichment, New Orleans, January 29 - February 1, 1978.

With respect to pricing, the production costs and currencies of the Netherlands and West Germany are employed in equal parts to contain the price as*

$$P_t = P_o \left(a + b \frac{mt}{mo} + c \frac{pt}{po} + d \frac{e_t}{e_o}\right)$$

Where

$P_t$ = price of separative work at the time t,

$P_o$ = price of separative work when the contract is concluded (unit price),

$m_t$ = price of material in chemical and precision engineering industry (indexes 1:1),

$m_o$ = same material index at time when contract is concluded,

$p_{t,o}$ = personnel cost of an average labourer in chemical industry as published,

$e_{t,o}$ = electricity cost factor.

Provisions Governing Market Sharing and Restrictions. The Contracting Parties have agreed upon a formula such that Urenco Ltd. seeks business opportunities against the terms and conditions of sale determined by the unanimous agreement of its shareholders. Urenco Ltd. also concludes all business transactions on behalf of the two enterprises. The enterprises are entitled to shares of the business on the basis of one-third to Urenco (UK) and two-thirds to Urenco (Netherlands). If one enterprise does not wish to undertake its full share of the

* Ibid.

business, it may be taken on by the other enterprise. The minority participants in each enterprise provide their share of the required investment (according to the participation illustrated in Figure 5) up to the level required to meet business commitments that are shared on the one-third/two-thirds basis.

In addition, the Contracting Parties are bound by restrictions to the effect that no Party may pursue commercial exploitation or unapproved R&D of the gas centrifuge uranium enrichment process other than through the principles of collaboration mandated by the Agreement.

Provisions for Dealing with Competition and Other Non-Members. The sale or passage of technological information is politically controlled by the Joint Committee. See the section on Organizational Structure, p. 37 , regarding the function of the Joint Committee in controlling technology dissemination. The purpose of the restrictions is stated in the agreement as follows:

> The Contracting Parties jointly and separately undertake to ensure that any information equipment, source or special fissionable material...will not be used by or to assist, encourage, or induce any non-nuclear-weapon State to manufacture or control such nuclear weapons or explosive devices.*

Otherwise, URENCO/CENTEC competes with other groups that offer enrichment services on a commercial basis.

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* Treaty of Almelo, Article VI.

Provisions for Dealing with Member Infractions of Rules. See section on Mechanism for Resolution of Disputes p. 42.

Mechanism for Planning New Facilities and Services. See section on Provisions for Adjusting to Future Conditions p. 47.

Mechanism for Regulating Auditing, and Otherwise Assuring Accountability. The Urenco/Centec Agreement incorporates specific provisions for the application of appropriate safeguards procedures. The following safeguards procedures are applied:

- the European Atomic Energy Community (EURATROM) safeguards system;
- the measures that account for the use of material and equipment established by the Government of the United Kingdom;
- the consultations and exchanges of visits between Contracting Parties; and finally,
- procedures pursuant to obligations incurred by Contracting Parties with the International Atomic Energy Agency.

In addition, elaborate security measures protect classified materials, (i.e., information, documents, or equipment). The provisions of the Agreement cover the following matters: establish a common classification and security grading system, designation of an agency in each Party's state to execute security measures, transfer of classified matter between countries, access authorization and designation of restricted areas, and investigation of lost or disclosed classified information.

Provisions for Staffing. The staff of the production enterprises are generally nationals of the country in which the factory

is located. See the section on Organizational Structure, p. 37, for composition of the organizational entities. The Central organization based at Marlow, England, employs a staff of 46, of whom a quarter are German or Dutch.

Facilities and Siting for Initial Formation of Institution. The initial facilities are provided for in Annex I of the Treaty of Almelo. It states:

> Each Contracting Party shall take all measures within its powers to ensure that the appropriate joint industrial enterprise is granted a free non-exclusive license to use and exercise the pre-existing industrial rights...and the right to grant sub-licenses.

With regard to compensation of the Contracting Parties, the Agreement created an Evaluation Group to undertake this assessment. The Evaluation Group composed of one person nominated by each Contracting Party, made an evaluation of the respective contributions and fixed an appropriate percentage royalty to be applied to the value of the enrichment plant to be constructed.

Initial Participants and Initially Planned Expansion of Participants. The Contracting Parties are permitted to jointly conclude agreements for collaboration with European or other states, or international organizations. The proposed agreements must be approved of by the Joint Committee.

Provisions for Adjusting to Future Conditions. The Urenco/Centec Agreement provides for procedures to withdraw from or terminate the arrangement. With respect to the former, any

Contracting Party may give one year's notice of withdrawal after the Agreement has been in force for a period of ten years. Regarding the latter, the Agreement may be terminated by the unanimous consent of the Contracting Parties. In either case, the Parties must take the appropriate steps to continue safeguards and measures for the protection of classified information.

As a result of an awareness that future markets would be more obtainable through potential customer involvement, URENCO indicated in 1971 that they were interested in considering arrangements with "third-party" organizations. The Tripartite Agreement of Almelo was in fact designed to capitalize on centrifuge experience and to, thus, accommodate future participants. In June 1973 URENCO announced the formation of the 'Association for Centrifuge Enrichment' (ACE)* for the purpose of examining the economic, technological and organizational possibilities for establishment of centrifuge enrichment enterprises outside of the Trinational Organization. A proposal was made to provide sufficient technical and economic information to evaluate the European centrifuge process. Moreover, since a proposal was made to provide classified information at some stage in the study, the Tripartite governments are expected to supervise the procedure to ensure security and assure the necessary conformity with international obligations and agreements.

* ACE is comprised of organizations from each following countries: Australia, Belgium, Canada France, Holland, Italy, Japan, Spain, Sweden, United Kingdom. U.S. companies attended the first meeting but later withdrew.

### 2.2.2 History and Evolution of Urenco/Centec

The organizational development of Urenco has been marked by substantial deviation from its original objectives. The original goal was to create both an integrated centrifuge machine combining the best features of the British, Dutch and German centrifuges and an efficient, egalitarian, tripartite organization. Three factors, however, generated pressures which eventually led to substantial revision of Urenco's policy and organizational structure. First, serious disagreements existed among the three partners over technology choice. Second, the initial separation of plant operator and manager from centrifuge manufacturer created problems once the commercial operation stage was reached. Lastly, the inclusion of public and private sector shareholders with different investment philosophies and financial responsibilities complicated decision-making on capacity expansion.

The first reorganization of Urenco, which took place in late 1973, involved the merger of Urenco and Centec, which initially had been separate companies responsible to a central committee. The division of Urenco and Centec, and the separation of German shareholders in Urenco from those in Centec proved to be an obstacle when the time came in 1973 to select a single centrifuge design. Neither the Germans or the British were willing to compromise their own designs for the sake of technological integration, while within Germany the German stockholders in Centec refused to

share any of Urenco's investment risk if they were to have no say in the latters' technological decisions. Consequently, Urenco and Centec effectively were merged at the working level. Compromise also was reached on the technology issue, with the British and German technologies employed at Capenhurst and Almelo, respectively, and the Dutch centrifuge plant as the center of the Research and Development program. This represented a substantial deviation from the objective of technological integration expressed by all three partners when the treaty of Almelo was signed.

The second reorganization occurred a year later. A major provision of the Treaty of Almelo is that important decisions affecting the enterprise are to be made by unanimity. The German shareholders disagreed with British arguments for advancing the plans for capacity expansion in order to take advantage of the post oil embargo shift to nuclear power and the irritation of many utilities at changes in American contract policy. The German position was to proceed cautiously in order to see if the apparent expansion of the enrichment market was in fact solid. Complicating this situation was the fact that the German shareholders, who represented the private sector, argued that public funds should finance expansion demanded by governments. The British shareholder was a public sector corporation for whom neither the source of financing, nor showing a profit to stockholders, were problems in any way analogous to those of the private corporations in Germany.

As a result of this conflict over investment and expansion, Urenco again was reorganized to create two new enterprises: Urenco U.K. and Urenco, Netherlands. Although Urenco/Centec Ltd. remained tripartite in accordance with treaty provisions, Urenco U.K. and Urenco Netherlands were dominated by British and Dutch/German shareholders, respectively, and had responsibility for financing the expansion of their own plants beyond an agreed level of investment which all would share equally. This change was necessary to prevent the disagreements over expansion from paralyzing the organization's operations.

The experience of Urenco demonstrates the difficulties of fashioning a joint effort among three countries with strong vested interests in their own technologies and with different perspectives on appropriate business strategy. It also provides additional evidence of the tension between the political notion of equality and the economic concept of efficiency, and the particular problems these two ideas present when commercial decisions must be made.

## 3.0 CARTELS, PRODUCER ASSOCIATIONS

### 3.1 THE ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES

#### 3.1.1 Description

Form and Charter of Institution. On September 14, 1960, the Organization of Petroleum Exporting Countries (OPEC) was formed in Baghdad by Iran, Iraq, Kuwait, Saudia Arabia, and Venezuela. The countries which joined OPEC after its establishment

are Qatar, Libya, Indonesia, Abu Dhabi, Algeria, Nigeria, United Arab Emirates, Gabon, and Ecuador.*

OPEC is the organizational manifestation of the multinational oil producers' cartel. The 1960 "gentleman's agreement" institutionalizing the cartel has been supplemented by numerous Resolutions. However, in January of 1961 an agreement was reached on the basic organizational structure of OPEC, and three main bodies were set up: The Conference, the Board of Governors and the Secretariat. The agreements, Declaratory Statement and Resolutions differ fundamentally from a charter or international convention or treaty in that they do not have the status of law and depend solely upon continued consensus of each member as to their applicability.

Organizational Structure. The 10-point Declaratory Statement of Petroleum Policy in member countries** defines, in part, the purpose, principles, and rights of OPEC:

- "Member Governments shall endeavor, as far as feasible, to explore for and develop their hydrocarbon resources directly.". To the extent that they are unable to do so, contracts with foreign companies may be concluded, provided that the government retains "the greatest measure possible of participation in and control over all aspects of operations" and that "changing circumstances should call for revision of existing concession agreements."

- "...the Government may acquire a reasonable participation on the grounds of the principle of changing circumstances."

- There should be "progressive and more accelerated relinquishment of (any) acreage" of existing company concessions where exploration and production have not in fact occurred.

* See Addendum B, "Chronology of OPEC's History".

** See Addendum C.

- Posted prices "shall be determined by the Government" and adjusted against declining monetary values.

- "The Government may, at its discretion, give a guarantee of fiscal stability to operators for a reasonable period of time."

- Such guarantees are to be renegotiated if for any year just ended the company is found to have realized "excessively high net earnings after taxes."

The remaining points claim for the OPEC governments the right:

- to set reasonable standards of accounts to be kept and information to be furnished by the companies;

- to formulate "the conservation rules to be followed";

- to exercise full jurisdiction in its "competent national courts" in any disputes with the companies; and

- to invoke against the companies the rule of "the best of current practices" for such matters as incorporation, labor relations, royalties, taxes, and property rights.

The Conference. The Conference is composed of member countries' representatives, usually of ministerial rank. The members have equal voting rights and decisions are taken by unanimous consent. The Conference holds meetings, at least twice a year, one at organization headquarters, one at a member's capital.

The Conference is the supreme authority of the organization. It represents the member's individual interests. The functions of the Conference include:

- to formulate general policy;

- to devise the appropriate means to implement policy; and
- to approve decisions formulated by consultative meetings of delegations' heads called by the Conference's President.

The Board of Governors. The Board of Governors is composed of one representative and a Governor from each member country. The Governor serves for a two-year period. The Board, which meets twice a year, has the following functions:

- to implement the Conference's decisions; and
- to oversee management of Secretariat.

The Economic Commission. The Economic Commission is comprised of member countries' experts (one from each). It is empowered to analyze periodically important economic issues in cooperation with the Secretariat's economics department.

Mechanism for Resolution of Disputes Within the Organization. To date, OPEC's resolutions do not institutionalize a mechanism for dispute resolution. OPEC studied the feasibility of, but failed to establish, an intra-OPEC High Court. The Court was to have settled all disputes and differences relating to petroleum matters and to have served in both advisory and judicial capacities.

The "Declaratory Statement of Petroleum Policy in Member Countries", June 25, 1968, states that all disputes arising between the member countries' governments and the petroleum companies fall exclusively within the jurisdiction of the competent national courts or specialized regional courts.

Provisions for Raising Capital, Operating Funds And Addressing Related Financial Issues. Not applicable.

Provisions for Establishing Pricing Policy. Agreements taken by OPEC members at the Conference level are reached through a bargaining process. The agreements on oil export prices are strictly voluntary and do not carry with them sanctions or rewards. To the extent that agreement is reached, it is up to the discretion of each member government to set and change prices within the range considered reasonable by OPEC.

Examples may provide some insights into the pricing policy formulation process. The first instance of price rise was undertaken unilaterally by Libya. In September 1970 all the companies operating in Libya had given into the government's demands to increase both posted prices and tax rates. Libya had threatened to shut down production altogether if their demands were not met.

In December 1970, OPEC passed a Resolution calling for "a uniform general increase in oil prices" and threatened "concerted and simultaneous action". In February and April of 1971 the Persian Gulf (not all OPEC) exporting countries agreed on increased posted price and tax rates with the major oil companies. The gains from the Tehran-Tripoli Agreements were achieved through negotiations. The subsequent price increases of 1973-1974 were announced unilaterally by OPEC members.

In general, OPEC is marked by two "pricing camps", the low-price preference and high-price preference states. The latter are roughly characterized by large populations, massive development programs, and major plans for military buildup. On the other hand, the low-price preference states are characterized by small populations, limited capital absorption capability, large financial reserves, and huge untapped petroleum reserves. The split in price preferences is also conditioned by differing intra-OPEC political ideologies.

The extent to which prices are established through a bargaining process ensures that the process is greatly influenced by a "price leader". This position in turn, is reflective of the leader's relative market share. See the following for more discussion concerning market sharing determination.

Provisions Governing Market Sharing. At no time in its 18-year history has OPEC been able to institutionalize production quotas or ration production. As recently as March 1975, at the OPEC conference meeting in Algiers, Saudi Arabia is reported to have blocked the effort of Algeria, Iraq, and Libya supported by Iran, Nigeria, and Venezuela to get OPEC to adopt a coordinated system of regulating production.*

Therefore, the criteria relevant to the establishment of members' market shares and more specifically to the process of re-allocating market shares, are difficult at best to state with

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* Middle East Economic Survey, 7 March 1975, supplement, p. 2.

great confidence and certainty. Many competing theories have surfaced to define OPEC's criteria.*

A summary (non-comprehensive) list of potential criteria used to determine market shares would include the following:

- o technical rationality of oil flow; market share based on capacity for future production;
- o past production levels;
- o political pressure of members;
- o capital absorption capability;
- o collective goods mentality; production levels made inverse to GNP so that small states are free riders;
- o equitable distribution by allocating production shares inversely to capital wealth; and
- o cultural and ideological affinity of member to price leader.

Provisions for Dealing with Competition. To date, OPEC has not developed a strategy to deal with its competition. Whether this is due to the fact that OPEC did not foresee competition, that they are incapable of cooperating and devising a strategy, or that they do not feel a need to take such measures is open to interpretation and question. Moreover, this issue is open to interpretation of whether OPEC does indeed have a strategy that may not be generally known to the public.

The question is, however, particularly relevant as the rise in the production of alternative energy sources is now beyond the control of OPEC. The price increases of the early to mid 1970's

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* See Bibliography for a survey of literature presenting the various theories.

has stimulated the development of other high cost sources of energy.

The price increases and the constant fear of a politically motivated oil embargo has produced a major change in the energy policies of oil importer and other non-OPEC energy producing nations. World energy supplies will be constantly augmented by renewable energy sources as well as by new oil supplies.

For OPEC to hold on to or augment its existing share of world oil trade, a strategy would contain a pricing policy and a means of adjusting production to the quantity that can be sold at the desired price. Alternative market strategies which could in theory accomplish production adjustments are:

- o formal prorationing;
- o indirect allocation of market shares by the oil companies; and/or
- o assumption of the role of residual supplies by one or more financially strong oil-exporting countries.

Provisions for Dealing With Member Infractions Of Rules. Discussion of provisions for sanctions must be approached on two-levels. On the first level, OPEC can be seen as a policy-making organization lacking supranational powers or decision-making powers. Therefore, OPEC's Resolutions are non-binding and do not provide for a means to enforce them.

In practice, however, Saudi Arabia plays the role of policeman. The implicit threat to any OPEC member who attempts to leave the organization to obtain a preferential commercial

deal is a Saudi counter-move of production expansion or cutback. Its huge financial and petroleum reserves ensures that members would be unsuccessful in unilateral deals. With huge reserves and a small population Saudi Arabia is likely to remain the defacto imposer of cartel "rules".

Provisions for Planning New Facilities. Not applicable

Mechanism for Auditing, Regulating, and Otherwise Assuring Accountability. Not applicable

Provisions for Staffing. See Section on Organizational Structure, p. 52.

Facilities and Siting For Initial Formation of Institution. Not applicable

Initial Participants and Initially Planned Expansion of Participants. OPEC Resolutions restrict membership to countries with a substantial net export of crude petroleum; the exact export size is not defined. Moreover, every founding member has veto power over any new applicant. In April 1965, an additional restriction was adopted in regard to new applicants. They should have interests that are fundamentally similar to those of member countries.

Provisions for Adjusting to Future Conditions. The Resolutions do not adress or mandate procedures by which OPEC must adjust to new conditions. By virtue of the flexible "charter" of OPEC, a unanimous decision taken by the Conference, in the

form of a Resolution, would automatically introduce organizational or policy changes.

### 3.1.2 HISTORY AND EVOLUTION OF OPEC

The major initiatives leading up to the formation of OPEC reach back into the mid-1940's. As early as 1947, Venezuela established diplomatic contacts with Iran at the time of Iran's negotiations with British Petroleum. In 1949 the Venezuelan delegation visited the Middle East and in 1951 a Middle Eastern delegation visited Venezuela. By 1951 Saudi Arabia and Aramco had announced the first "fifty-fifty" profit sharing agreement.

June 29, 1953, Iraq and Saudi Arabia signed an agreement providing for an exchange of information on petroleum and consultation on prices. The agreement also instituted the principle of matching the best-terms obtained by either government. The first Arab Petroleum Conference of 1959, held in Cairo, adopted a resolution that companies could no longer unilaterally reduce prices.

The catalyst which triggered the major oil exporting governments' decision to create OPEC was the oil companies' unilateral reduction of posted prices in August 1960, following on the heels of a February 1959 price cut. The producing countries were clearly angered by their steadily declining revenues, per barrel as well as absolutely.

The first surge of OPEC unity did not last long. The Iraqis did not attend meetings. And OPEC was failing to achieve an effective pro-rationing of oil production between its members.

OPEC's strategy has evolved over a period of years. It was not until 1962 that OPEC devised a tactic that brought it its first modest success. Under complex resolutions and formulas, OPEC had managed by 1965 to obtain higher per barrel revenues for its members. This limited success bolstered more agressive attitudes that were embodied in the "Declaratory Statement of Petroleum Policy in the Member Countries", accepted at OPEC's June 1968 meeting.

In mid 1967, with the closing of the Suez Canal in the Six Day War, and an oil shortage (caused by transport blockage), Libya stepped up production to meet European demand. This solution was, however, short-lived. King Idris, was overthrown by Colonel Qaddafi in September 1969. Early in 1970 Qaddafi cut back oil production for conservation reasons. Shortly thereafter the Libyan government demanded a large increase in tax payments on its oil. The international oil companies operating in Libya yielded one by one. The success of Libya demonstrated that producer countries could demand concessions from the oil companies.

Toward the end of 1970, the producers consolidated new tax demands through OPEC, and began to act as a single group and more stridently. Every OPEC member, with the exception of Indonesia,

either made public statements or told the companies privately that if their demands were not met, all oil production would be stopped. An OPEC resolution in December laid down a 15-day time limit for acceptance and called for "concerted and simultaneous action by all member countries" if the negotiations failed. Meeting with the companies on January 11, 1971, the Libyan Deputy Prime Minister left no doubt that what was meant was a cut-off of all oil production. The same message was conveyed directly and through official channels to the American and British governments by two rulers of friendly countries.

Negotiation deadlines were extended and an assurance was obtained that agreements reached with companies would be honored for their full terms. Further negotiations continued and a settlement was reached at Tehran in February 1971. OPEC was clearly satisfied and bolstered by its demonstration of power.

Yet OPEC dissatisfaction was not long in manifesting itself. Various members, in the next half year, started looking at the figures more harshly. They could see large and growing incomes for their governments and were generally pleased. But they could also see that their income per barrel was still low - especially when compared with the excise taxes which Europe levies on its fuel. Much more important, indeed of overwhelming importance to the changing world oil picture, was that the OPEC countries, for the first time, began to recognize and discuss openly the fact that their reserves were exhaustible and should be conserved.

At the Arab Oil Congress in Algiers in May-June 1972, OPEC was castigated for having been too soft, for having yielded too easily and readily to company and consumer government pressures. The OPEC "triumph" thus lasted in the eyes of many Arab observers a scant 15 months. The idea began to take root that it was important to maximize present revenues but without exhausting what was now perceived to be a wasting asset.

In this mood, the OPEC countries turned their attention in mid-1972 to the question of participation, i.e., a defined percentage in the producing operations and assets of the international companies. At once there was a sharp difference of view on whether this issue had been laid aside, at least until 1976, by the Tehran agreements.

In its October 1973 resolutions, OPEC took the important new step of placing pricing prerogatives in its own hands, thus doing away with the prior agreement of the major companies. This move, undertaken in a sellers' market, could not be challenged successfully by the companies. It enabled OPEC governments to raise their oil export prices about four-fold over the October 1973 - January 1974 period. OPEC's strategy has been to obtain full government ownership and to simplify the oil companies accounting structure. The concurrent moves, called for by the September 1974 Conference have helped to fulfill the agenda of 1968 (as embodied in the Declaratory Statement).

Nevertheless, several instances of intra-OPEC rivalry exist. In the case of Iraq which stripped the companies' affiliates of 99.5% of their concession areas in 1961, neighboring countries were more than willing to sell oil to companies who refused to buy Iraqi oil. Even unanimous OPEC Conference Resolutions have not been observed. A November 1969 Resolution called for member countries to refrain from granting new oil rights to rich industrialized countries' companies whose governments (eg., Japan) aimed to reduce oil import prices. Soon after the Resolution was passed, Qatar and Abu Dhabi granted oil rights to Japanese concerns.

OPEC members have disagreed over the participation in ownership and management of major oil concessions. Other contentious issues have been the compensation to be paid for government's participation shares, and the terms of sale of crude oil to the foreign concessionaire. OPEC members continue to disagree over prices. Furthermore, OPEC is constantly plagued by boundary disputes, regional politics and broader issues such as East-West relations.

The institutional development of OPEC has been relatively minor and slow. The sole major change of interest was action taken by the June 1970 Conference to increase the Secretary-General's term from one to three years and to place more stringent professional requirements on the candidates. The term's extension and setting of high qualifications strengthened OPEC by improving the quality of its top management.

Development of OPEC as an institution has been hampered by significant differences among members. Several decisions of the Conference have failed to be implemented. Notable among them are the intra-OPEC High Court and the joint emergency fund to assist members encountering financial difficulties as a result of oil company reactions to Conference decisions.

## 3.2 INTERGOVERNMENTAL COUNCIL OF COPPER EXPORTING COUNTRIES

### 3.2.1 DESCRIPTION

Form and Charter. Four major copper exporting countries, Chile, Peru, Zaire, and Zambia, conferred in June 1967 and agreed to form the Counseil Intergouvernemental des Pays Exportateurs de Cievre (Intergovernmental Council of Copper Exporting Countries), CIPEC. Since 1967 membership has expanded to include Indonesia, Australia, and Papua New Guinea (the last two are Associate Members).

CIPEC has been alternately described as a cartel and as an economic consultative organization. The organization's main objectives are:

- to coordinate measures designed to foster, through the expansion of the industry, dynamic and continuous growth of real earnings from copper exports, and to ensure a real forecast of such earnings;
- to promote the harmonization of the decisions and policies of the member countries on problems relating to the production and marketing of copper;
- to obtain better and more complete information and appropriate advice on the production and marketing of copper; and

- to increase resources for the economic and social development of producer countries (bearing in mind the interest of consumers).

Organizational Structure. CIPEC is composed of four organs: the Conference of Ministers, the Governing Board, the Executive Committee, and the Information Secretariat. The Conference of Ministers is the highest authority. It meets in ordinary session once every two years, unlike OPEC's Conference which meets at least twice a year. In order to expedite matters under consideration, the CIPEC conference classifies subjects for discussion into those of major and minor importance. The major subjects require unanimous vote, minor ones are taken by a simple majority.

Composed of high-ranking officials, two from each country, the Governing Board is responsible to the conference for fostering technical and administrative cooperation among member countries. It meets in ordinay session once a year. A quorum is established with at least one representative from each member country. Decisions are, as in the case of the conference, subject to the same classifications of major and minor.

The Executive Committee is comprised of one representative from each member country. On behalf of the Governing Board, it supervises the Secretariat in administrative and financial matters, prepares the budget for approval by the board, determines studies to be undertaken, and makes various other recommendations to the board.

The highest administrative post in CIPEC is that of Executive Director. The Executive Director is appointed by the unanimous vote of the Governing Board for an initial period of two years. After the expiration of this period, he holds office on a permanent basis, unless removed at the request of two member countries. The executive director's indeterminate appointment contrasts with the three-year term of OPEC's secretary-general, which is rotated among member countries. A long period of appointment is indeed a beneficial feature to the extent that it enables the chief executive to plan and implement an administrative program.

CIPEC's executive director need not be - a national of any member country and in fact was not from 1967 to 1975. He is selected on his ability to supervise and represent the Secretariat, and to act as secretary of the Conference, the Governing Board, and the Executive Committee, with the right to speak but not to vote. Moreover, the Governing Board empowers the executive director to appoint technical and administrative staff, besides those on endorsement by member governments. Neither the executive director nor any member of the staff may have any financial interest in copper or any other metal.

MECHANISM FOR RESOLUTION OF DISPUTES WITHIN INSTITUTION. See previous section.

Provisions for Raising Capital. To meet the costs of financing a copper stockpile, the CIPEC countries face a major hurdle in raising capital. They do not have access to the International

Monetary Fund (IMF) buffer stock financing facility. (The IMF, which provides financing at concessionary rates, limits its assistance to commodity agreements where both importer and exporter countries are represented.)

CIPEC countries have turned to the International Bank for Reconstruction and Development (IBRD or World Bank). In 1971 Zambia appealed to the World Bank for financial assistance to build up a stockpile of copper out of surplus supplies in order to bolster the prevailing low prices, with the understanding that the stockpile would also be used to ease prices that reached abnormally high levels. However, the request was turned down.

Some CIPEC countries, such as Chile, Zambia, and Peru, have been able to obtain funds from the IMF. Those countries were eligible for the IMF's compensatory financing program for countries experiencing a temporary shortfall in export earnings due to conditions beyond their control.

Establishing Pricing Policy. CIPEC's main concern is not higher prices per se, but rather stable prices, preferably at a price level just below the substitution price. The members of CIPEC, however, are not in a position to maintain price stability through the creation of a buffer stock. Establishing a significant buffer stock would be too great a financial burden on the members and external financing has not been forthcoming. Their efforts to pursue the buffer stock method demonstrate

the members are, however, aware of the long run benefits of such a policy.

In late 1974, CIPEC instituted export controls. November 18-19, 1974, CIPEC countries agreed to cut the volume of their exports by ten percent in the first half of 1974 and by another five percent in April 1975. The objective was to sustain the open market price. However, those pricing measures were inadequate for a number of reasons:

- o relatively moderate size of cutbacks;
- o CIPEC countries controlled only 35 percent of world mine production;
- o large accumulation of commercial inventories by consumers following the world recession;
- o absence of a buffer stock; and
- o and most importantly, the low demand for copper.

Finally, CIPEC has arranged an agreement with Japan in an effort to stabilize prices. CIPEC and Japan, a major copper importing country, agreed on a method to moderate disposal of excess inventories during the 1974-1975 economic recession. CIPEC countries cut their exports while the Japanese industry halted copper exports from their accumulated commercial stocks and cut other exports by 50 percent.

Provisions Governing Market Sharing. Relatively little information is available to the general public concerning the criteria used by CIPEC governing their copper production allocations. Differing sociopolitical conditions and goals and mining

conditions constrain group action. As well, figures from 1975 indicate that all members of the group are not equally willing to restrict their planned production in order to push up the price of copper. The following table demonstrates CIPEC's changes in expansion plans from 1974 to 1975:

*Mine Capacity Planned for 1978
(mine tonnage, thousand of short tons)

| Country | 1974 estimate | 1975 estimate | % Change |
|---|---|---|---|
| Chile | 250 | 25 | -90 |
| Peru | 217 | 235 | +8 |
| Zambia | 195 | 0 | -100 |
| Zaire | 305 | 185 | -39 |
| Indonesia | 75 | -10 | -112 |
| Australia | 79 | 16 | -80 |
| Papua New Guinea | 0 | 0 | unchanged |

Provisions for Dealing with Competition. CIPEC has four sources of "competition":

- o the world's largest copper reserves are located in the United States and significant reserves are located in the Soviet Union and Canada;
- o many materials, such as aluminum, plastics, and stainless steel, substitute for copper;
- o secondary supplies, for example copper mined as long ago as 100 years is currently available. Adding to this problem is the fact that copper scrap recovery can be as high as 75 percent; and
- o consumer stockpiles exist, especially in the United States.

CIPEC has taken some measures to maintain control over the market. CIPEC expanded its membership, thereby tying up

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* Metals Week, June 16, 1975, p. 1.

supplies in East Asia. The overall price strategy is designed to encourage "stable" rather than "higher" prices so that expensive substitutes do not become economically attractive. CIPEC and the producers of aluminum's main source, the International Bauxite Association (IBA) cooperate on a close basis (IBA observes all CIPEC meetings) to further soften the impact of close substitutes. And finally, CIPEC has established contacts with the United States. The U.S. has agreed that a sale of US copper from its reserves would be handled in such a way that could avoid any effects on U.S. imports and exports.

CIPEC is also given prior notice of U.S. sales so that it can express its point of view. However, the question for CIPEC remains; it is whether or not the U.S., Canada, and Russia will expand their production to take advantage of CIPEC policies.

Provisions for Dealing with Member Infractions of Rules. CIPEC's Charter does not stipulate either penalties for breach of, or means to enforce the collective decisions of the members. There is no counterpart to Saudi Arabia in CIPEC as all members depend to a large degree upon the sale of copper. Copper accounts for over 80 percent of Chile's and Zambia's export earnings, 60 and 30 percent for Zaire and Peru respectively. Given the extent of member's dependence on a single source to meet international commitments, unilateral actions are not only unlikely but potentially dangerous to the country's economy. Further constraints are placed on Chile and Zambia by the strong copper unions who would react to production cutbacks.

Planning New Facilities. Not Applicable

Mechanism for Auditing Regulating and Otherwise Assuring Accountability. Not applicable

Provisions for Staffing. See section on Organizational Sturcture, p. 52.

Initial Facilities and Siting. Not applicable

Initial and Planned Expansion of Participants. See section on Form and Charter, p. 65.

Provisions for Adjusting to New Conditions. Not available.

### 3.2.2 HISTORY AND EVOLUTION OF CIPEC

The inspiration for CIPEC is the successes of OPEC in raising government revenues. CIPEC members state that OPEC's achievements "have demonstrated how other producers of raw materials could satisfy their claims for an equitable compensation... offsetting the deterioration in the terms of trade which has resulted both from inflation in the industrialized countries and from changes in monetary parities".* CIPEC, however, has been unsuccessful in making a significant impact on copper prices. The organizational structure contributes partly to its ineffectiveness in implementing a market production scheme or a buffer stockpile.

More importantly, to understand the scope and limitation of CIPEC group action, one must examine the salient characteristics of the industry. The marketplace has placed severe constraints

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*Copper Market (CIPEC), 4th Quarter 1971, p. 3.

on the copper exporters. Constraining factors include: the nine major trans-national copper companies that are closely inter-related or linked by interlocking directorships; the latter 1960's and early 1970's witnessed a significant increase in suppliers and greater competition among them; the demand and supply of copper is inelastic in the short run; however, in the long run supply elasticity acts as a brake on price increases, and the future promises bountiful new sources of copper from the seabed. Finally, the relatively high price of copper, wide price fluctuations and frequent shortages have encouraged substitution of aluminum. Even though market constraints are the most serious, political problems make collusion even more difficult. For example, political relations between Zambia and Chile under the rule of Mr. Allende were strained and the countries could not reach agreement on production levels.

Given market place contraints, CIPEC members have attempted to develop policies to stabilize prices. (See, the section on Provisions for Establishing Pricing Policy p. 90.) Using the organizational framework accepted in 1967, CIPEC has been most successful in the collection and dissemination of studies. The CIPEC forum has also encouraged a greater awareness of a community of interests. For example, CIPEC members supported Chile when copper importers supported Kennecott's claims after its nationalization. To date, the CIPEC organization is the beginning of cooperation among a limited number of copper of conversation, CIPEC is considering widening its membership and

has offered assistance to non-CIPEC members. It has also established lines of communication with groups which sell other raw materials, including OPEC and the IBA.

## 3.3 FIFTH INTERNATIONAL TIN AGREEMENT*

### 3.3.1. DESCRIPTION

Form and Charter. The International Tin Agreements have been negotiated under the auspices of the United Nations Conference on Trade and Development. The negotiations were initiated in 1953 and the first agreement became operative on July 1, 1956. The International Tin Agreements cover the periods from 1956-1961, 1961-1966, 1966-1971, 1971-1976, and 1976-1981.

The fifth International Tin Agreement (ITA), a commodity agreement, sets in place a cooperative venture of tin producing and consuming countries. It represents the diverse interests of speculators, importers' and exporters' governments, transnational enterprises, tin miners, smelters, dealers, investors and creditors, industrial users and consumers.

The ITA incudes two categories of membership; the consuming countries and the tin producing countries. The categories include the following: tin consuming countries**-Austria, Belgium-Luxemburg, Bulgaria, Canada, Cuba, Czechoslovakia, Denmark, Dominican Republic, Federal Republic of Germany, France, German Democratic Republic, Hungary, India, Ireland, Italy, Japan,

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* Fifth International Tin Agreement, UNCTAD, 20 June 1975; TD/TIN.5/8.

** See Table 1.

Netherlands, Nicaragua, Poland, Republic of Korea, Rumania, Spain, Switzerland, Turkey, United Kingdom, USSR, Yugoslavia, United States;* tin producing countries**-Australia,*** Bolivia, Indonesia, Malaysia, Nigeria, Federal Republic of Thailand, and the Republic of Zaire.

The objectives of the ITA are:

- to maintain a balance between world production and consumption;
- to prevent excessive price fluctuation and export earnings;
- to promote export earnings;
- to insure an adequate supply at prices "fair" to consumers and "remunerative" to producers;
- to increase tin production in the event of a shortage and mitigate difficulties in times of surplus;
- to monitor disposal of governmental, non-commercial tin stockpiles;
- to develop the developing, producing countries' tin market;
- to review the need to explore and/or develop new tin deposits;
- to support the International Tin Council (ITC)

Organizational Structure. The sole institution administering the ITA is the International Tin Council. The seat of the Council is in London. The following material outlines the salient organizational features of the International Tin Council (ITC).

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* The U.S. was not a party to previous ITAs.
** See Table 2.
*** Australia is the only "developed" tin producing country.

TABLE 1

Percentages and votes of consuming countries

| Country | Percentage | Votes | | |
|---|---|---|---|---|
| | | Initial | Additional | Total |
| Austria | 0.31 | 5 | 3 | 8 |
| Belgium/Luxembourg | 1.95 | 5 | 17 | 22 |
| Bulgaria | 0.48 | 5 | 4 | 9 |
| Canada | 2.91 | 5 | 25 | 30 |
| Cuba | 0.05 | 5 | 1 | 6 |
| Czechoslovakia | 1.91 | 5 | 16 | 21 |
| Denmark | 0.30 | 5 | 3 | 8 |
| Dominican Republic | 0.03 | 5 | 0 | 5 |
| France | 6.09 | 5 | 52 | 57 |
| German Democratic Republic | 0.53 | 5 | 5 | 10 |
| Germany, Federal Republic of | 8.16 | 5 | 70 | 75 |
| Hungary | 0.68 | 5 | 6 | 11 |
| India | 1.88 | 5 | 16 | 21 |
| Ireland | 0.04 | 5 | 1 | 6 |
| Italy | 4.37 | 5 | 38 | 43 |
| Japan | 18.55 | 5 | 160 | 165 |
| Korea, Republic of | 0.38 | 5 | 3 | 8 |
| Netherlands | 2.50 | 5 | 21 | 26 |
| Nicaragua | 0.03 | 5 | 0 | 5 |
| Poland | 2.39 | 5 | 20 | 25 |
| Romania | 1.62 | 5 | 14 | 19 |
| Spain | 1.99 | 5 | 17 | 22 |
| Switzerland | 0.41 | 5 | 3 | 8 |
| Turkey | 0.72 | 5 | 6 | 11 |
| United Kingdom | 8.10 | 5 | 70 | 75 |
| United States of America | 29.56 | 5 | 254 | 259 |
| Union of Soviet Socialist Republics | 3.21 | 5 | 28 | 33 |
| Yugoslavia | 0.85 | 5 | 7 | 12 |
| Total | 100.00 | 140 | 860 | 1,000 |

Note: The countries, percentages and votes listed in this annex are those arrived at during the United Nations Tin Conference, 1975, at which the Fifth International Tin Agreement was drawn up. The list of countries and the figures are subject to revision from time to time in accordance with the operation of the provisions of this Agreement.

TABLE 2

Percentages and votes of producing countries

| Country | Percentage | Votes | | |
|---|---|---|---|---|
| | | Initial | Additional | Total |
| Australia ..... | 4.37 | 5 | 42 | 47 |
| Bolivia ..... | 18.06 | 5 | 174 | 179 |
| Indonesia ..... | 13.71 | 5 | 133 | 138 |
| Malaysia ..... | 43.60 | 5 | 421 | 426 |
| Nigeria, Federal Republic of .. | 4.17 | 5 | 40 | 45 |
| Thailand ..... | 12.55 | 5 | 121 | 126 |
| Zaire, Republic of ..... | 3.54 | 5 | 34 | 39 |
| Total ..... | 100.00 | 35 | 965 | 1,000 |

Note: The countries, percentages and votes listed in this annex are those arrived at during the United Nations Tin Conference, 1975, at which the Fifth International Tin Agreement was drawn up. The list of countries and the figures are subject to revision from time to time in accordance with the operation of the provisions of this agreement.

Members and voting procedures

- The ITC is composed of all participating countries, one delegate per country, with an alternate and advisors as necessary;
- Each membership category has an equal voting power of 1,000 votes;
- Each country must consent to its designation as consumer or producer;
- Each tin producing and tin consuming country holds five initial votes and an additonal number in relation to its share of world production and consumption, respecitively, as set out by the ITA*;
- No country may hold more than 450 votes;
- Decisions are made in principle by a "simple distributed majority vote" - a majority of votes cast by producers and a majority of votes cast by consumers - Delegates may not divide their votes;
- Vote allocations are revised to take into account changes in production and consumption and membership in the ITC; and
- The ITC meets on a regular basis, at least once every three months.

Powers and functions

- The ITC appoints its Executive Chairman and two Vice-Chairman, Manager of the Buffer Stock, the Secretary of the Council and Council staff;
- The ITC has the necessary power to and must perform the administration and operational duties of the ITA;
- The ITC requests information concerning the buffer stock and individual countries' tin costs, production levels, stocks, etc...
- The ITC publishes annual financial and quarterly tin stock reports;

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* See Tables 1 and 2

- The ITC appoints the necessary committees;
- The ITC arranges for consultation and cooperation with the United Nations; and
- The ITC assesses the probable future production and consumption of tin, at least quarterly.

Mechanism for Resolution of Disputes Within the Institution. The ITA addresses itself to resolution of complaints and disputes in three separate articles. First each participating country has the right to complain to the ITC if it feels its economic interests are injured by another participant's actions. If, by a simple distributed majority vote, the complaint is determined to be justified, the ITC may permit the complainant country to withdraw from the ITA.

The dispute settlement mechanism works in the following manner. Any dispute concerning interpretation or application of the Agreement which is not settled by negotiation is, at the request of any participating country, referred to the Council for decision. A majority of participating countries or any participating country holding not less than one-third of the votes in the ITC may require the Council to seek the opinion of an advisory panel. The panel would consist of:

- two persons, one having wide experience in matters under dispute and another with legal standing, nominated by producers;
- two such persons nominated by consumers; and
- a chairman selected unanimously by the four members, or if they fail to agree, by the Executive Chairman.

The advisory panel submits their opinion to the ITC which decides the dispute.

Finally, the ITA provides that no participating country can commit a breach of the ITA unless a resolution to that effect is passed. The resolution must specify the nature and extent of the breach.

Provisions Between Institution and Host Nation. The status, priviledges and immunities of the Council, which sits in London, in the territory of the United Kingdom are governed by the Headquarters Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the International Tin Council, signed at London on February 9, 1972.

Provisions for Raising Capital and Compensation of Participants. The administration and operation of the ITA are carried out under two accounts, Administrative and Buffer stock.

Administrative Account (AA) - The administrative expenses of the Council are met by the AA's funds. Each participating country is assessed, in pounds sterling, a contribution to the AA. Countries with 21 or more votes pay one percent of the total budget and countries with 20 or less votes pay three-tenths of one percent of the total budget. The portion of the budget not covered by such payments is financed by further assessments with respect to a participant's number of votes.

Buffer Stock Account* - Contributions in cash, tin metal, or both are made by both producing and consuming countries. The producing countries must contribute the equivalent of 20,000 tonnes of tin metal. The tin is held in warehouses approved by the London Metal Exchange or the ITC. Consuming countries may make contributions to the buffer stock up to an amount of 20,000 tonnes of tin metal. The ITC must approve conditions upon which such contributions are made. Furthermore, any countries invited to the 1975 United Nations Tin Conference may make contributions.

Borrowing - The ITC is empowered to borrow for the purposes of the buffer stock. A majority of the consumers and the unanimous consent of producers is required to approve such action. The tin warrants of the buffer stock provide the loan's security.

Compensation - The contributions to the ITC accounts represent the costs of joining the ITA and, as such, the countries are not compensated. Upon liquidation of the buffer stock, the share of each contributing country would be refunded according to the ITA's formula, minus the costs of liquidation.

A provision of the ITA guarantees that participating countries are not required to furnish information which it considers essentail to its security interests. The ITA further guarantees that the agreement does not prevent each participant from entering into or carrying out any intergovernmental agreement for the purpose of national security.

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* For the function of the Buffer Stock Account see the following section Provisions for Establishing Pricing Policy and Governing Market Sharing and Restrictions, p. 82.

Provisions for Establishing Pricing Policy and Governing Market Sharing And Restrictions. The ITC has three main instruments to achieve its objectives; the second and third are for ultimate recourse should the buffer stock fail. The three tools are:

- o the buffer stock;
- o export controls; and
- o setting and changing "optimal" price ranges.

A summary of the ITA's provisions regarding the above instruments follows.*

Buffer Stock - The use of buffer stock is decided in the following manner. Usually following hard bargaining between the consuming and producing countries, agreement is reached on the floor price at which the buffer stock manager must buy, on a ceiling price at which he must sell, on a middle sector in which he does not usually operate, on a lower sector in which he may buy or sell (provided he is a net buyer), and on an upper sector in which he may sell or buy (provided he is a net seller). If he is a net buyer or a net seller in the upper and lower regions, the manager is not limited to any finite period, thus affording much greater flexibility in his operating terms than were provided under the first three agreements, and providing him with the advantage of hiding his movements more thoroughly from the market.

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* pp. 122-218, Zuhayr Mikdashi, The International Politics of Natural Resources, Cornell University Press, Ithaca, New York, 1976.

The council can change the floor and ceiling prices in the light of changing market conditions and consistent with the objectives of the agreement. By special dispensation it can also allow the buffer stock manager to operate - on a cash or forward basis - in the middle sector as well. This undoubtedly gives greater freedom to the manager in stemming fluctuations in prices at an early stage, curbing speculative activity, and phasing out tin sales accumulated in the buffer stock if the tin agreement were not to be renewed at its expiration date.

There are two main so-called free markets for tin, one in Penang, Malaysia and the other in London (the London Metal Exchange, LME). The Penang market is used by the ITC buffer stock manager and its prices serve to determine the taxable income of Malaysian tin mines. Indonesia depends mostly on negotiated prices for its tin exports. Bolivia, Nigeria, and Zaire rely on LME prices for large portions of their exports. Across the ocean, the LME is the leading open exchange for copper, lead, silver, tin, and zinc. Less than ten percent of its transactions represent physical movements of metal; the balance consists of arbitage and hedging operations. The LME price level for traded metal reflects on average, more than any other price, the competitive forces of supply and demand.

Export Control - If the buffer stock proves ineffective in countering price weaknesses, the ITC can then resort to export control. Export control cannot, however, be instituted unless

the buffer stock holdings have already exceeded the 5,000-ton mark. During control periods the maximum level of national stocks each producing country may hold in accordance with the ITA's provisions roughly equivalent to three months export supply.

The formula devised by the ITC for the allocation of export quotas - and consequently production quotas since permissible stocks cannot exceed 25 percent of productive capacity - does not command the unreserved approval of all parties concerned. In the case of the ITC formula, the total permissible amount allocated to each member country for a control period is based on the percentage of votes held by that country for that period. That percentage is itself based on average production over the most recent period, usually the year preceding an export control period. An innovation was added to the Fifth Agreement with respect to export controls in periods of shortages. Whereas under previous agreements, member consumer countries did not have purchasing preference over non-member consumer countries, the Fifth Agreement provided that preference as regards the supply of tin available would be given to consuming countries which participate in the Agreement.

Price Ranges - The third method is the use of price ranges. The ITC must appraise economic and other trends in order to set the supporting price ranges, changing them in response to fundamental shifts in supply and demand conditions and not in response to seasonal or cyclical fluctuations. Realistic price ranges can avoid draining the tin resources of the buffer stock by selling

tin at the ceiling price when this is too low, or exhausting the cash resources of the buffer stock by buying tin at a floor price fixed too high.

Provisions for Dealing with Competition. Not available

Provisions for Dealing with Member Infractions of Rules. The ITA lays out specific penalties to be imposed by the ITC for failure to meet ITA obligations. For example, failure to pay the contribution to the Administrative Account within six months of assessment results in a loss of the right to vote; failure to contribute within 12 months results in a loss of all other rights.

Secondly, failure to contribute to the buffer stock account also carries penalties. The ITC may deprive a participant of any or all of its rights and privileges. As well, it may also require the remaining producing countries to make good the deficit.

Finally, the ITA imposes penalties on producing countries that violate the export control provisions. Penalties range in severity according to the degree to which permissible export tonnages are exceeded.

In conclusion, the ITC may deprive a country that has committed a breach of the ITA of its voting and other rights until it has remedied the breach or otherwise fulfilled its obligations.

Provisions for Planning New Facilities. Not applicable

Mechanism for Auditing, Regulating, and Otherwise Assuring Accountability. The ITA stipulates that:

- o the ITC appoints auditors to audit it accounts; and
- o the ITC must publish the independently audited Administrative and Buffer Stock Accounts within a specified time period.

Provisions for Staffing. The administrative duties of the ITC are carried out by the Executive Chairman, First and Second Vice-Chairman (one each from producing and consuming countries on a rotating basis), Manager of the Buffer Stock, Secretary and Staff. Staff members and officers may not have interests in any tin or related activities, nor may they reveal any information regarding the ITA's operation or administration. They receive instructions from the ITC and must ensure the international character of their responsibilities. The staff and officers are remunerated out of the ITC's Administrative Account.

Initial Facilities and Siting. Not applicable

Initial and Planned Expansion of Participants. Any country invited to the 1975 United Nations Tin Conference or any party to the Fourth ITA has the right to accede to the agreement.

Provisions for Adjusting to New Conditions. The ITA outlines the procedures for for withdrawal of participants, the adjustment of floor and ceiling prices, a change of category (producer or consumer) by a participating country, any changes in percentages and votes, and the suspension of buffer stock arrangements and/or the institution of export controls. The ITA also provides for ammendments to the agreement.

### 3.3.2 HISTORY AND EVOLUTION OF THE INTERNATIONAL TIN AGREEMENTS

This section addresses the evolution of the ITAs, their positive achievements and some remaining problematical issues and limitations. First, with regard to the evolution of the ITAs, the most important change has been the accession of the United States to the fifth ITA. Previously, the ITC could not operate successfully without explicit, or at least, tacit US cooperation due to the large US tin surplus. Second, two consuming countries, the Netherlands and France, have made voluntary contributions to the buffer stockpile. This move was significant, insofar as it was the first by such move by consumers. The Fifth ITA now provides that voluntary contributions from consumers can reach the equivalent of 20,000 tonnes of tin metal. As discussed in the sections on Provisions Governing Pricing Policy and Market Restrictions, pp. 82 - 85, the fifth ITA now provides for preferences of member consumers over non-member consumers in time of tin shortage, representing a significant incentive.

Finally, the International Monetary Fund agreed in 1969 to extend assistance to member countries with balance of payments needs in connection with financing buffer stockpiles. IMF's provisions have eased pressures on many of the producer developing nations.

The ITA represents a reasonably successful importer and exporter cooperative venture. Statistical evidence shows that the ITAs have had a noted effect on moderating price fluctuations as

compared with other nonferrous metals, such as, copper, lead, and zinc, which are not governed by international commodity, agreements.*

The ITC formula for allocating export quotas is considered to have the merit of being simple and workable (since it is confined to a single objectively definable factor, of recent past production).

A number of problematical issues remain. Among them is the dissatisfaction of the developing producing countries that bear the burden of financing the buffer stockpile. They argue that the mechanism is assigned to benefit both producers and consumers and should therefore be financed by both groups. Another problem arises as the stockpile manager can be faced with limitations on his capacity to intervene, at times completely powerless. Such a situation can come about if, for example, the manager is short of funds to buy tin in periods of depressed prices or short of tin to sell in periods of high prices. Finally, the ITC formula for the allocation of export quotas overlooks, among several other important economic factors, existant and potential reserves and the relative costs of working tin deposits in each member country. Thus, in comparison with a low-reserve and high-cost producing country whose exports are falling off; a country with a relatively low, recent production level; a potentially large, low cost reserves; and a currently rapid growth rate would suffer under this production control system. (Brazil represents the first type and Bolivia belongs to the second category.)

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* Mikdashi, p. 135.

These limitations do however have organizational and structural solutions. For example, a much larger buffer stock could considerably reduce the need for tin export control, and avoid the costs connected with the shut-down and rehabilitation of mines.

On balance, the ITA is evolving in a positive direction as measured against the increasing membership and moderation in tin price fluctuations. This is due to the collective production control and to the cooperation, explicit or tacit, of major importer countries. No similar cooperation has yet been possible between CIPEC and importer countries.

# BIBLIOGRAPHY


1. A Cartel Policy for the United Nations. Corwin Edwards, ed. Columbia University Press. New York. 1945.

2. Adams, Brooks. The Law of Civilization and Decay. Revised Edition. A.A. Knopf. New York. 1943.

3. Adede, A.O. "Law of the Sea - Developing Countries' Contribution to the Development of the Institutional Arrangements for the International Seabed Authority." Brooklyn Journal of International Law. vol. IV, no. 1. Fall 1977.

4. Asyee, J. "Urenco Enrichment Services - A New Departure." Presented to the Atomic Industrial Forum International Conference on Uranium Enrichment. New Orleans. Jan 29-Feb 1, 1978.

5. Baker, Steven J. "Monopoly or Cartel?" Foreign Policy. no. 23, pp. 202-220. Summer 1976.

6. Bergsten, C. Fred. "The Threat is Real." Foreign Policy. no. 14, pp. 84-90. Spring 1974.

7. Bergsten, C. Fred. "The Response to the Third World." Foreign Policy. no. 17, pp. 3-35. Winter 1974-1975.

8. Blair, John M. The Control of Oil. Random House, Inc. New York. 1978.

9. Boeing Engineering & Construction. "Concept for Developing A Pacific Based Spent Fuel Consortium." Global Spent Fuel Logistics Systems Study (GSFLS). vol. 4.

10. "Cartels Are No Solution." Foreign Policy. no. 30, pp. 157-164. Summer 1978.

11. Chayes, A. "U.S. Policy-Making for Satellite Communications." The Committee on the Organization of the Government for the Conduct of Foreign Policy: Appendix B. U.S. Government Printing Office. Washington, D.C. June 1975.

12. Copper Market. CIPEC. Fourth Quarter. 1971.

13. Doran, Charles. Myth, Oil and Politics. Free Press. New York. 1977.

14. "Even OPEC Has Its Headaches." Economists. pp. 87-88. July 4, 1978.

15. Ferraro, Vincent. "Resource Cartels and International Politics: Case Studies of Petroleum and Copper." Presented at the International Studies Association 1976 Annual Meeting. Toronto. February 25-29, 1976.

16. Friedham, Robert L., and Durch, William J. "The International Seabed Resources Agency Negotiations and the New Economic Order." International Organization. 31: 343-384. Madison, Wisconsin. Spring 1977.

17. Grant, James. "Shark and Prey: The Latest United Nations' Extravaganza Will End Badly." Barron's. p.7. September 4, 1978.

18. Gray, John E., et al. International Cooperation on Breeder Reactors. The Rockefeller Foundation. New York. March 1978.

19. Hardy, Michael. "The Implications of Alternative Solutions for Regulating the Exploitation of Seabed Minerals." International Organization. 31: 313-342. Madison, Wisconsin. Spring 1977.

20. Hexner, Ervin. International Cartels. University of North Carolina Press. Chapel Hill. 1946.

21. International Law of the Sea and the Future of Deep Seabed Mining. Christopher C. Joyner, ed. The John Bassett Moore Society of International Law. Charlottsville, Virginia. 1975.

22. Kaufman, Burton I. The Oil Cartel Case. H.R. 9566. K 38. Greenwood Press. Westport. 1978.

23. Krasner, Stephen D. "Oil is the Exception." Foreign Policy. no. 14, pp. 68-83. Spring 1974.

24. Kravis, Irving B. Domestic Interests and International Obligations. University of Pennsylvania Press. Philadelphia. 1963.

25. Leslie, Karen E. "Nuclear Weapons Non-Proliferation and U.S. Foreign Policy." May 1977.

26. Metals Week. June 16, 1975.

27. Mikdashi, Zuhayr. The Community of Oil Exporting Countries A Study in Governmental Cooperation. Cornell University Press. Ithaca. 1972.

28. Mikdashi, Zuhayr. "Collusion Could Work." Foreign Policy. no. 14, pp. 57-67. Spring 1974.

29. Mikdashi, Zuhayr. "Cooperation Among Oil Exporting Countries With Special Reference to Arab Countries: A Political Economy Analysis." International Organization. 28: 1-29. Madison, Wisconsin. Winter 1974.

30. Mikdashi, Zuhayr. The International Politics of Natural Resources. Cornell University Press. Ithaca. 1976.

31. Mikesell, Raymond F. Nonfuel Minerals -- U.S. Investment Policies Abroad. Sage Publications. Beverly Hills. 1975.

32. Mikesell, Raymond F. Nonfuel Minerals: U.S. Investment Policies Abroad. Declaratory Statement. CSIS D.C. Sage Publications. Beverly Hills. 1975.

33. Miller, John P. Competition, Cartels and Their Regulation. North-Holland Publishing Co. Amsterdam. 1962.

34. Moran, Theodore H. Oil Prices and the Future of OPEC. Resources for the Future. Washington, D.C. 1978.

35. Mugno, John F. and Rustow, Dankward A. OPEC: Success and Prospects. CFR 300K. New York University Press. New York. 1976.

36. Nuclear Fuels Policy Working Group, Atlantic Council. Nuclear Fuels Policy. vol. I & II. The Atlantic Council of the United States. Washington, D.C. 1978.

37. Rustow, Dankwart A. Success and Prospects. New York University Press. New York. 1976.

38. Sampson, Anthony. The Seven Sisters, The Great Oil Companies and The World They Made. Hodder & Stroughton. Toronto. 1975.

39. SAS Yearbook 1976-1977. SAS Public Relations Department. Stockholm-Bromma, Norway. 1976.

40. Sixth Session of the International Law of the Seas Convention. May 23-July 15, 1977. AI Conference 62/Working Paper no. 10.

41. The Making of SAS, A Triumvirate in World Aviation. A/S Nationaltrykkeriet & Forlagsbokbinderiet. Oslo, Norway. 1973.

42. United Nations Conference on Trade and Development. Preparation of an International Agreement Embodying International Measures Considered Desirable. Draft Fifth International TIN Agreement. TD/TIN. 5/8. June 20, 1975.

43. United States Department of Energy. Barnwell Fuels Plant Applicability Study. vol. II. Washington, D.C. April 1978.

44. "World Oil Cartel." Quarterly Review of Economics and Business. vol. 16, pp. 7-18. Summer 1976.

ADDENDUM A

MAJOR TRADE AGREEMENTS 1900-1945

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|---|---|
| 1901 | France, Britain, Switzerland, and Canada formed an aluminum cartel; it collapsed but was reestablished in 1912. |
| 1910 | International Carbide Cartel. |
| 1912 | New Aluminum Cartel. |
| April 10, 1918 | "Act to Promote Export Trade and for other Purposes." Also known as the Export Trade Act of the Webb-Pomerene Act. Made it possible for American Exporters to operate collectively in international markets. |
| 1918 | Cooper Export Association: A U.S. cartel established to liquidate the stocks of copper accumulated as a result of the war; and to regulate new production of exports. This cartel was organized under the Webb-Pomerene Law. |
| 1919 | "Bandoeng Pool": Organized by tin producers to liquidate excess stocks, and help restore tin prices to normal prewar levels. |
| 1919 | US Alkali Export Association, Inc., formed under the Webb-Pomerene Law to promote exports in alkalies. |
| Nov. 1, 1922 | Stevenson Plan: to limit rubber exports by means of an export duty on all shipments in excess of established quotas. |
| Feb. 29, 1924 | International cartel of Calcium Carbide Exporters: to establish export quotas; collapsed in 1937. |
| 1925 | Belgian Congo and Czeckoslovakia entered into an agreement to determine export price of Platinum. |
| March 12, 1926 | International Cartel of European Producers of Heavy Rails. |
| Sept. 30, 1926 | Steel producers from Germany, the Saar, Luxembourg, France and Belgium established the International Steel Cartel. |
| Nov. 5, 1926 | New aluminum cartel formed which reduced the number of middlemen involved thereby reducing distribution costs. |
| 1926 | Internatinal Potash Cartel. |
| 1927 | International Bismuth Convention established to regulate the export prices of bismuth metals. |
| 1927 | American Magnesium Company (AMC) and Dow Chemical Company entered into a cross-licensing agreement: AMC discontinued production of crude magnesium in return for magnesium from Dow at preferential prices. |
| May, 1928 | International Zinc Cartel. Collapsed in 1929, was revised in 1931, and subsequently broke up in 1934. |

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| Sept. 1928 | International Mercury Cartel, "Mercurio Europe" established. Dormant during the Spanish Civil War and re-established in May, 1939. |
| 1929 | International Ferro-Silicon Syndicate: to protect home markets of members and to regulate exports. Members were France, Germany, Sweden, Norway, Switzerland, Yugoslavia, and Czeckoslovakia. |
| March 13, 1930 | Central European Group established commodity controls in Europe. |
| 1930 | International Cocaine Convention established import quotas of crude cocaine and levied production and export quotas on the finished product. |
| 1930 | An international cartel for artificial sweetening agents was established to fix uniform prices and export quotas. Members were Germany, France, Switzerland, and Czeckoslovakia. |
| 1930 | International Tea Agreement signed by India, Ceylon, and the Netherlands East Indies: designed to curtail tea output. The agreement was not renewed after its one year trial period. |
| 1930 | Diamond Corporation of London. |
| May 1931 | Chadbourne Agreement: national sugar cartels in Cuba, Java, Peru, Belgium, Hungary, Poland, Czeckoslovakia, and Germany agreed to gradually dispose of surplus stocks over a period of five years, restrict current production levels and establish an export quota. The agreement provided for a common cartel to be formed at the Hague and called the International Sugar Association. |
| July 3, 1931 | Aluminum cartel agreement signed in Paris. This agreement prohibited investment in outside plants unless a dominant influence in outsiders' facilities was acquired. |
| Oct. 21, 1931 | Platinum Cartel: restricted production and influenced price of refined Platinum. |
| 1931 | The first International Tin Stock: prevented a drop in the price of tin. This was accomplished through cooperaton by acquiring a large part of the excess stock. |
| Sept. 1932 | International Timber Committee. |
| April 1, 1933 | Second International Tea Agreement. |
| June 1, 1933 | France, Belgium, Luxembourg, and Germany signed an agreement to regulate the export of all steel commodities by establishing quotas based upon amoung of crude steel in the export item. |
| Aug. 25, 1933 | International Wheat Agreement: provided for acerage reduction and export quotas; endeavored to increase the world-wide consumption of wheat. Agreement broke down within one year. |
| Aug., 1934 | International Sulphur Agreement. |
| 1934 | Diamond Producers Association. |
| Jan., 1935 | European Citric Acid Cartel |

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| March 29, 1935 | World Copper Agreement was formed by European and US copper producers. |
| June, 1935 | European Coal and Steel Community formed. |
| Sept., 1935 | Chadbourne Agreement dissolved. |
| Nov. 15, 1935 | Sweden, USSR, Finland, Latvia, Poland, Austria Czeckoslovakia, Yugoslavia and Rumania entered into a cartel agreement on exports of sawed and planned soft timber. The cartel, the European Timber Exporters Convention, did not, however, provide a mechanism for price fixing. |
| 1936 | Tri-Party Agreement between US, UK, and Canadian Chemical Industry. |
| April 1, 1937 | International Coke Cartel: to determine export quotas and fix prices. |
| May 6, 1937 | New International Sugar cartel agreement: provided for the regulation of production and marketing so as to be an equitable venture for both producer and consumer. |
| Aug. 1, 1937 | International Rail Agreement. |
| 1937 | Calcium Carbide Cartel disbanded as a result of dumping by an outsider, Japan. |
| Feb., 1938 | International Zinc Sheet Cartel: to regulate prices and establish export quotas. |
| June 21, 1938 | Council of the Tin Producers Association approved a buffer-stock program to help stabilize tin prices. |
| Sept. 6, 1938 | Lead Producers' Association to exchange statistical information and collaborate in the production of supplies.<br><br>This represented an attempt to prevent sharp price decreases, and to remove production restrictions when price rose above a certain level. |
| 1938 | International Rubber Agreement. |
| March 16, 1939 | Dusseldorf Agreement between the Reichgruppe Institute and the Federation of British Industries: to establish good Anglo-American trade relations. |
| May, 1939 | "Mercurio Europeo" was re-established. |
| 1939 | International Commission of the Commerce of the Diamond Industry, a trade association of Belgian, German, Dutch and French diamond cutters to put certain shops on a part-time basis and to reduce wages. |
| April 16, 1941 | Inter-American Coffee agreement. |
| 1941 | The Washington Wheat Meeting of the UK and other main wheat exporting countries: to establish a pool of wheat for inter-governmental relief in war-stricken areas, restrict production to prevent excessive stocks and form an administrative body to carry out provisions of the agreement. |
| Aug. 8, 1944 | Anglo-American Oil Accord set up to lay out a pattern for agreements covering important commodities in international trade. |

ADDENDUM B

CHRONOLOGY OF OPEC'S HISTORY, 1948-1975*

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| June 28, 1948 | Kuwait and the American Independent Oil Company (Aminoil) sign a concession agreement for Kuwait's half-interest in the Kuwaiti-Saudi Neutral Zone, which gives Kuwait and 15% interest in the concessionnaire company. |
| Nov. 12, 1948 | Venezuela adopts tax legislation to insure that the government will receive at least 50% of net income from oil production. This becomes the first instance of a "fifty-fifty" arrangement between a host government and oil companies. |
| Feb. 20, 1949 | Saudi Arabia and American Pacific Western Oil Company (J. Paul Getty) sign a concession agreement for the Saudi half-interest in the Neutral Zone, which gives Saudi-Arabia a 25% interest in the company. |
| Sept,, 1949 | Venezuela initiates discussions of a possible oil producer's organization with Saudi Arabia, Iran, Iraq, Egypt, Kuwait, and Syria. |
| Jan. 2, 1951 | Saudi Arabia and Aramco announce the first "fifty-fifty" profit sharing agreement in the Middle East (signed in early December 1950). Kuwait follows in 1951. Iraq in 1952. |
| May 1, 1951 | Iranian government under Mosadegh adopts the law nationalizing Anglo-Iranian Oil Company (BP) Mosadegh's government is overthrown in August 1953. |
| June 29, 1953 | Iraq and Saudi Arabia sign agreement providing for exchange of information on petroleum and consultation onprices. |
| Aug., 1954 | Iran and the Consortium sign agreement, tc take effect October 28, that settles the nationalization dispute and embodies the "fifty-fifty" principle. |
| Dec. 16, 1957 | Saudi Arabia and Arabian Oil Company (Japanese Petroleum Trading Co.) announce agreement for Saudi offshore interest in the Neutral Zone which gives the government a 56% share of profits. The company signs a similar agreement for Kuwait's offshore interest, providing for a 57% government share. |
| Feb. 13, 1959 | The major multinational petroleum companies reduce posted prices for Middle East petroleum. |
| April 1, 1959 | United States government introduces oil import quotas. |
| April 16-22, 1959 | First Arab Petroleum Conference insists that companies cannot unilaterally reduce prices. |
| May 13, 1960 | Venezuela and Saudi Arabia call on other producing countries to formulate a "common petroleum policy." |

*Success and Prospects, Dankwart A. Ruston, Council on Foreign Relations New York University Press, New York, New York, 1976

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| Aug. 9, 1960 | The major companies reduce prices further without consulting the governments. |
| Sept. 14, 1960 | The Organization of Petroleum Exporting Countries (OPEC) is formed in Baghdad by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela. |
| June 7, 1962 | Fourth OPEC Conference adopts resolution (IV 33), providing that a 50% income tax should be payable in addition to royalty. |
| June 3-9, 1967 | Third Arab-Israeli War; all oil ministers of Arab producing states meet at Baghdad and decree an oil boycott (against Great Britain and France), which proves ineffectual. Suez Canal remains closed until 1975. |
| June 24-25, 1968 | OPEC's 16th Conference at Vienna adopts "Declaratory Statement of Petroleum Policy in Member Countries." |
| May 3, 1970 | TAP line from Saudi Arabia to the Mediterranean interrupted in Syria; from June to December tanker rates rise to all-time highs. |
| Sept 4, Oct 4, 1970 | Libya raises its posted prices and increases tax rate from 50% to 55% retroactive to September 1. Iran and Kuwait follow suit in November. |
| Dec. 9-12, 1970 | OPEC's 21st Conference at Caracas establishes 55% as the minimum tax rate and adopts the principle that differences in posted prices should be based only on quality and transportation differential (Resolution XX1,120), demands that posted prices be changed so as to reflect changes in foreign exchange rates (XX1.122), and instructs its Secretary General to monitor oil compnay liftings and report on any "discriminatory production policy" (XX1.125). |
| Jan. 12, 1971 | Negotiations begin at Tehran between six Gulf producing states and 22 oil companies. |
| Feb. 3-4, 1971 | OPEC's 22nd Conference at Tehran decrees a "total embargo" by member states (except Indonesia) against any company that does not accept the 55% tax rate (Resolution XX11.125)). |
| Feb. 14, 1971 | Tehran agreement signed between six Gulf states and 23 oil companies. |
| Feb. 24, 1971 | Algeria nationalizes 51% of French oil concessions. |
| April 2, 1971 | Tripoli Agreement concluded between oil companies and Mediterranean producers (Libya and Algeria, as well as Saudi Arabia and Iraq for their Mediterranean pipeline throughput). Similar terms are embodied in an agreement between Nigeria and companies operating there, on May 3. |
| July 12-13, 1971 | OPEC's 24th Conference demands "immediate steps towards the effective implementation of the principle of Participation" (Resolution XXIV.135). |
| July 31, 1971 | Venezuela Hydrocarbons Reversion Law requires companies "to cede...their unexploited concession areas" by 1974 and "all their residual assets" by 1983. |
| Sept. 22, 1971 | OPEC's 25th Conference appoints Ministerial Committee on participation and directs members (Resolution XXV.140) to negotiate price increases to offset the de facto devaluation of the U.S. dollar. |

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| Dec. 5, 1971 | Libya nationalizes BP concession in response to British government "collusion" in Iran's occupation of several disputed islands in the Persian ("Arab") Gulf. |
| Jan. 20, 1972 | Geneva agreement between Middle Eastern oil-producing countries and companies increasing posted prices by 8.49% to offset the decline in the value of the U.S. dollar. |
| March 11-12, 1972 | OPEC's 27th Conference in Resolution XXVII.145 takes note of oil company efforts to undermine its solidarity and threatens unspecified action against companies that "fail to comply with...any action taken by a Member Country in accordance with (OPEC) decisions." The implicit reference is to the dispute between Iraq and the multinational concessionnaires. |
| June 1. 1972 | Iraq nationalizes the Iraq Petroleum Company's concession (Kirkuk area) after an eleven-year dispute. |
| June 9, 1972 | OPEC's 28th Conference adopts Resolution XXVIII.146 to prevent companies whose interests were nationalized in Iraq from increasing production elsewhere. |
| Sept. 30, 1972 | Libya acquires a 50% interest in two ENI concessions. |
| Nov. 6, 1972 | Saudi Minister Yamani concludes the General Agreement on Participation between Arab Gulf states (Abu Dhabi, Iraq, Kuwait, Qatar, Saudi Arabia) and the companies, providing for 25% government participation on January 1, 1973, rising to 51% by January 1, 1982. |
| Feb. 28, 1973 | Iraq and IPC reach agreement on compensation for nationalization. |
| March 16, 1973 | The Shah of Iran announces that the Consortium members have agreed to turn over their assets immediately in return for a long-term supply agreement (which is signed on May 24). |
| March 16-17, 1973 | OPEC's 32nd Conference discusses raising prices to offset further decline in value of the U.S. dollar. A ministerial Committee is appointed on March 22. |
| April 1, 1973 | OPEC members increase posted prices by 5.7%, following the terms of the Geneva Agreement of January 1972. |
| April 9, 1973 | Newsweek publishes interview of one of its editors with President Sadat of Egypt, indicating use of "oil weapon" in any future Arab-Israeli War. |
| April 18, 1973 | United States government ends oil import quotas. |
| June 1, 1973 | Six Gulf states, Libya, and Nigeria increase posted prices by 11.9%. |
| June 11, 1973 | Libya nationalizes Bunker Hunt concession; Nigeria acquires 35% participation in Shell-BP concession. In August, Libya nationalizes 51% of the Occidental Petroleum concession and of the Oasis consortium; in September, of nine other companies. |

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| Sept. 15-16, 1973 | OPEC's 35th Conference supports Abu Dhabi's efforts to increase posted prices and Libya's nationalization, and appoints a Ministerial Committee from the Gulf States to "negotiate collectively" an increase in posted prices (Resolutions XXXV.159-160). |
| Oct. 6, 1973 | Fourth Arab-Israeli War begins. |
| Oct. 7, 1973 | Iraq nationalizes Exxon and Mobil shares in Basrah Petroleum Co. |
| Oct. 8-10, 1973 | OPEC Ministerial Committee meets with oil company representatives to discuss price increases; no agreement reached. |
| Oct. 16-17, 1973 | Arab oil ministers meeting at Kuwait announce 70% increase in posted prices, and production cuts. |
| Oct. 19-20, 1973 | Libya (10/19) and other Arab oil producers (10/20) announce halting of oil shipments to the United States; during the following week the embargo is extended to the Netherlands. |
| Nov. 5, 1973 | Arab petroleum producers announce production cuts for end of November of 25% below September levels; further cuts of 5% per month are threatened, and a 5% cut for January is announced December 9. |
| Dec. 22, 1973 | Six Persian Gulf producing states (Abu Dhabi, Iran, Iraq, Kuwait, Qatar, Saudi Arabia) raise their posted prices, that for the marker crude going from $5.12 to $11.65 as of January 1, 1974. |
| Dec. 25, 1973 | The Arab oil-producing states announce that exports for January rather than being cut 5% will be increase 10%; the United States and Netherlands remain on embargo list. |
| Jan. 7-9, 1974 | OPEC's 37th Conference decides that posted prices will remain frozen until April 1. |
| Jan. 29, 1974 | Kuwait announces 60% government participation in the BP-Gulf concession; Qatar follows February 20. |
| Feb. 11, 1974 | Washington Energy Conference opens. |
| Feb. 11, 1974 | Libya nationalizes 3 U.S. oil companies that had not agreed to 51% nationalization in September. |
| March 18, 1974 | Arab oil-producing states (except Libya) announce the end of the embargo against the U.S. |
| April, 1974 | U.S. government sets up task force on "Project Independence." |
| May 1, 1974 | U.N. General Assembly at its Sixth Special Session adopts a "Declaration and Programme of Action on the Establishment of a New International Economic Order." |
| May 18, 1974 | Nigeria announces 55% government participation in all concessions. |
| June 4, 1974 | Saudi Arabia announces that it will increase its participation in Aramco to 60%. Abu Dhabi and Kuwait follow in September. The increases are retroactive to January 1. |

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| June 13, 1974 | IMF establishes its "oil facility." |
| July 10-11, 1974 | Organization of Arab Petrolum Exporting Countries (OAPEC) lifts embargo against the Netherlands. |
| July 18, 1974 | Iran announces that it will acquire a 25% interest in Krupp. In November Kuwait buys one-seventh of Daimler Benz. |
| Sept. 13, 1978 | OPEC's 41st Conference instructs its Secretary General "to carry out a study of supply and demand in relation to possible production controls." |
| Nov. 15, 1978 | International Energy Agency formed at Paris within OECD framework. |
| Nov. 15, 1978 | Saudi Arabia, Qatar, and the United Arab Emirates announce a slight reduction in posted price and increases in royalty and income tax rates. Earlier (September 6) Saudi Arabia had increased its buy-back price from 93% to 94.9% of posted price. |
| Dec. 22, 1974 | Iraq announces plans to develop its production capacity to 3.5 mb/d by late 1975 and to 6 mb/d by 1981. |
| Jan. 13, 1975 | Business Week publishes Kissinger interview hinting at military action against oil countries in case of "actual strangulation." |
| March 4-6, 1975 | OPEC meeting of heads of state or government at Algiers. |
| April 7-15 | Preliminary meeting at Paris between oil-exporting, oil-importing, and non-oil Third World countries (Algeria, Saudi Arabia, Iran, Venezuela; European countries, U.S., Japan; India, Brazil, Zaire). |
| April 9, 1975 | 24 OECD members decide on Safety Net. |
| June 13, 1975 | World Bank establishes its "Third Window." |
| Sept. 24, 1975 | OPEC's 45th Conference announces a 15% increase in government per barrel revenues as of October 1. |
| Oct. 28, 1975 | Venezuela and foreign oil companies agree on nationalization as of January 1, 1976. |
| Dec. 1, 1975 | After protracted negotiations, Kuwait agrees with Gulf and BP on terms of nationalization. |
| Dec. 9, 1975 | Iraq completes nationalization by taking over the BP, CFP, and Shell shares of the Basrah Petroleum Company. |
| Dec. 16, 1975 | Conference on International Economic Cooperation opens at Paris. |

For OPEC's Declaratory Statement of Petroleum Policy in Member Countries, refer to Addendum C.

ADDENDUM C

DECLARATORY STATEMENT OF PETROLEUM POLICY IN MEMBER COUNTRIES *

(Resolution XVI.90, adopted at OPEC's 16th Conference, June 24-25, 1968)

The Conference, recalling Paragraph 4 of its Resolution 1.2; recognizing that hydrocarbon resources in Member Countries are one of the principle sources of their revenues and foreign exchange earnings and therefore constitute the main basis for their economic development;

bearing in mind that hydrocarbon resources are limited and exhaustible, and that their proper exploitation determines the conditions of the economic development of Member Countries, both at present and in the future;

bearing in mind also that the inalienable right of all countries to exercise permanent sovereignty over their natural resources in the interest of their national development is a universally recognized principle of public law and has been repeatedly reaffirmed by the General Assembly of the United Nations, most notably in its Resolution 2158 of November 25, 1966;

considering also that in order to ensure the exercise of permanent sovereignty over hydrocarbon resources, it is essential that their exploitation should be aimed at securing the greatest possible benefit for Member Countries;

considering further that this aim can better be achieved if Member Countries are in a position to undertake themselves directly the exploitation of their hydrocarbon resources, so that they may exercise their freedom of choice in the utilization of hydrocarbon resources under the most favorable conditions;

taking into account the fact that foreign capital, whether public or private, forthcoming at the request of the Member Countries, can play an important role, inasmuch as it supplements the efforts undertaken by them in the exploitation of their hydrocarbon resources, provided that there is government supervision of the activity of foreign capital to ensure that it is used in the interest of national development and that returns earned by it do not exceed reasonable levels;

bearing in mind that the principal aim of the Organization, as set out in Article 2 of its Statute, "is the coordination and unification of the petroleum policies of Member Countries and the determination of the best means for safeguarding their interests, individually and collectively";

recommends that the following principles shall serve as basis for petroleum policy in Member Countries.

(1) Mode of Development

1. Member Governments shall endeavour, as far as feasible, to explore for and develop their hydrocarbon resources directly. The capital, specialists and the promotion of marking outlets required for such direct development may be complemented when necessary from alternate sources on a commercial basis.

* OPEC: Success and Prospects.

2. However, when a Member Government is not capable of developing its hydrocarbon resources directly, it may enter into contracts of various types, to be defined in its legislation but subject to the present principles, with outside operators for a reasonable remuneration, taking into account the degree of risk involved. Under such an arrangement, the Government shall seek to retain the greatest measure possible of participation in and control over all aspects of operations.

3. In any event, the terms and conditions of such contracts shall be open to revision at predetermined intervals, as justified by changing circumstances. Such changing circumstances should call for the revision of existing concession agreements.

(2) Participation

Where provision for Governmental participation in the ownership of the concession-holding company under any of the present petroleum contracts has not been made, the Government may acquire a reasonable participation, on the grounds of the principle of changing circumstances.

If such provision has actually been made but avoided by the operators concerned, the rate provided for shall serve as a minimum basis for the participation to be acquired.

(3) Relinquishment

A schedule of progressive and more accelerated relinquishment of acreage of present contract areas shall be introduced. In any event, the Government shall participate in choosing the acreage to be relinquished, including those cases where relinquishment is already provided for but left to the discretion of the operator.

(4) Posted Prices or Tax Reference Prices

All contracts shall require that the assessment of the operator's income, and its taxes or any other payments to the State be based on a posted or tax reference price for the hydrocarbons produced under that contract. Such price shall be determined by the Government and shall move in such a manner as to prevent any deterioration in its relationship to the prices of manufactured goods traded internationally. However, such price shall be consistent, subject to differences in gravity, quality and geographic location, with the levels of posted or tax reference prices generally prevailing for hydrocarbons in other OPEC Countries and accepted by them as a basis for tax payments.

(5) Limited Guarantee of Fiscal Stability

The Government may, at its discretion, give a guarantee of fiscal stability to operators for a reasonable period of time.

(6) Renegotiation Clause

1. Notwithstanding any guarantee of fiscal stability that may have been granted to the operator, the operator shall not have the right to obtain excessively high net

earnings after taxes. The financial provisions of contracts which actually result in such excessively high net earnings shall be open to renegotiation.

2. In deciding whether to initiate such renegotiation, the Government shall take due account of the degree of financial risk undertaken by the operator and the general level of net earnings elsewhere in industry where similar circumstances prevail.

3. In the event the operator declines to negotiate, or that the negotiations do not result in any agreement within a reasonable period of time, the Government shall make its estimate of the amount by which the operator's net earnings after taxes are excessive; and such amount shall then be paid by the operator to the Government.

4. In the present context, "excessively high net earnings" means net profits after taxes which are significantly in excess, during any twelve-month period, of the level of net earnings the reasonable expectation of which would have been sufficient to induce the operator to take the entrepeneurial risks necessary.

5. In evaluating the "excessively high net earnings" of the new operators, consideration should be given to their overall competitive position vis-a-vis the established operators.

(7) Accounts and Information

The operator shall be required to keep within the country clear and accurate accounts and records of his operations which shall at all times be available to Government auditors, upon request.

Such accounts shall be kept in accordance with the Government's written instructions, which shall conform to commonly accepted principles of accounting, and which shall be applicable generally to all operators within its territory.

The operator shall promptly make available, in a meaningful form, such information related to its operations as the Government may reasonably require for the discharge of its functions.

(8) Conservation

Operators shall be required to conduct their operations in accordance with the best conservation practices, bearing in mind the long-term interests of the country. To this end, the Government shall draw up written instructions detailing the conservation rules to be followed generally by all contractors within its territory.

(9) Settlement of Disputes

Except as otherwise provided for in the legal system of a Member Country, all disputes arising between the Government and operators shall fall exclusively within the jurisdiction of the competent national courts or the specialized regional courts, as when established.

(10) Other Matters

In addition to the foregoing principles, Member Governments shall adopt on all other matters essential to a comprehensive and rational hydrocarbons policy, rules

including no less than the best of current practices with respect to the registration and incorporation of operators; assignment and transfer of rights; work obligations; the employment of nationals; training programs; royalty rates; the imposition of taxes generally in force in the country; property of the operator upon expiry of the contract; and other such matters.

(11) Definition

For the purposes of the present Resolution, the term "operator" shall mean any person entering into a contract of any kind with a Member Government or its designated agency including the concessions and contracts currently in effect, providing for the exploration for and/or development of any part of the hydrocarbon resources of the country concerned.

# APPENDIX B

## Political Implications and Acceptability of Active Use Denial for Sensitive Nuclear Facilities in Multinational Fuel Centers (MNFCs)

by

Lincoln Gordon

# POLITICAL IMPLICATIONS AND ACCEPTABILITY OF ACTIVE USE DENIAL FOR SENSITIVE NUCLEAR FACILITIES IN MULTINATIONAL FUEL CENTERS (MNFCs)

## I. Introduction

Starting from the premise that, in other respects, the multinationalization of sensitive nuclear facilities provides an important institutional component of proliferation resistance, the objection has been raised that multinational fuel centers (MNFCs) would be vulnerable to seizure by the government of the host country or by subnational forces. Assuming location in a non-weapon state, seizure by the host government would be a means to acquiring a weapons capacity. To counter that kind of proliferation risk, the concept of active use denial (AUD) has been advanced -- a combination of institutional and technological arrangements that would prevent (or greatly delay) the use of the facility by the host government for national weapons-making purposes. The same arrangements could also be used against seizure efforts by subnational groups or by invading foreign forces.

The most elaborate working out of this concept presently available is the System Planning Corporation's "Active Proliferation Resistance Control System for International Fuel Service Centers," dated September 1979 and cited hereafter as SPC-412. An earlier report, "Draft Contributions to a Preliminary Report on Proliferation Resistance Engineering," (SPC-358, May 1978), introduced the

concept. In essence, SPC-412 proposes to apply to the key facilities and inventories of an MNFC some of the "use-denial" systems developed by the U.S. national laboratories to prevent the unauthorized use of nuclear weapons. A "command, control, and communication ($C^3$) system" would be organized under multinational auspices, with some elements inside each sensitive facility, some in the MNFC headquarters, and some external to the MNFC (perhaps even external to the host country). A combination of "enable" and "disable" systems under $C^3$ control would be required to permit normal operations to proceed but would disrupt operations on receipt and confirmation of signals of abnormality suggesting imminent or actual efforts at seizure. Recognizing the risks of unnecessary disruption, SPC-412 stresses the importance of high reliability and low false alarm probability, and the need for graded denial responses ranging from short-term and readily reversible suspension of operations up to virtual destruction of the MNFC as a functioning unit.

Although the report pays considerable attention to organizational and technical measures for ensuring uninterrupted operation where no threat to the facility is present, the extent to which the AUD system might be subject to legitimate objection on the ground of additional risk to the continuity of vital energy supplies remains crucial to its acceptability. The report states that a cut off of fuel supplied by the MNFC would be mitigated to some extent by the time delay between cutoff and its impact on power production, as well as by the possibilities for stockpiling and

for finding alternative supplies (Chapter II, p. 6). It is difficult, however, to reconcile this reassurance with the concept of a plutonium management regime in which mixed-oxide fuel elements are delivered to national reactors outside of MNFC only as needed, with zero inventories at the reactor sites. (It would make a better fit with a "symbiotic" system in which only denatured, low-enriched $^{235}U$ or $^{233}U$ fuel elements were exported from the MNFC.) SPC-412 also contemplates a case in which the AUD system could disrupt electric power supplied by an MNFC in which breeders were colocated with the reprocessing plant, a feature which contributes to the system's deterrent effect but may also weaken its political acceptability.

In general, substantial political objection must be anticipated to any proposal based on nuclear weapon precedents. In the weapon systems, the requirement for positive enabling actions to arm the weapons is a precaution of self-evident merit, but in an energy supply system, a paralled requirement implies some degree of risk to supply continuity. The balance between "enable" and "disable" components might have to be altered on this account. The system design and its political acceptability in any event ought to be considered in relation to three critical parameters of any MNFC.

## II. Critical MNFC Parameters: Form, Location, and Scope

The evaluation of any AUD proposal will depend on the character of the MNFC to which it is applied, the relevant parameters being as follows:

A. Degree of Multinationality, i.e., how closely it fits with one of the three conceptual paradigms:

1. An MNFC serving primarily the program needs of the host country and operated mainly on a national basis, with the multinational elements introduced primarily for their contribution to proliferation resistance (and perhaps secondarily to secure economies of scale, cost-sharing, and product-sharing among the partners);
2. An MNFC serving the program needs of a number of participating countries (most likely among a regional grouping of countries), none of which is large enough to justify a full fuel cycle, with multinational staffing of most of the operations (along the lines of SAS Scandinavian Airlines); or
3. An international or multinational custody institution controlling personnel and material ingress and egress to and from nationally owned and operated sensitive facilities.

B. / Nature of the Host Country, i.e., whether it is:

1. An officially recognized nuclear weapon state;
2. Another advanced industrial country in the nuclear supplier category;
3. A threshold developing country with a significant political power status within its region; or
4. A small "neutral" country with no regional or global power potential.

[N.B. A variety of subsets of these four alternatives will be obvious. The issue of location has other important AUD aspects, such as isolation from areas regularly used for political demonstrations or for domestic armed forces maneuvers; and also accessibility to armed forces of other member-states of the consortium. Location is also subject to important technological and economic constraints.]

C. Scope of the MNFC Operations, i.e., whether it extends:

1. Only to sensitive "back end" activities, namely reprocessing and associated storage;
2. To the above plus enrichment, fuel element fabrication, and delivery of fuel to operating national reactors; or
3. To the above plus all breeder reactors (including "fuel factories" in a symbiotic breeder-converter system).

In theory, this three-dimensional matrix contains 36 cells, and their number could be amplified by considering subsets and variations. For purposes of this memorandum, it should suffice to illustrate how various combinations of parameters would affect the nature of the challenge against which AUD measures are addressed, and therefore also affect the AUD system design and its political acceptability.

Within Category A (Form), the first type would raise the most difficult problems, especially if combined with B.2 or B.3 and C.3. That appears to be the paradigm envisaged in the SPC-412 Report. In it, the AUD system designers and the $C^3$ operators are in a constant adversarial relationship to the host government (which is presumed to be planning clandestine diversions or overt takeovers) and to the national operators (who are presumed to share the proliferating objectives of their government). Most of the multinationality would occur in the AUD system itself, which would, in effect, constitute a radically upgraded system of international safeguards.

Unless acceptance of the multinational AUD system were the only way in which a country could secure desperately desired technology, it is difficult to believe that paradigm would be politically negotiable. The major exceptions might be the very special cases of countries whose present regimes are unequivocally opposed to a weapon capability and who would like to foreclose the option to their own successors -- a rare class, which may be

limited to Japan and West Germany at the most.

In the case of an MNFC of type A.2, the situation is quite different. By definition, the majority of the economic and operating interests in this case would lie outside the host country, so that most of the participants would desire to maximize the deterrent against host country takeover. Their own energy supply security would argue in favor of an effective AUD system, provided that it were not too expensive and not too easily triggered by false alarms. For these reasons, it might be desirable to consider a less complex design than suggested in SPC-412.

Although neither report considers a multinational institution of type A.3, the acceptability of AUD in this case would depend, to a great extent, upon whether the facility supplies primarily the needs of the owner or whether it also services a number of foreign customers. If the former were the case, then the remarks directed towards AUD and type A.1 facilities would be relevant. If the latter were the situation, then the considerations regarding a type A.2 facility would be germane.

A less complex design would be especially appropriate if locations could be confined to categories B.1 and B.4. The weapon states are, by definition, free of proliferation motives and fully alert to subnational threats. Assuming, however, that the world community would not accept a permanent limitation of MNFCs to weapon states, the other safest category would be B.4, a group

including such countries as Switzerland, Costa Rica, and Sri, Lanka. They are not only too small to have pretensions for regional hegemony, but are also vulnerable to various kinds of retaliation from the other prospective regional consortium members in case their governments fall into extremist or irrational hands. It would still be desirable to provide some kind of AUD protection for an MNFC located in such a country, in order to deter takeover bids by ambitious subnational domestic groups (including factions of the armed forces) or foreign invaders. The experiences in recent years of Uruguay and Lebanon -- both once regarded as the "peaceful Switzerlands" of their respective regions -- illustrate the need to avoid exclusive reliance on the character of country regimes. Inherent weakness and vulnerability due to small size and location are more dependable grounds for reassurance.

The scope of the MNFC has an obvious bearing on the importance of the political acceptability of its creation in the first place and of any AUD arrangements associated with it. If it is itself the generator of a substantial part of any country's total power supply, or if it is the monopoly supplier of fuel elements needed for that supply and which (for non-proliferation reasons) are not permitted to be stockpiled, the commitment to an MNFC entails a far-reaching pooling of sovereignty. That is easiest to envisage within a group of nations like the European Community. Whether it may become possible in South or Central America, South or Southeast Asia, various subregions of Africa, or the Middle East depends on many factors unrelated to energy supply,

and, within the energy sector, to the available alternatives, both nuclear and non-nuclear. Precedents that may be established in Europe, Japan, and North America will have a major bearing on acceptability to developing countries, as will the terms of participation by nuclear suppliers in any regional MNFCs proposed for developing countries.

Assuming that the basic commitment can be achieved, acceptability of an AUD component will require a showing that it makes continuity of operations more secure and that its marginal costs are within tolerable limits.

## III. Problems of Decision-Making

The cardinal elements of any AUD system are its technology and its arrangements for decision-making. An earlier report on the subject, SPC-358, gives balanced attention to these two elements, but its proposals for decision-making are limited to the most difficult combination of form, location, and scope (A.1, B.3, and C.3 in Section II above). Under that combination, the operators are mainly nationals of the host country, while the AUD teams are the principal multinational components. That fact leads to proposals for decision teams of four nationalities at the critical control points (see Chapter V of SPC-358, p. 15), one representing the host country and any two of the others being enabled to institute a denial action.

The report makes no reference to the problems of recruiting and maintaining the morale of such teams, presumably led by skilled professionals, who in normal times would have only the excruciatingly boring task of non-interference with the operators. Periodic paper exercises or "war-game" takeover scenarios would offer only limited relief to this tedium. Given the legitimate concern of the host country with false alarm risks to continuity of energy supplies, it is difficult to believe that political acceptability could be won for a two-out-of-four decision-making arrangement. A more negotiable arrangement would require either concurrence of the host national authority (likely in case of subnational or external threats) or reference to a higher level of authority, with a clear majority needed for even limited use-denial actions. Much would depend on the seriousness of the disruption entailed by the lower-level responses, a factor that in turn depends on the technological details.

These considerations reinforce the non-proliferation advantages of paradigms A.2 and A.3 over A.1 (in Section II above). In those cases, there is a wide scope for multinational operating responsibility, either for the individual facilities (A.2) or for the responsibilities of the Custody Authority (A.3). These models also display the built-in deterrence of multinational staffing against clandestine diversion and the majority-shared interest against host-country takeover. For these reasons, at least a portion of the AUD system could be entrusted to regular operating personnel, and decision-making could follow the pattern established for important decisions of operating policy.

Extreme cases of use denial against frontal attack by host-country armed forces would require the kind of technological disruption indicated (although not described in detail) in SPC-358 and dealt with more extensively in SPC-412. The more difficult cases would arise with ambiguous threats or with disputed allegations of diversion denied by the host government. Political acceptability would appear more probable for an AUD system run by operators whose responsibilities include both non-proliferation and system continuity than for one in which AUD decisions are made by adversary teams whose sole responsibility is non-proliferation.

## IV. Conclusion

This first effort at analyzing active use denial suggests that arrangements can be developed to protect against host country takeover of sensitive nuclear facilities in multinational fuel centers. It also makes clear that the design of adequate arrangements and their political acceptability are closely related to the form, location, and scope of the MNFC, and cannot be judged independently of those parameters. It seems probable, however, that in cases where an MNFC can be made politically acceptable in other respects, the political problems of adding AUD features should not be so severe as to lead to its rejection.

# APPENDIX C

References

## REFERENCES


1. R. Ahearne, "Precedents for U.S. Involvement in International Cartels and Participation in Intergovernmental Commodity Agreements," Library of Congress, April 21, 1976.

2. Argonne National Laboratories, "Suggested Nonproliferation Criteria for Commercial Nuclear Fuel Cycles," (Revision 1), January 12, 1978.

3. Atlantic Council Nuclear Fuels Policy Working Group, "Nuclear Fuels Policy Paper," June 7, 1976.

4. Atomic Industrial Forum, "An Assessment of the Civex Concept," August 25, 1978.

5. S. J. Baker, "Political Acceptability of Nuclear Energy and Nonproliferation Alternatives in Industrial Nations," Rand Corporation, November 1978.

6. W. Ballard, "Coprocessing of Thermal Reactor Fuels," DOE, n.d.

7. J. Barkenbus, "Assurance of Fuel Supply -- an Issue Paper," Institute for Energy Analysis, August 1, 1978.

8 J. Barkenbus, "Domestic and International Deployment of Reactor Systems -- Status and Rationale," Institute for Energy Analysis, August 1, 1978.

9. J. Barkenbus and M. J. Ohanian, "Interim Report #2 -- A Methodology for the Assessment of the International Acceptability of Nonproliferation Alternative Systems," (Revised), Institute for Energy Analysis,, May 10, 1978.

10. J. Barkenbus and M. J. Ohanian, "International Nuclear Community-Reactor Systems," International Energy Agency, June 23, 1978.

11. J. Barton et al., "Evaluation of a Proposal for an Integrated International Nuclear Fuel Authority," Stanford University Law School, August 1978.

12. K. Beckurts, "Nuclear Nonproliferation -- A View from Germany," Atomic Industrial Forum, October 23-25, 1978.

13. Booze-Allen and Hamilton, "Key Issues and Evaluation Criteria for Assessing the Proliferation Risk of Alternative Nuclear Energy Systems," September 27, 1977.

14. P. Bracken, "Some Aspects of Fuel Assurance," Hudson Institute, July 12, 1978.

15. P. Bracken, "Some Aspects of Fuel Assurance," Hudson Institute, October 23, 1979.

16. Brookings Institute, "International Nuclear Fuel Bank Issues," January 28, 1978.

17. Brookings Institute, "Nuclear Policies of the Republic of Korea," (Draft), May 26, 1978.

18. J. Buckham, "Reprocessing Developments -- Foreign and Domestic," Allied General Nuclear Services, March 5-8, 1978.

19. G. Bunn, "Report of Uranium Fuel Assurances Subcommittee: Promoting 'Reliable Interdependence,'" Aspen Institute for Humanistic Studies, August 17, 1978.

20. A. Chayes and W. Lewis, International Arrangements for Nuclear Fuel Reprocessing, Ballinger, 1977.

21. Commission of the European Communities, "Nuclear Science and Technology -- A Reference Regional Nuclear Fuel Center," May 11, 1978.

22. T. J. Connolly, "Nuclear Proliferation and Once-Through Fuel Cycle Alternatives," Pan Heuristics, Feburary 1978.

23. Contribution of India Co-Chairman/WG4/58, "Comments on Paper Co-Chairman /WG4/41(A,B) -- International and Institutional Aspects of Reprocessing and Plutonium Management, " November 29, 1978.

24. G. Corey, "The Effect of Thermal Recycle of Plutonium Upon the Institutional Control of Spent Fuel -- With Respect to Proliferation," Aspen Institute for Humanistic Studies, August 17, 1978.

25. F. Culler, "Precedents for Diversion-Resistant Nuclear Fuel Cycles," Fifth Energy Conference (Washington, D. C., 1978).

26. A. De Volpi, "Denaturing Plutonium: A Study of the Requirements, Technological Capabilities, and Implications with Regard to Proliferation of Nuclear Weapons," Argonne National Laboratory, August 1, 1977.

27. D. A. Deese, "Nuclear Nonproliferation and the International Management of Spent Reactor Fuel," Harvard University, May 1978.

28. J. R. Dietrich, "The Realities and Illusions of Alternate Fuel Cycles," Atomic Industrial Forum Conference (New York, October 23-25, 1978).

29. D. A. Deese, Nuclear Power and Radioactive Waste: A Sub-Sealed Disposal Option?, Lexington, 1978.

30. DOE, "International Nuclear Fuel Cycle Evaluation Conference," March 8, 1978.

31. DOE, " Nonproliferation Alternative Systems Assessment Program Plan," April 1978.

32. DOE, Office of Nuclear Energy Technology. Nuclear Proliferation and Civilian Nuclear Power, Report of the Nonproliferation Alternative Systems Assessment Program, 9 volumes, December, 1979.

33. L. A. Dunn, "Going Nuclear (1): Some Characteristics of the First Decades," Hudson Institute, January 12, 1978.

34. L. A. Dunn, "Influence at the Margin: Alternative Institutional Outcomes and Their International Deployment," (Draft), Hudson Institute, January 23, 1979.

35. L. A. Dunn, "Military Politics, Nuclear Proliferation, and the 'Nuclear Coup d'Etat,'" Hudson Institute, April 20, 1976.

36. L. A. Dunn, "The Role of Sanctions in Nonproliferation Strategy," Hudson Institute, February 2, 1977.

37. L. A. Dunn, "Some Nuclear Weapon Pathways: A First Cut," Hudson Institute, January 27, 1978.

38. J. Engle, "Denatured Fuel Cycle Scenario Employing an International Fuel Cycle Facility," n.d.

39. W. Epstein, The Last Chance: Nuclear Proliferation and Arms Control, The Free Press, 1976.

40. ERDA, "Summarization of Aspects of the Program of the Energy R&D Administration That are Designed to Provide Greater Support to Nonproliferation Objectives," n.d.

41. D. E. Ferguson, "Simple, Quick Reprocessing Plant," Oak Ridge National Laboratory, August 30, 1977.

42. R. Fox and M. Willrich, "International Custody of Plutonium Stocks: A First Step Toward and International Regime for Sensitive Nuclear Energy Activities," Rockefeller Foundation, 1978.

43. H. Fujii, "Nuclear Fuel Cycle Facilities in the World, (Excluding the Centrally Planned Economics)," International Atomic Energy Agency, May 1978.

44. L. Gallini and J. Farley, "Institutional and International Aspects of Spent Fuel Management," (4th Draft), Arms Control and Disarmament Agency, July 5, 1978.

45. L. Gallini and F. Williams, "Institutional Aspects of International Spent Fuel Management," Arms Control and Disarmament Agency, May 26, 1978.

46. L. Gallini and F. Williams, "Institutional Aspects of International Spent Fuel Management," Arms Control and Disarmament Agency, June 14, 1978.

47. V. Gilinsky, "Plutonium, Proliferation and Policy," MIT Technology Review, February 1977.

48. V. Gilinsky, "Plutonium, Proliferation and the Price of Money," Atomic Industrial Forum/British Nuclear Forum, September 27, 1978.

49. L. Gordon, "International Spent Fuel Management," Aspen Institute for Humanistic Studies, August 14, 1978.

50. J. Gray et al., "International Cooperation on Breeder Reactors," Rockefeller Foundation, May 1978.

51. T. Greenwood, H. Feiveson and T. Taylor, Nuclear-Proliferation: Motivations, Capabilities, and Strategies for Control, McGraw-Hill, 1977.

52. E. Gyftopoulos et. al., "A Methodology for the Assessment of the Proliferation Resistance of Nuclear Power Systems," Massachusetts Institute of Technology, September 1978.

53. E. B. Haas et al., "Non-Proliferation and Nuclear Waste Management, International Technology Project," Institute of International Studies, University of California, Berkeley, 1977.

54. W. Hafele and W. Sassin, "The Global Energy System," Annual Review of Energy, 1977.

55. P. R. Haffner et. al., "An Assessment of Denatured Fuel Cycles in Civilian Nuclear Power Systems," Hanford Engineering and Development Laboratory, May 1978.

56. Hanford Engineering and Development Laboratory, "First Quarterly NASAP Rolling Report," March 1, 1978.

57. W. Harris, "Institutional Alternatives for International Nuclear Service Centers (INSCS)," Rand Corporation, November 1977.

58. W. Harris, "International Institutions for Nuclear Energy: Issues of Assessment and Design," Rand Corporation, April 1978.

59. W. Harris et al., "Institutional Choices for the Management of Plutonium and Plutonium-Processing Facilities," Aspen Institute for Humanistic Studies, August 18, 1978.

60. W. Harris et al., "Rules-of-Trade for International Nuclear Commerce," Rand Corporation, July 1978.

61. L. C. Hebel et al., "Report to the American Physical Society by the Study Group on Nuclear Fuel Cycles and Waste Management," Reviews of Modern Physics, 50, no. 1, January 1978.

62. F. Hoffman, "International Institutional Arrangements for Nuclear Fuel Cycles: Issues of Policy and Timing," Aspen Institute for Humanistic Studies, August 18, 1978.

63. Hudson Institute, "Influence at the Margin: A First Cut at Defining the Issues," August 28, 1978.

64. IAEA, "International Conference on Nuclear Power and Its Fuel Cycle," May 1977.

65. IAEA, "International Management and Storage of Plutonium and Spent Fuel," July 13, 1978.

66. IAEA, "International Nuclear Safeguards," March 1976.

67. IAEA, "The Management of Plutonium," June 14, 1978.

68. IAEA, "Regional Nuclear Fuel Cycle Centers, Vol. II," 1977.

69. INFCE, "Assurances of Long-Term Supply of Technology Fuel and Heavy Water and Services in the Interest of National Needs Consistent with Nonproliferation," June 8, 1978.

70. INFCE, "Final Communique of the Organizing Conference of INFCE," October 21, 1978.

71. INFCE, "Meeting Report of the Second Meeting of the TCC," n.d.

72. INFCE, "Progress Report to the TCC INFCE WG2 Enrichment Availability," June 12, 1978.

73. INFCE, "Summary Report of the Second Meeting of the TCC of the INFCE Held in Vienna on 12-14 June 1978," June 14, 1978.

74. INFCE, U.S. Delegation, "International and Institutional Aspects of Reprocessing and Plutonium Management," August 21, 1978.

75. INFCE, U.S. Delegation, "International and Institutional Aspects of Reprocessing and Plutonium Management," September 8, 1978.

76. INFCE, U.S. Delegation, "Institutional and International Aspects of Spent Fuel Management," July 1978.

77. INFCE, WG3, "International Nuclear Fuel Bank," October 31, 1978.

78. INFCE, WG4, "The Present Status of IAEA SAfeguards on Nuclear Fuel Cycle Facilities," September 11, 1978.

79. INFCE, WG5, "Deployment Considerations," July 1978.

80. INFCE, WG5, "Internationalization and Colocation of FBR Fuel Cycle Facilities," July 1978.

81. INFCE, WG6, "Status Report 1 on Task 6: 'Analysis of Institutional Matters (Argentina, Spain, IAEA),'" June 2, 1978.

82. INFCE, WG8, "International Data Collection Analysis," September 9, 1978.

83. INFCE, Working Group Final Reports, June 1979.

84. J. Jennekens, "Canadian Experience in the Implementation of NPT Safeguards," Atomic Industrial Forum, October 23-25, 1978.

85. K. Kaiser, "The Great Nuclear Debate," Foreign Policy, no. 30, Spring 1978.

86. P. R. Kasten, "Nonproliferation Assessment of the Thorium Fuel Cycle," Oak Ridge National Laboratory, July 7, 1977.

87. S. M. Keeny, Jr. et al., Nuclear Power: Issues and Choices, Report of the Nuclear Energy Policy Study Group, Ballinger, 1977.

88. H. Kouts, "Report of Technical Panel," Aspen Institute for Humanistic Studies, August 14-16, 1978.

89. M. Kratzer, "Fuel Cycle Centers and Their Role in Nonproliferation," International Energy Associates Ltd., 1978.

90. M. Kratzer, "International Fuel Cycle Service Centers, the Role of Institutional Arrangements in Furthering Nonproliferation," International Energy Associates Ltd. July 17, 1978.

91. M. Kratzer, "Institutional Measures to Reduce Proliferation Risks," International Energy Associates Ltd., 1978.

92. M. Kratzer, "Multinational Institutions and Nonproliferation," International Energy Associates Ltd., 1978.

93. M. Kratzer, "Progress Toward a More Effective Nonproliferation Regime," Atomic Industrial Forum, October 23-25, 1978.

94. H. H. Landsberg et al., Energy: The Next Twenty Years, The Ford Foundation, Ballinger, 1979.

95. R. Liner and D. Outlaw, "Draft Summary of Preliminary Proliferation Resistance Evaluation for Five Systems," Scientific Applications, Inc., December 21, 1977.

96. R. Liner and D. Outlaw, "Draft Summary of Preliminary Proliferation Resistance Evaluation of Five Systems," Science Applications, Inc., January 4, 1978.

97. W. Marshall, "The Graham Young Memorial Lecture - Nuclear Power and the Proliferation Issue," 1978.

98. Massachusetts Institute of Technology, "Determinants of Nuclear Fuel Assurance and Strategies for Assured Supply of Low-Enriched Uranium Fuel," December 22, 1977.

99. Massachusetts Institute of Technology, "Proliferation Implications of Nuclear Research and Training," n.d..

100. L. H. Mayo and H. H. Hitchcock, "Evaluating the Legal-Institutional Aspects of the Introduction of Nonproliferation Alternative Nuclear Systems - Quarterly Report," George Washington University, April 15, 1978.

101. M. McCormack, "How Not to End Nuclear Proliferation," Atomic Industrial Forum, n.d.

102. F. McGoldrick, "Institutional Aspects of Plutonium Management," DOE, June 6, 1978.

103. F. McGoldrick, "International and Institutional Aspects of Reprocessing and Plutonium Management," (Draft), DOE, July 28, 1978.

104. F. McGoldrick, "International Management of Spent Fuel -- Part II," DOE, June 1, 1978.

105. H. Mendershausen, "International Cooperation in Nuclear Fuel Services: European and American Approaches", Rand Coporation, 1978.

106. M. Milhalka, "Can Sanctions Curb the Spread of Nuclear Weapons?" Rand Corporation, January 1978.

107. M. Milhalka, "International Acceptability," Rand Corporation, March 9, 1978.

108. M. Miller, "Proliferation Implications of Research Reactors," Massachusetts Institute of Technology, July 26, 1978.

109. M. Miller and M. Benedict, "Nonproliferation Alternative Systems Study - Program Report," Massachusetts Institute of Technology, February 1978.

110. M. Miller and M. Dalzell, "Workshop on Institutional Aspects of Proliferation Resistance," Massachusetts Institute of Technology, February 1978.

111. R. K. Mullen, "Safeguards Implications of Potential Subnational Activities," Rand Corporation, December 1978.

112. R. K. Mullen, "Subnational Threat Assessment," Rand Corporation, November 1978.

113. R. K. Mullen, "Taxonomic Methods for Evaluating Potential Subnational Adversaries," Rand Corporation, November 1978.

114. P. W. Murphy,"Appendix H, Review of Literature on International Nuclear Fuel Assurances, Fuel Banks and Service Centers," Oak Ridge National Laboratory, December 1978.

115. P. W. Murphy, "International Fuel Assurances as an Element of Nuclear Nonproliferation Policy," Oak Ridge National Laboratory, November 1978.

116. P. W. Murphy, "Memorandum on Fuel Assurances: Executive Summary," DOE, October 20, 1978.

117. T. L. Neff and H. D. Jacoby, "Nonproliferation Strategy in a Changing Nuclear Fuel Market," Foreign Affairs, 57, no. 5, Summer 1979.

118. T. L. Neff et al., "Nuclear Fuel Assurance: Origins, Trends, and Policy Issues," Massachusetts Institute of Technology, November 28, 1978.

119. J. Nye, "Balancing Nonproliferation and Energy Security," Speech at Uranium Institute (London, July 12, 1978).

120. J. Nye, "Nonproliferation: A Long-Term Strategy," DOS, April 1978.

121. Oak Ridge National Laboratory, "NASAP -- Preliminary Evaluation Assessment of Th/U Fuel Cycle Systems," August 1977.

122. Oak Ridge National Laboratory, "Nonproliferation and Nuclear Power: Building on the 1946 Acheson - Lilienthal Report," October 14, 1977.

123. NRC, Office of Nuclear Material Safety and Safeguards, "Safeguarding a Domestic Mixed Oxide Industry Against a Hypothetical Subnational Threat," May, 1978.

124. Organization for Economic Cooperation and Development, "Nuclear Fuel Cycle Requirements and Supply Considerations, Through the Long-Term," February 1978.

125. D. A. Outlaw, R. T. Liner and E. A. Straker, "A Methodology for Evaluating the Proliferation Resistance of Alternative Nuclear Power Systems," Science Applications, Inc., November 1, 1977.

126. W. Overholt, "Warning Time and Nonproliferation Policy," Hudson Institute, January 31, 1978.

127. Honorable Justice Parker, "The Windscale Inquiry," January 26, 1978.

128. W. D. Perry, "Deferred Nuclear Reactor Spent Fuel Reprocessing and Implications for Breeder Commercialization," Rand Corporation, August 1978.

129. G. M. Petty and M. Yokota, "International Nuclear Service Centers: A Bibliography," March 1978.

130. Presidential Report, "Preliminary Proposals for Initial Fuel Assurances," White House, n.d.

131. Rand Corporation, "Nuclear Fuel Cycles and Weapons Proliferation," n.d.

132. G. I. Rochlin, "Nuclear Fuel Cycle Internationalization: The Uncertain Political Context," SIPRI Symposium on Internationalization of the Nuclear Fuel Cycle (Stockholm, October-November 1979).

133. G. I. Rochlin, Plutonium Power and Politics: International Arrangements for the Disposition of Nuclear Fuel, University of California, 1979.

134. B. Rosenthal, "International Fuel Service Centers: Proliferation Risks and International Acceptability," DOE, May 10, 1978.

135. H. S. Rowen, "Nonproliferation Criteria for Assessing Civilian Nuclear Technologies," Pan Heuristics, n.d.

136. H. Rowen and A. Wholstetter, U.S. Non-Proliferation Strategy Reformulated, Draft report to the Council on Environmental Quality, the Department of Energy, and the National Security Council (Washington, D.C., 1979).

137. J. G. Ruggie, "International Responses to Technology: Concepts and Trends," International Organization, 1975.

138. L. Scheinman, "Draft Fuel Bank Paper," INFCE, May 5, 1978.

139. L. Scheinman, "Reconciling Theory and Reality in Attaining Nonproliferation Objectives," Atomic Industrial Forum, October 24, 1978.

140. Science Applications, Inc., "Characteristic Requirements for Dedicated Proliferation Facilities," February 10, 1978.

141. Science Applications, Inc., "Description and Comparative Analysis of Nuclear Fuel Reprocessing Alternatives from a Proliferation Resistant Viewpoint," June 22, 1978.

142. Science Applications, Inc., "A Preliminary Methodology for Evaluating the Proliferation Resistance of Alternative Nuclear Power Systems," June 15, 1977.

143. Science Applications, Inc., "Proliferation Resistance (Draft) -- Input to Rolling Report," March 17, 1978.

144. Science Applications, Inc., "Proliferation Resistance Implications of Alternative Nuclear Strategies," March 20, 1978.

145. C. Smith and A. Chayes, "Institutional Arrangements for a Multinational Reprocessing Plant," n.d.

146. K. A. Solomon and W. R. Harris, "Institutional Alternatives for International Nuclear Service Centers (INSCS), "Rand Corporation, November 1977.

147. I. Spiewak, "Studies of Nuclear Alternative Systems," Oak Ridge National Laboratory, n.d.

148. C. Starr, "A Current View of Civex: A Nonproliferation Approach to the Breeder," Atomic Industrial Forum Conference (New York, October 22-25, 1978).

149. C. Starr, W. Hafele and E. Zebrowski, "Nuclear Power and Weapons Proliferation," February 21, 1977.

150. G. Steinberg, "The Existing Nuclear Regime: Materials, Facilities, and Institutions," Hudson Institute, June 16, 1978.

151. G. Steinberg, "The French Violation of the Western European Union Treaty: Some Lessons for Future Arms Control Agreements," Hudson Institute, June 1978.

152. G. Steinberg, "The Non-NPT Safeguards Regime," Hudson Institute, August 28, 1978.

153. E. A. Straker, "Reprocessing and Nonproliferation," Science Applications, Inc., June 30, 1978.

154. T. Taylor, "Benefits of Deferring Pu Recycle: Counterview to ERDA," Arms Control and Disarmament Agency, October 10, 1976.

155. F. Tooper, "Spent Fuel Storage and Nonproliferation," (Preliminary Draft), Science Applications, Inc., June 28, 1978.

156. C. Walske, "Civil Nuclear Power Without Weapons Proliferation," Atomic Industrial Forum, March 5-8, 1978.

157. J. F. Wimpey, "Discussion of Safeguards Goals," (W.P. #27), Science Applications, Inc., June 22, 1978.

158. A. Wholstetter, "Spreading the Bomb Without Quite Breaking the Rules," n.d.

159. A. Wholstetter et al., "Nuclear Alternatives and Proliferation Risks," Pan Heuristics, July 27, 1978.

160 M. Willrich, "A Workable International Nuclear Energy Regime," The Washington Quarterly, 2, no. 2, Spring 1979.

161. F. Williams, "Internationally Supervised Spent Fuel Storage: The Alternative to Expanded Reprocessing," Harvard University, June 1978.

162. J. Yaeger, "Chapter 4 Japan," (Draft), Brookings Institute, May 31, 1978.

161. J. Yaeger, "Issues Involved in Establishing an International Nuclear Fuel Bank," (Draft), Brookings Institute, February 23, 1978.

162. J. Yaeger, "Nuclear Policies of the Republic of Korea," (Draft), Brookings Institute, May 26, 1978.

144. M. Yokota, M. Milhaka, G. Petty, W. Harris and K. Solomon, "News (Nuclear Energy Weapons and Safeguards) Date Base: A Complete Bibliography, 1978 - April 1978," Rand Corporation, April 1978.

145. E. Zebrowski and M. Levenson, "Fast Breeder System Concept -- Diversion Resistant Fuel Cycles," Electric Power Research Institute, February 27, 1978.