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Item 1: Opening of the Session

1. The Chairman called the session to order welcoming the delegates and thanking them for their participation. He introduced Mr. Vladimir Baum, Head of the Ocean Economics and Technology Office, Department of Economic and Social Affairs, United Nations. Speaking on behalf of the United Nations, Mr. Baum extended a cordial welcome to the seventh session of the Working Group. He noted the increasing involvement of the United Nations system in marine matters as was exemplified by the forthcoming Third Conference on the Law of the Sea. He emphasized that well organized, properly analysed data were a prerequisite to meeting the requirements of the total user spectrum. He further explained that several United Nations organizations had joined forces in the Inter-Secretariat Committee on Scientific Programmes Relating to Oceanography (ICSPRO), with an objective, among others, to support the work of the Intergovernmental Oceanographic Commission (IOC) and thus the Working Group on International Oceanographic Data Exchange (IODE). The Chairman expressed his appreciation to Mr. Baum. He then announced that Mr. Douglas Bradford (Canada) had agreed to act as the Rapporteur of the session.

Item 2: Adoption of Agenda

2. The agenda as adopted by the Working Group is shown as Annex I. Annexes VI, VII and VIII contain, respectively, a list of acronyms, session documents and participants.

Item 3: Terms of Reference of Working Group

3.1 Historical Background

3. Referring briefly to the existing structure of the Working Group and its terms of reference, the Chairman quoted from document IOC/IODE-VII/2 (Explanatory Memorandum Relating to the Provisional Agenda), emphasizing that the very demanding terms of reference had caused a re-evaluation of the effectiveness of the international oceanographic data exchange system. A task team had, in fact, been formed and requested to recommend methods whereby the international exchange of oceanographic data could be strengthened and expanded.

3.2 Information Concerning Rationalization of the Structure of the Commission's Subsidiary Bodies

4. The Assistant Secretary of IOC reviewed the present proposals before the Commission on the rationalization of the structure of the Commission's subsidiary bodies, pointing out that terms of reference, composition and working procedures of subsidiary bodies were currently under examination.

5. The Working Group noted the recommendation of the Executive Council (resolution EC-II.5) that the Assembly of the Commission consider changing the Working Group into a Working Committee for International Oceanographic Data Exchange. The Working Group requested the IOC Secretariat to communicate the
following views to the Canadian member* of the Ad Hoc Working Group on Rationalizing the Structure of the Commission:

(i) that the Working Group's efficient functioning had been based upon its open membership of interested nations and upon its delegates being experts in oceanographic data management; and

(ii) that the Working Group considered its composition and current mode of operation fully corresponded, at the present time, to the tasks laid upon it.

Item 4: Reports

4.1 Secretariat

6. The Assistant Secretary reviewed the resolutions of the seventh session of the Commission and the second session of the Executive Council relating to the Working Group. He noted that the reports of the fifth and sixth sessions of the Working Group had been approved and that the Working Group was called upon to undertake additional tasks. Specifically, data management for certain international experiments and monitoring programmes such as Integrated Global Ocean Station System (IGOSS) Pilot Project for Marine Pollution Monitoring would need close attention. It was felt that the two other items which the Working Group should act upon were the preparation of an International Catalogue of Fixed Ocean Data Stations and the clarification of practices related to the submission and distribution of announcements of Declared National Programmes (DNP). Finally, the Assistant Secretary noted that the recommendations of the sixth session of the Working Group had been implemented effectively.

7. Concerning the preparation of an International Catalogue of Fixed Ocean Data Stations, the Directors of World Data Centres (WDCs) A and B (Oceanography) were asked to provide the requested editorial assistance through a small technical advisory group consisting of the Directors of WDC-A and WDC-B (Oceanography), or their designates, working in consultation with the IOC Secretariat.

4.2 ICES

8. The representative of the International Council for the Exploration of the Sea (ICES) reviewed the activities of ICES (IOC/IODE-VII/INF.1), highlighting the system that had been developed for the exchange of salinity/temperature/depth (STD) and expendable bathymetograph (XBT) data.

4.3 WMO/AComR

9. The representative of the World Meteorological Organization (WMO) confirmed that both oceanographers and meteorologists had identified an increasing need for co-ordination between oceanographic and meteorological data files with respect to parameters in the air/sea interaction zone. Two WMO Working Groups

* By resolution EC-II.8, the Canadian member was requested to draft terms of reference for and make suggestions on the subsidiary bodies for submission to the Eighth Assembly of the Commission.
were examining this interface: the Working Group on the Global Data Processing System of the Commission for Basic Systems (CBS) and the Working Group on Marine Climatology of the Commission for Marine Meteorology (CMM). The latter Working Group in particular had reviewed drafts of the Manual on IOSS Data Archiving and Exchange and comments had been submitted to the present session for consideration. The WMO representative noted that because air/sea interaction aspects appeared in several agenda items the United States representative on the CMM Working Group on Marine Climatology, Mr. W. Haggard, was available to provide technical assistance during the session.

4.4 FAO/ACMRR

10. The representative of the Food and Agriculture Organization of the United Nations (FAO) reported that the FAO Fishery Data Centre holdings included data related to fish stock assessment in the nature of resources surveys, biological sampling of commercial catches, catch and effort statistics, specialized fishery experiments and pollutants in aquatic organisms. These data were provided by the United Nations Development Programme (UNDP) Special Fund and Technical Assistance projects, by IOC co-operative investigations, and by other international and national projects and institutions.

11. Information was being collected by mail cataloguing institutions which collected data on the concentration of contaminants in aquatic organisms. It was expected that an inventory of such institutions would be published by October 1973.

12. The Fishery Data Centre had in operation a library of computer programmes for medium- and large-sized computers for various types of analyses of fish stock assessment data; this was essentially to respond to the needs of the UNDP/FAO Special Fund field projects and those of Member States.

13. FAO's activities in the field of scientific documentation were reviewed briefly. Collaboration with national institutions such as the Bundesforschungsanstalt für Fischerei in Hamburg; The Institut national de la recherche agronomique in Biarritz; the Natural Environment Research Council (NERC) in London; and the All-Union Institute for Marine Fisheries and Oceanography (VNIRO) in Moscow, in the preparation of an abstracting journal in Aquatic Sciences and Fisheries Abstracts (ASFA) was noted with satisfaction. The evolving information system was developing links with the appropriate national bodies - e.g. the National Oceanic and Atmospheric Administration (NOAA) in the United States - to cover relevant, non-conventional literature.

14. The Working Group was informed that the FAO information system would be considered by the eighth session of the IOC Assembly as a possible system to meet the requirements of the Commission and ICSFRO agencies for information in the entire field of aquatic sciences and fisheries.
4.5 **FSNSL**

15. The Chairman introduced this item by noting with regret the sudden death of Dr. J.R. Rossiter, Director of the Permanent Service for Mean Sea Level (FSNSL). The representative of FSNSL mentioned that the Service was at present under the acting direction of Mr. G.W. Lennon. He reminded the Working Group that at the last session Dr. Rossiter had identified the need for increased financial support and had reported that much of the mean sea level data was inhomogeneous due to varying datum having been used. Since then, a plan had been implemented that provided homogeneous data. The coverage was world-wide and published data would be available soon. Furthermore, the present level of funding, at least on the short term, was considered to be satisfactory.

4.6 **WDC-A and WDC-B (Oceanography)**

16. Information regarding activities, holdings and services of WDC-A (Oceanography) was made available to the Working Group in the Annual Report on Oceanographic Data Exchange for 1972. This report also contained information on the data, publications and information supplied to countries and international organizations during 1972.

17. The representative of WDC-A noted that WDC-A (Oceanography) was one of four international data organizations assisting the Commission in compiling an International Catalogue of Fixed Ocean Data Stations to replace the IOC booklet Fixed Oceanographic Stations of the World published by Unesco in 1963. It was also pointed out that WDC-A (Oceanography) collaborated with WDC-B (Oceanography) in the preparation of a third edition of the IOC Manual on International Oceanographic Data Exchange. In addition, the United States National Oceanographic Data Center (NODC), on behalf of WDC-A (Oceanography), was preparing vertical plots showing space/time variability among various parameters for Mediterranean Sea station data, these having been requested by the UNDP/FAO Fishery Survey and Development Plan in Tunisia.

18. The representative of WDC-B referred briefly to the large volume of oceanographic data (2.4 million punch cards) stored in WDC-B (Oceanography) and to the various types of calculations that could be performed on these data. He described, on a percentage basis, how the data had been received in terms of centres of origin, indicating that a major problem was created by the differences in format used by the United States of America, Canada, Japan, the Federal Republic of Germany and ICES. He urged that the Working Group continue to address itself to the task of developing a single international format.

19. The representative of the International Council of Scientific Unions' (ICSU) Panel on World Data Centres reviewed the rôle and functions of the Panel as they related to WDCs (Oceanography). He noted the publication by the Commission of the third edition of the Manual on International Oceanographic Data Exchange and confirmed that the oceanography section of the revised, consolidated, ICSU Guide to World Data Centres would include the main text from the IOC Manual. He also informed the Working Group that there was a proposal that ICSU issue a Guide to Guides - listing, discipline by discipline, the newest guide and where it had been published.
20. One of the functions of the ICSU Panel on World Data Centres was to review the effectiveness of the WDC system. The IOC Secretariat was represented on the Panel. The Chairman referred comment to the Assistant Secretary who informed the Working Group that the IOC member of the ICSU Panel was to change soon and suggested that the Chairman of the Working Group or his appointee became the new IOC member. The Working Group agreed to this and instructed the Chairman, in consultation with the Secretariat, to designate the IOC member of the ICSU Panel on World Data Centres.

4.7 SCOR

21. The representative of the Scientific Committee on Oceanic Research (SCOR) reviewed the activities of SCOR/ACMRR Working Group 32 on biological inventories and of Working Group 43 on oceanographic data management for the Global Atmospheric Research Programme's Atlantic Tropical Experiment (GATE). He also referred to the three newly-formed Working Groups (Nos. 44, 45 and 46) dealing with aspects of marine pollution; it was expected that the three groups would study problems of direct interest to the Working Group.

4.8 ECOR

22. The representative of the Engineering Committee on Oceanic Resources (ECOR) outlined several specific engineering needs for marine data, giving particular emphasis to those for waves and littoral currents. The report of ECOR, prepared at the request of the Working Group and in co-operation with the Permanent International Association of Navigation Congresses (PIANC), is included as Annex V. The Chairman, noting the co-operation developing between the Working Group on IODE and ECOR, urged that this co-operation develop further and expressed the appreciation of the Working Group for the report which was to be discussed in detail under agenda item 5.6.

4.9 International Co-operative Investigations

23. Brief progress reports were received from representatives of the Co-operative Investigations in the Mediterranean (CIM), the Co-operative Investigation of the Northern Part of the Eastern Central Atlantic (CINECA), the Co-operative Investigations of the Caribbean and Adjacent Regions (CICAR), and the Co-operative Study of the Kuroshio and Adjacent Regions (CSK). In reporting on CIM, the representative of WDC-B (Oceanography) pointed out that only two out of 23 participating countries had fulfilled their obligations regarding data exchange. The IOC Secretariat was urged to take action as appropriate to encourage countries taking part in regional co-operative studies to submit their data promptly.

Item 5: Data and Information Management and Exchange

5.1 ROSCOP

24. The Chairman of the Task Team on Inventories of Marine Data and Samples summarized the development of the revised Report of Observations/Samples Collected by Oceanographic Programmes (ROSCOP) form which was submitted to the
IOC Secretariat early in 1973. He described the form as being a compromise, having a built-in degree of flexibility, and emphasized its multidisciplinary nature. He suggested that the ROSCOP form would require continuous review and periodic revisions.

25. The Chairman suggested that the ROSCOP form, containing general, first level inventory information, should be the basis for the preparation of more detailed, second level inventories, each related to different disciplines. The Assistant Secretary remarked that the form would be available (in four languages) for distribution to Member States by January 1974.

26. After considerable discussion, basically about specific items on the form, the Chairman suggested that the Working Group accept, with sincere appreciation and commendation, the ROSCOP form and related documentation as submitted by the Task Team to the IOC Secretariat. The Chairman further suggested that the ROSCOP form, as proposed by the Chairman of the Task Team and slightly modified by the Working Group, be used by Member States of the Commission; suggestions for changes be submitted to the Secretariat and a first review of the ROSCOP form be made at the eighth session of the Working Group; and, at the end of three years, consideration be given to the modification of the ROSCOP form in the light of its use by Member States. He proposed that the Task Team be discharged with honour and sincere thanks for a job well done. The Working Group unanimously supported these suggestions.

5.2 Format Standardization

27. The Chairman of the Ad Hoc Group on Format Standardization, in presenting his report, referred to the increasing need to integrate many types of data. He enumerated a number of suggestions as to how data files could be generalized or formalized. The Working Group then considered the recommendations of the Ad Hoc Group (IOC/IODE-VII/13, Appendix I). Recommendation 1 concerning the country code was endorsed. It was agreed that WDC/ICES Country Code be incorporated in the Manual on International Oceanographic Data Exchange and that the decision to adopt that code for purposes of international data exchange be announced in International Marine Science (IMS).

28. Recommendation 2 - that the ICES format for reporting subsurface physical and chemical observations be recognized - received special emphasis. The Chairman suggested that the Working Group reiterate its recognition of the ICES format for physical and chemical subsurface observations as an effective interim minimum format for the international exchange of data. Considerable debate on this idea then followed with the result that the Chairman asked the Ad Hoc Group to reconvene during the session to examine Recommendations 2 and 3 further. The Working Group's Recommendation 1 on Format Standardization is contained in Annex II. Recommendation 4 of the Ad Hoc Group was incorporated in the decisions taken under agenda item 5.6.

29. The Chairman of the Ad Hoc Group, keeping the debate in view, proposed an alteration in the terms of reference of the Ad Hoc Group. The modified terms of reference, as approved by the Working Group, are given in Annex IV. The name of the Ad Hoc Group was changed to "Ad Hoc Group on Format Development."
5.3 Geological/Geophysical Data Management

30. The Chairman of the Ad Hoc Group for Development of Marine Geological/Geophysical Data Management presented a detailed review of the Ad Hoc Group’s report. He noted that considerable effort had gone into establishing a format that would be acceptable for the exchange of marine geological data. Considering the scope of the task, he explained that a decision had been made to place emphasis on marine geology while deferring marine geophysics to after the present session of the Working Group. He further explained that selection of parameters had been a compromise and that criteria for the selection of parameters was provided in Annex I to the Ad Hoc Group’s report (IOC/IODE-VII/8).

31. The Chairman, after considerable discussion by members of the Working Group, recommended the adoption of the Ad Hoc Group’s report and of Recommendation 1 contained therein. He suggested, in view of the discussion, that the Chairman of the Ad Hoc Group, after consultation with the delegates of France and the United Kingdom, revise Recommendations 2 and 3 of the Ad Hoc Group. Recommendation 2 (cf. Annex II) combined all the elements of the Ad Hoc Group’s recommendations. The membership of the Ad Hoc Group, as reconstituted by the Working Group, was the following: Federal Republic of Germany (Chairman); Arab Republic of Egypt; Argentina; Canada; France; Japan; Netherlands; Norway; Pakistan; U.S.A.; and USSR.

5.4 Biological Data

32. The Chairman of the Task Team on International Exchange of Marine Biological Data presented the Task Team’s report. He made the observation that biologists should be urged to enter the "data age" so that marine biological studies could be undertaken on the global scale and noted that within the biological research community considerable difference of opinion existed on the comparability of data. He then remarked that the Task Team had accepted the second level inventory concept and pointed out that the documentation standards formulated by the Task Team were listed in Annex I to document IOC/IODE-VII/6.

33. The Chairman of SCOR/ACMRR Working Group 32 described the second level inventory form - Results of Marine Biological Investigations (ROMBI) - which Working Group 32 was developing to facilitate the dissemination and exchange of marine biological data. He emphasized that, in the opinion of Working Group 32, full integration of ROMBI with ROSCP was desirable. It was mentioned that some form of endorsement of ROMBI by the Working Group on IODE would be appreciated, as would advice on how use of ROMBI might be implemented, i.e. some feedback on user trends.

34. Considerable discussion followed on both reports. The delegate of Canada cautioned that the proposals outlined tended to be idealistic and indicated that, perhaps because of the impracticability of exchanging some forms of biological data, the proposals were premature. Other delegates (Sweden, United Kingdom, FAO), however, favoured the concept, arguing that ample evidence existed that some biological parameters could be exchanged usefully. The need was pointed out, as an example, for data from various oceanic areas for comparative studies in marine productivity as well as for baseline studies relating to biological uptake of marine pollutants. The Chairman proposed that Member States follow the
suggestions in the Task Team's report with respect to those data that lent themselves to international data exchange, urging that the list of such data be made available immediately to the WDOs and to national and regional oceanographic data centres. He further proposed that National Co-ordinators for IODE become increasingly active within their countries in identifying the benefits from and needs for the exchange of biological data and that Member States be urged to adopt the ROMBI second level inventory concept as developed by SCOR/ACMRR Working Group 32. These proposals were accepted. The Chairman of the Task Team on International Exchange of Marine Biological Data suggested that the work be continued by the Ad Hoc Group on Format Development under its new terms of reference and thereby the Task Team could be discharged. The Working Group so agreed, discharging the Task Team with commendation and thanks for its work.

5.5 Satellite and Airborne Sensed Data

35. As the Chairman of the Ad Hoc Group on Exchange of Satellite and Airborne Sensed Data could not be present, the Ad Hoc Group's report (IOC/IODE-VII/15) was reviewed by the United States member of the Ad Hoc Group. He explained that the Ad Hoc Group had concentrated on an overview of the needs of the user community and had deferred attempting a systematic overview of the state of the art. He directed the attention of the Working Group to the Ad Hoc Group's recommendations and focussed briefly on Recommendation 3.4 which indicated the difficulty of making specific recommendations at this time concerning formats for international exchange of satellite or remote sensed data. The recommendations included a proposal for a pilot study to experiment with the exchange of such data.

36. Since discussion of the report verified that it was premature to expect a readiness on the part of all Member States to participate in the international exchange of remote sensed data, the Chairman requested the record show that the Ad Hoc Group was urged to continue its efforts to provide information on the development of satellite and remote sensing technology, and related data management and exchange aspects. He also urged that the IOC Secretariat compile and distribute to Member States lists of sources of satellite and remote sensed oceanographic data. The Chairman further suggested that the Ad Hoc Group pursue the recommendation concerning a pilot study. Should such prove to be feasible, the Ad Hoc Group was instructed to investigate the possibility of using an area such as CINECA or some other area of co-operative investigation for the pilot study. As a final point, the Chairman suggested that if the pilot study were carried out arrangements be made by the IOC Secretariat for the data and appropriate documentation to be presented in the four official languages of the Commission.

37. The Working Group was informed of the recommendation of the IOC Group of Experts on ICGGSS Technical Systems Design and Development and Service Requirements (ITECH) that a study be made of the contribution satellites and aircraft could make to the acquisition of oceanic data and of ITECH's proposal that a report be prepared outlining the medium- and long-term projects of the countries which were involved in developing satellites able to participate in the acquisition of oceanic data. The Working Group agreed to assist in drawing up the requested report through its Ad Hoc Group on Exchange of Satellite and Airborne Sensed Data.
5.6 Wave Data as Measured by Instrumental Methods

38. The Chairman introduced the item with the observation that the demand for wave data increased as man increasingly extended engineering structures onto the continental shelves and beyond. The Chairman of the Ad Hoc Group on Format Development, commenting on the report "Engineering Requirements for Wave Data" *(IOC/IODE-VII/INF.9)*, pointed out that a high degree of agreement existed among users as to what wave data were needed. Although the essential need now was for statistical estimates of the wave field, a growing interest was developing in the spectral characteristics of the wave field.

39. The delegate of Canada outlined *(IOC/IODE-VII/INF.15)* Canadian experiences in the establishment and operation of a wave climate programme. Interesting information was provided on the feasibility or lack of feasibility of archiving and exchanging certain types of wave data.

40. In the light of the Canadian report, the Chairman formed a small ad hoc group of the session consisting of Canada (Chairman), Netherlands, Norway, and South Africa, with representatives from ECOR and WMO, to review the conclusions and recommendations of the ECOR report. The ad hoc group reported as follows:

"The group found two major areas requiring action in the field of wave data management.

The first area concerned the documentation of wave data. It was clear that substantially more information concerning techniques, methods of analysis and instrument characteristics was required by a user of wave data than was generally the case with other data. It seemed also that no written guide existed to aid data centres or users as to what documentation must be exchanged with the data to ensure proper interpretation.

A further problem existed regarding the development of procedures and formats in the area of archival and exchange. There was insufficient knowledge of the form, quantity and exchangeability of wave data to facilitate such technical developments. The group felt it did not have enough knowledge to comment on non-engineering instrumental wave data requirements for the purpose of specification of archiving requirements.

To enable the Working Group on IODE to recommend procedures for the international exchange of wave data, it was necessary to set up a task team to work on these problems in the intersessional period and report to the eighth session of the Working Group. Member States would be requested to submit information on programmes and on data archiving and processing techniques. The task team, working by correspondence, would then attempt to recommend to the eighth session of the Working Group the minimum documentation necessary to accompany the exchange of wave data and recommend the necessary procedures and formats for archival and exchange.

The second area of concern was the actual exchange of wave data, this being an immediate requirement. It was therefore suggested that Member States who were in a position and willing to exchange wave data should*

* The report draws attention to the need for an international scheme for acquisition and archiving of instrumental wave data for the open sea and suggestions are offered for ways in which it might be organized. Some preliminary advice is given on data formats preferred for engineering purposes.
identify themselves to the Working Group; where necessary, exchanges could proceed bilaterally. It was strongly suggested that in such exchanges every effort be made to use the format scheme suggested for new data by the Ad Hoc Group on Format Development in order to obtain experience with it. All information pertinent to the work of the task team should be documented during these exchanges and forwarded to the team.

The group noted that, as pointed out by ECOR in document IOC/IODE-VII/INF.9, there was a requirement for instrumented wave data in the open ocean, particularly in the shipping lanes. It was also noted that WMO was studying the feasibility of instrumenting ships to replace part of their visual observations with measured data. It was suggested that in planning any such system the requirement be recognized that following the real time use of the data by WMO, the data be archived through the system of world and national oceanographic data centres and thus be made available to secondary users.

The group noted there was a requirement for a wave data inventory service and that such a scheme had been set up by PIANC. It was recognized that this inventory was insufficient for all the needs of the environmental and engineering communities as it did not include offshore observations. The task team described might explore with PIANC the possibilities for extending PIANC's inventory to these other observations through mutual co-operation.

41. The Working Group decided to establish a Task Team on Wave Data Management. The terms of reference of the Task Team are contained in Annex III. Recommendation 3, on wave data management, was adopted by the Working Group (cf. Annex II).

5.7 Declared National Programmes

42. The Director of WDC-A (Oceanography) and the representative of WDC-B (Oceanography) provided the Working Group with brief accounts of the functions of the Declared National Programmes (DNP). While mentioning that statistics demonstrated that participation by Member States in the DNP concept had steadily declined, both believed it would be unwise to abandon the concept.

43. The Assistant Secretary presented a somewhat brighter picture based on recent submissions of DNP summaries to the IOC Secretariat. He reminded the Working Group that it had previously been requested that the Working Group review DNP procedures, taking into account the usefulness of DNPs, their relationship to ROSCOP submissions and the method of dissemination of DNP announcements.

44. As suggested by the Chairman, the Working Group requested the Directors of WDCs A and B (Oceanography) and nominees from Sweden, Korea and Colombia to re-evaluate the DNP practices and outline such new practices as were desirable. This group was advised to submit its report to the IOC Secretariat before 1 January 1974. The Working Group also requested that the findings and recommendations on DNP be published in IMS and that Member States be informed by circular letter. Further, should the decision be to continue DNPs, the Commission was urged to publish early in 1974 a descriptive brochure on DNP practices for distribution to Member States.
5.8 National Co-ordinators for International Oceanographic Data Exchange

45. The Chairman reported on the newly established practice of exchanging among national oceanographic data centres information on operational problems and techniques employed by each centre. This was accomplished through the National Co-ordinators for IODE, appointed by Member States, who provided the Chairman with the pertinent information (IOC/IODE-VII/INF.6) through a questionnaire he had designed. Some Member States who did not have a national oceanographic data centre also provided information on their plans for such a centre and related problems. The Working Group agreed that the information received was useful and suggested that the National Co-ordinators expand their role by assisting in such areas as fostering the exchange of biological data; collecting lists of institutions and ship codes (IOC/IODE-VII/13, Appendix 1); and by providing a national or regional focal point for the indexing or inventorying of historical marine pollution data files (IOC/IODE-VII/10, page 4). It was suggested that the statements of the delegates of the Arab Republic of Egypt, Malta and Pakistan on training and education, under agenda item 8, be provided to all National Co-ordinators.

5.9 Manual on International Oceanographic Data Exchange

46. With the recent publication of the third edition of the Manual on International Oceanographic Data Exchange, as No. 9 in the IOC Technical Series, the Working Group had complied with one of its tasks: to keep under review and to update the Manual. The Chairman expressed the appreciation of the Working Group to the Directors of WDCs A and B (Oceanography), as well as to ICSU and SCOR, for preparing the third edition and to the IOC Secretariat for ensuring its prompt publication.

47. Even though the third edition of the Manual had only been in circulation a little while, Working Group members noted that modifications would be needed. Therefore, members of the Working Group were requested to transmit suggested modifications to the IOC Secretariat for compilation and submission to the eighth session of the Working Group. The Assistant Secretary indicated that periodic supplements would be issued for those modifications of a substantive nature. For example, the ROSCOP Form in the Manual would be superseded by the new form to take effect from 1 January 1974; therefore an appropriate supplement would be issued. The Chairman concluded this item by urging that Member States make copies of the Manual on International Oceanographic Data Exchange available to all appropriate institutions.

5.10 Marine Pollution Data

48. The Chairman introduced the report of the Ad Hoc Group on Marine Pollution Data (IOC/IODE-VII/10) by reading from the terms of reference of the Ad Hoc Group and underscored the need to determine whether marine pollution data already stored in various national and regional centres could be made available for use in baseline studies or trend analyses. The Chairman of the Ad Hoc Group then reviewed briefly the chronology of events leading to the completion of the report. He mentioned that the report highlighted the requirements for and problems of exchange but did not come to grips with solutions for many of the problems. In addition to the recommendations contained in the report, the Chairman of the Ad Hoc Group asked the Working Group to consider the following:
(a) that the Ad Hoc Group be provided with increased (or revised) membership to tie the Group effectively to programmes of the Commission. Representation from Canada, the United Kingdom or the USSR would be desirable;

(b) that the Ad Hoc Group be provided with revised terms of reference to facilitate a specific interface with ICOSS groups;

(c) that, while the Ad Hoc Group could obtain information on the marine pollution aspects of CIM through the Group's members from France and Monaco, and on CSE through the member from Japan, it was not possible yet to obtain direct input from ICES (either as a regional data centre for CINECA or in its own right) regarding the marine pollution programmes in the Baltic and North Seas. The Ad Hoc Group would benefit by the participation of an observer from ICES; and

(d) that similarly the Ad Hoc Group would benefit by the participation of an observer from SCOR Working Group 45 (Marine Pollution Research).

49. A lively discussion followed with delegates from USSR, Norway, Sweden, Federal Republic of Germany, the observer from the East African Community and representatives from FAO and ICES all taking part. The observer from the East African Community referred to marine pollution problems in waters adjacent to the member nations of the Community, problems which related to the run-off of agricultural pesticides and oil from passing tankers. He spoke of the East African Marine Fisheries Research Organization (EAMFRO) and asked the Working Group if ways could be explored through which data and information collected by EAMFRO could be made available for international exchange.

50. The Chairman noted the Commission's mandate to assist developing countries and indicated that the Working Group would assist EAMFRO within its terms of reference. As many other points were raised in the discussion a small in-session group was appointed, comprising members of the Ad Hoc Group of Marine Pollution Data, plus Italy, Brazil, USSR, the East African Community, ICES and a representative of the the United Nations Environment Programme, to review the recommendations contained on pages 4 and 5 of the Ad Hoc Group's report with the object of assigning priorities; to review the Ad Hoc Group's terms of reference to ensure that they were still pertinent to its activities; and to review the proposals presented during the session by the Ad Hoc Group's chairman. The decisions of the in-session group, as approved by the Working Group, are contained in Annex II as Resolution 1.

5.11 International Experiments and Co-operative Investigations

51. Two experiments were described: the ICES "Overflow 1973" Expedition, and the 1974 GATE. The representative from ICES outlined the purpose of the Overflow Expedition and described some of the plans for exchanging the data. He noted that "Overflow 1973" would provide an input to the ICOSS BATHY Pilot Project.

52. GATE was described by an observer from the United States. He emphasized the magnitude of the experiment and the complexity of data management inherent in such a major experiment (IOC/IODE-VII/INF.5).
53. The Assistant Secretary, relating GATE to the Commission's activities, indicated that GATE would contribute to the Long-Term and Expanded Programme of Oceanic Exploration and Research (LEPOR) and that the service aspects of the Commission would be called upon to support GATE. In particular, the Working Group on IODE should provide expertise in data management. The Assistant Secretary also asked the Working Group for its opinion on the functions suggested for the Oceanographic Subprogramme Data Centre (France) as outlined on page 2 of document IOC/IODE-VII/INF.12.

54. The Chairman reminded the Working Group that its function in connexion with major projects and experiments lay in ensuring that properly formatted, quality controlled data, in a non-real-time mode, be made available to the international data exchange system.

55. The delegate of France outlined the rôle that the Bureau National des Données Océaniques (BNOO) would play as a Subprogramme Data Centre for GATE. He described the benefits that could be derived by testing the compatibility of formats under full-scale operational conditions.

56. The Assistant Secretary announced that an International Scientific Management Group meeting for GATE data management was to be held in Moscow in September 1973. Recognizing that the delegate of France, the Director of ENDO, would participate, the Working Group designated him as its representative and recommended that he present the following during the meeting:

1. the ROSCOP formula be used to facilitate the general inventory of collected observations;

2. standard data be considered for presentation in the formats already existing and recognized by the Working Group;

3. special data be presented in a format which included the general directions for formats established by the Ad Hoc Group on Format Development, especially regarding the utilization of the format for heterogeneous data;

4. the existence of the formats established in somewhat analogous programmes such as the Barbados Oceanographic and Meteorological Experiment (BOMEX) and CICAR be taken into account;

5. a particular effort be made during GATE to provide for a quick distribution of oceanographic data in real time, and the IGOSS procedures and formats as adopted in the Manual on IGOSS Data Archiving and Exchange be utilized to provide for the final archiving of GATE oceanographic data.

57. The delegate of Brazil offered the facilities of the Brazilian Hydrographic Office's Oceanographic Data Bank for use in support of GATE. The offer included the use, commencing immediately, of the following for one hour daily Monday to Friday and for ten hours on Saturday and Sunday:
1. IBM/360 Model 30 Computer Configuration with
   (a) 4 magnetic tape units and 9 track/800 BPI
   (b) 4 disc IBM 2314
   (c) 2 1403 printers
   (d) 1 read/punch card 25/4 CE.

2. Two scientific programmers.

58. This very generous offer was welcomed by the Working Group, which assured
the Brazilian delegate that the offer would be transmitted to the LSMG
meeting for GATE data management to be held in September.

59. The Working Group, recognizing the importance of ensuring close co-operation
between the Working Group and co-ordinating bodies for international oceanographic
experiments, decided to establish a task team for that purpose. The terms
of reference and composition of the task team are contained in Annex III.

60. The Chairman called the attention of the Working Group to information docu-
ment IOC/IODE-VII/INF.13 submitted by the United States, which reviewed the
United States programme for the International Decade of Ocean Exploration (IDOE).
He noted in particular the "Guidelines for Submission and Dissemination of
Environmental Data Collected on IDOE Programmes" appended to that document.

Item 6: Marine Environmental Quality

6.1 Resolutions of the XXVIIth United Nations General Assembly
Concerning the Human Environment

61. By resolution 2994 (XXVII), the United Nations General Assembly referred
the Action Plan for the Human Environment (as approved by the United Nations
Conference on the Human Environment, Stockholm, June 1972) to the Governing
Council for the United Nations Environment Programme (UNEP) for appropriate action.
The recommendations directed to the Commission relating to the Working Group on
IDOE were considered by the Working Group. These recommendations dealt with the
activities for exchange, dissemination and referral to sources of marine pollution
data and information; interdisciplinary marine pollution data and scientific
information referral capability and others. The Working Group considered that
most of the recommended activities had been under study by the Ad Hoc Group on
Marine Pollution Data and by the Joint Task Team on Interdisciplinary and Inter-
organizational Data and Information Management and Referral. The Working Group
felt that the activities of the Working Group as recommended by the Action Plan
for the Human Environment should be further strengthened. These questions were
discussed again under agenda items 5.10, 6.2, 6.3 and 6.4.

62. The Chairman invited attention to the following quote from (paragraph 99) of
the Annual Report of the Administrative Committee on Co-ordination (ACC) of
the United Nations Economic and Social Council (ECOSOC) (E/5289, Part I,
25 April 1973):
"It is true that some progress has been made. The Intergovernmental Oceanographic Commission (IOC) and the agencies members of the Intersecretariat Committee on Scientific Programmes Relating to Oceanography (ICSPO), for example, have initiated a series of measures to enhance the role of the IOC as an interorganizational instrument for co-ordinated international action in oceanography. Also, the United Nations Conference on the Human Environment has taken place in the meanwhile and its results are now known, thus removing a major element of uncertainty which had existed at the time of ACC's last report".

The representative of UNEP also noted that the study of marine pollution is a UNEP objective and that information exchange and other supporting activities were principal considerations in the UNEP Action Plan (UNEP GS/5) recently approved by the first session of the UNEP Governing Council. To this end, the Governing Council authorized the implementation of the experimental phase of (UNCHE Recommendation 101) the International Referral Service to Sources of Environmental Information.

6.2 Joint Task Team on Interdisciplinary and Interorganizational Data and Information Management and Referral

63. The Joint Task Team comprising members from the IOC (Team Leader), FAO, the International Atomic Energy Agency (IAEA), WMO and ICES, with the World Health Organization and the International Hydrographic Organization (IHO) as observers, was established in accordance with Recommendation 3 of the sixth session of the Working Group, endorsed by the seventh session of the Commission (Resolution VII-25). Its terms of reference included:

(a) to assess and document the present information and data management activities within members' respective organizations;

(b) to propose a concept for interdisciplinary and interorganizational data and information management and referral making full use of existing facilities and arrangements.

64. The Task Team Leader, in introducing the first report of the Task Team (IOC/IODE-VII/11), acknowledged the progress made by UNEP in working towards an International Referral Service (IRS), and noted the obvious relationships between IRS (UNCHE Recommendation 101) and the work of the Task Team (UNCHE Recommendation 91) - the latter as a specialized marine-oriented subset of the larger IRS. The first report of the Task Team was presented as a review of ongoing data and information management and referral activities of IOC, FAO, IAEA, WMO and ICES. The Task Team had met during the present session of the Working Group and prepared a second preliminary report containing findings and recommendations on the development of systems, concepts and mechanisms for management and referral services.

65. The second report, which had not been reviewed by the IAEA member of the Task Team, was then presented. The report recommended:
(1) the preparation and wide distribution of a multi-language popular brochure describing the environmental data and information services available within the Task Team's member organizations;

(2) the interorganizational preparation of technical, documented inventories of the data and information bases within the centres or systems previously identified in the brochure, which would serve as an interdisciplinary referral catalogue; and

(3) the encouragement of increased effort in establishing additional inventories of environmental data and information to enhance the current referral service capabilities available within the Task Team organizations.

The second report of the Task Team was endorsed, in principle, by the Working Group subject to the condition that no substantial change would be made when it was presented in final form.

66. Attention was invited to document IOC/IODE-VII/INF.16, submitted by the United States (NOAA, Environmental Data Service (EDS)), describing "An Approach to an Environmental Data Referral System (ENDEX)", which was suggested by the Task as one potential system for preparing the inventories noted in its Recommendations 2 and 3. Recommendation 4 was adopted by the Working Group (cf. Annex II).

6.3 Global Investigation of Pollution in the Marine Environment (GIPME)

67. The Assistant Secretary reviewed the findings and decisions of the first session of the International Co-ordination Group for GIPME and in particular those related to the activity of the Working Group on IODE. The International Co-ordination Group recognized that an important element of GIPME would be the management of data and information produced during the investigation and stressed the importance of close collaboration between the Working Group and the International Co-ordination Group for GIPME. This was fully supported by the Working Group and it was agreed that the Ad Hoc Group on Marine Pollution Data should work closely with the International Co-ordination Group for GIPME. This subject was considered by the Ad Hoc Group on Marine Pollution Data and its findings are contained in the report of the Ad Hoc Group, as well as in this report under agenda item 5.10.

6.4 IGOS (Pollution Related Activities)

68. The Assistant Secretary informed the Working Group of the Commission's activity in designing and planning marine pollution monitoring programmes under the framework of IGOS. The attention of the Working Group was drawn particularly to the Draft Operational Plan for the Marine Pollution Monitoring Pilot Project developed by the first session of ITECH, as well as to the preparatory work to be undertaken before the initiation of the Pilot Project. No specific action was required from this session of the Working Group as the Draft Operational Plan for the Pilot Project would first have to be considered and endorsed by the second session of the Planning Group for IGOS (IMPLAN), which
was to be held in August 1973. Nevertheless, the Working Group agreed that some
arrangements needed to be made to collaborate with ICES bodies in developing
methods for archiving, reporting and dissemination of the data resulting from the
Pilot Project. The Working Group's findings on this subject were reflected under
agenda item 5.10.

6.5 ICES (Pollution Related Activities)

69. The Working Group accepted with appreciation the report on pollution research
and monitoring studies undertaken by ICES, which was presented to the meeting
by the representative of ICES (IOC/IODE-VII/INF.2).

70. Commenting upon marine pollution in general, the delegate of Spain noted two
basic characteristics of the contamination problem: that it might affect huge
areas of the ocean and that there was an acknowledged lack of definition both in
the identification of the parameters to be measured and in the presently existing
measurement techniques. He considered that the establishment was necessary of
additional regional bodies, such as ICES, to serve neighbouring countries with
common pollution problems.

Item 7: Integrated Global Ocean Station System (IGOSS)

7.1 Manual on IGOSS Data Archiving and Exchange

71. The Chairman of the Ad Hoc Group on IGOSS Data Archiving and Exchange reviewed
the development of the third draft edition of the Manual on IGOSS Data Archiving
and Exchange (IOC/IODE-VII/14). He noted specifically the effective interaction
amongst the members of the Ad Hoc Group and representatives of WMO and ICES in
developing the Manual and that several of the practices outlined in the Manual had
been tested on a limited basis during the IGOSS Bathy Pilot Project. The Chair-
man recommended that the draft Manual be endorsed and transmitted to IPIAN for
adoption and that it include only the obligatory portion, i.e. those chapters at
present contained in the third draft edition and that a "Planning Guide for IGOSS
Data Archiving and Data Services" be developed. This guide would contain the
information previously intended for Chapters IV-VIII of the Manual which were not
included in document IOC/IODE-VII/14. The Working Group endorsed both recommen-
dations (IOC/IODE-VII/12 Supplement, Recommendations 1 and 2) and the IOC Secre-
tariat was requested to bring them to the attention of the second session of
IPIAN.

72. The representative of WMO noted with appreciation that the third draft
edition of the Manual took into account concepts and terms common to meteorolo-
gical practices and that this greatly facilitated its use by meteorological
centres concerned. He also informed the Working Group of a number of amendments
to the SYNDARC form proposed by members of the WMO/COMM Working Group on Marine
Climatology. The Chairman of the Ad Hoc Group was instructed to take these
proposals into consideration prior to the submission of the draft Manual to the
second session of IPIAN. The delegate of Japan notified the Working Group that
he could confirm that the Japan Oceanographic Data Centre (JODC) would within
two to three years act as a Responsible National Oceanographic Data Centre
(RNODC) for IGOSS and requested that this be so indicated in Chapter III.
73. The comments made by members of the Working Group on Marine Climatology regarding the replication of meteorological parameters in oceanographic and meteorological data forms were noted by the Working Group. It recognized the common interests of meteorologists and oceanographers who would turn to their respective centres for data.

74. The Working Group confirmed the opinion expressed by the Ad Hoc Group on IGOSS Data Archiving and Exchange, namely that in certain instances it would be more efficient to enter duplicated sets of meteorological observations into oceanographic data files (and vice-versa) than to maintain mutually exclusive data sets in the separate centres. The Working Group recognized, however, that such replicated data subsets must be identifiable in the respective centres and that the establishment of such files should be undertaken only after considering the burdens that would be placed upon the observers, the compatibility of data formats for the parameters involved, data accuracy, times of observation, etc.


75. Following discussion of the Manual, the Chairman observed that the agreement reached on this document provided clear evidence of another significant accomplishment by the Working Group. The Chairman and members of the Ad Hoc Group responsible for the development of the Manual were commended for their work. For the follow-on action to make full use of the Manual:

(a) it was emphasized that National Co-ordinators for IODE should take all steps practicable to implement the use of the Manual including its referral to all parties involved in data management for archival purposes;

(b) National Co-ordinators for IODE were urged to maintain close working relationships with National Representatives for IGOSS in order to work out further planning and implementation arrangements for handling IGOSS data both at the national level and for international participation;

(c) in relaying the draft Manual, as approved by the Working Group, to IPLAN, it was proposed that the Manual be included in IPLAN's consideration of manuals, planning guides, and other technical documentation.

76. The Working Group also expressed appreciation to the representative of WMO and requested that this appreciation be transmitted to the WMO bodies which made a number of valuable contributions during the preparation of the Manual.

7.2 IGOSS Pilot Project for the Collection, Exchange and Evaluation of Bathythermograph Data

77. The Assistant Secretary presented the Working Group with a synopsis of the implementation of the BATHY Pilot Project and an evaluation of the Project's first year which had been summarized in IGOSS Programme Information Circular (PIC) No. 6. One conclusion presented in PIC No. 6 was that the operational system initiated through the Pilot Project was a success and therefore should continue on a permanent basis. The evaluating team, however, did uncover several
inconsistencies in the design of IOSS and, of particular interest to the Working Group, that the non-real-time aspects had not been implemented adequately yet.

The publication of the Manual on IOSS Data Archiving and Exchange should foster more participation in the latter respect. The Assistant Secretary mentioned that at the end of February 1973 BATHY and TESAC reports were being exchanged within IOSS at a rate of 20,000 observations yearly. The delegate of the United Kingdom stated that a recent check within his country indicated that the yearly rate had increased to approximately 25,000 observations (70/day).

78. The delegate of Finland pointed out the need for a code addressed solely to sea surface temperature. He was informed that, in response to a similar suggestion which had been made by Sweden, this subject was being investigated by WMO and IOC.

7.3 Recommendations of the Joint IOC/WMO Planning Group for IOSS (IPLAN)

79. The Working Group reviewed the requests directed to it by IPLAN as contained in the Work Plan for Further Development of IOSS (IOC-WMO/IPLAN(1)/3, Annex VII) as paragraphs 3.3, 6.2, 6.3 and 9.1. The Working Group considered that appropriate action had been taken on each but recognized that further work would be needed. For example, work on current and sea surface temperature codes was anticipated and the "Planning Guide" material in agenda item 7.1 would need to be developed, if IPLAN so desired.

7.4 Air/Sea Interaction

80. Having reviewed earlier the potential data archival impact resulting from planned international experiments and co-operative investigations, the Working Group recognized that much of the data generated by meteorological studies over the oceans as well as oceanographic investigations were of common interest, particularly those data acquired in the air/sea interaction zone. The Working Group noted that data originating from these experiments and investigations were often archived in designated data centres which could result in a separation of such data from each other and from other environmental data obtained on a routine basis. Experience had shown that the total data requirement for subsequent research efforts often could not be met because of lack of availability of data from the related disciplines in compatible formats and also because of lack of effective inventories of data of different disciplines. To compensate for the types of problem indicated, there was a need for a joint mechanism between IOC and WMO to provide advice concerning the data formatting, storage and exchange procedures in respect to international air/sea interaction experiments. This joint mechanism could best be conceived as consisting of membership from the bodies of IOC and WMO concerned with data archiving and exchange, i.e., the IOC Working Group on IODE and the WMO/CMC Commission for Basic Systems. Consequently the Working Group adopted Recommendation 5 given in Annex II.

Item 8: Training and Education

81. In introducing agenda items 8.1 and 8.2, the Chairman mentioned their interdependence, particularly when considering the Unesco/IOC sponsored courses in marine data processing and management conducted at the United States NODC
(IOC/IODE-VII/INF.3) and the proposal presented by the United States for the preparation of a guide to the development and operation of NODCs (IOC/IODE-VII/INF.11). The delegate of the United States mentioned in his report that 23 trainees from 16 countries had received instructions in acquisition, processing and utilization of ocean data during the period of three courses - each of six months' duration. He then presented and reviewed the proposal for the preparation of a guide to the practices of NODCs, urging that other countries join the United States in preparing the details of the proposed guide. During discussion of agenda items 8.1 and 8.2 the delegate of Pakistan emphasized the need for (i) assistance in the establishment of national data centres in the developing countries that wished to have them; (ii) expansion of the training and education facilities in data management being provided to the developing countries; and (iii) assistance in developing marine sciences in the developing countries as this would help in the augmentation of their capabilities in data management. The observations of the delegate of Pakistan evoked general support, in particular from the delegates of the Arab Republic of Egypt, Argentina, Malta and the East African Community.

82. Following the discussions, the Chairman suggested the establishment of a task team to prepare the guide with terms of reference as documented in Annex III. The suggestion was adopted. It was requested that the IOC Secretariat transmit the comments of the delegates of Pakistan, Malta and the Arab Republic of Egypt to the IOC Group of Experts in Training, Education and Mutual Assistance (TEMA) and possibly to the member agencies of ICSPRO.

83. The delegate of the USSR informed the Working Group that courses similar to those sponsored by Unesco/IOC at the United States NODC could be scheduled in the Soviet Union in 1974, 1975 or later. This information was noted with pleasure and the delegate of the USSR was asked to interact with the IOC Secretariat in the planning and implementation of the courses. Recommendation 6 on training and education was adopted by the Working Group (cf. Annex II).

Item 9: Arrangements for International Oceanographic Data Exchange

84. The Chairman reviewed the discussions that had been held at the sixth session of the Working Group concerning various proposals for strengthening the international exchange of oceanographic data among world, regional and national data centres, including the concept detailed by IOC Circular Letter No. 342. He noted that these discussions had led to the establishment of a Task Team on the Development of Arrangements for International Oceanographic Data Exchange: the Team Leader had been selected by Canada and other participating countries were Argentina, Finland, France, the Federal Republic of Germany, Japan, Sweden, United Kingdom, U.S.A. and USSR. The Chairman called on the Team Leader to present the report developed during the intersessional period (IOC/IODE-VII/9) through correspondence among members of the Task Team.

85. Highlights of the report included:

(a) the concept of a data exchange network composed of existing Designated National Agencies (DNAs), NODCs, regional centres and the WDCs, together with a new element, the RNODCs;
(b) an emphasis that the RNODCs were envisioned as complementary to, and in support of, the WDCs - not as a substitute for the WDCs;

(c) delineation of the functions proposed by the RNODCs; and

(d) suggestions for implementation of the concept including the proposal that the RNODC scheme come into existence only on a gradual step-by-step basis - a limited capability by 1975, but greater prospects by 1980.

Following considerable discussion, the Chairman suggested:

(i) that, recognizing the RNODC concept proposed by the Task Team, with functions as detailed, the report as amended be considered for adoption;

(ii) that the IOC Secretariat be requested to determine by circular letter which Member States would affirm their support of the RNODC concept by agreeing to carry out the function of an RNODC as proposed by the Task Team (IOC/IODE-VII/9 as revised by the Task Team during the session would be included with the circular letter); and

(iii) provided with the responses to the IOC circular letter, that the Task Team prepare, for consideration by the eighth session of the Working Group on IODE, the details for implementation (including the schedule), of the Task Team's plan for the strengthening of arrangements for the international exchange of oceanographic data among world, regional and national centres with augmentation and support by the RNODCs.

86. The Task Team Leader was requested to co-ordinate closely the Task Team's activities with those of the Ad Hoc Group on IGOS Data Archiving and Exchange in order that there be no confusion between the respective RNODC concepts.

87. Amendments to document IOC/IODE-VII/9 as agreed upon by the Task Team during the session were as follows:

(a) page 1, paragraph 3, delete lines 4 and 5 and the first word of line 6 and substitute: "... the only feasible solution would be the concept of further development of a data exchange network composed of the existing Designated ..."

(b) page 2, Assumption No. (4), add at the beginning: "All data resulting from DNOPs and international programmes will continue to be submitted to the WDCs in the formats and according to the criteria established in the IOC Manual on International Oceanographic Data Exchange"

(c) page 2, Assumption No. (4), last line, amend "its" to "other"

(d) page 2, Assumption No. (5), for the first five words substitute: "The WDCs will have at their disposal in addition to their data full ..."

88. The Working Group approved the amended report of the Task Team and endorsed the suggestions of the Chairman for further activity on this subject.
Item 10: Other Business

89. The delegate of the United Kingdom requested that the Working Group consider briefly the question of standard techniques for the reduction of STD data. Whereas standards had been set for recording and storing data, methods for determining discrete values of the variables had not been developed. This led to inconsistencies in the data as several reduction methods were in use. It was suggested that this problem be studied during the next intersessional period by the Ad Hoc Group on Format Development, possibly in conjunction with ICES, in particular with the ICES Working Group on Marine Data Management. The representative of ICES was requested to bring this proposal to the attention of the 61st Statutory Meeting of ICES in October 1973.

Item 11: Next Session

90. The Working Group indicated that its eighth session should be held in 18 to 24 months' time, i.e. during the first half of 1975. The representative of FAO informed the Group that FAO would be delighted to host the eighth session. The Working Group was happy to accept this offer, recalling the outstanding support provided by FAO on the occasion of the sixth session of the Working Group. The Chairman, in consultation with FAO and the IOC Secretariat, would determine the dates of the eighth session.

91. The Vice-Chairman of the Working Group briefly reviewed the accomplishments of the Group and spoke of the challenges that it faced during the next intersessional period. He commented that only through continued hard work and, to a great extent, innovation would the tasks of the Group be completed adequately. On behalf of the Working Group he expressed appreciation to the Chairman for the pleasant and productive manner in which he had conducted the session.

The Chairman in turn thanked all those who had been involved in the session and declared the seventh session of the Working Group closed.
ANNEX I

Working Group on International Oceanographic Data Exchange

(Seventh Session, United Nations, New York, 9 to 13 July 1973)

AGENDA

1. Opening of session
2. Adoption of Agenda
3. Terms of Reference of Working Group
   3.1 Historical Background
   3.2 Information Concerning Rationalization of the Structure of the Commission's Subsidiary Bodies
4. Reports
   4.1 Secretariat
   4.2 ICES
   4.3 WMO/ACOMR
   4.4 FAO/ACMRR
   4.5 FSMSL
   4.6 WDC-A and WDC-B (Oceanography)
   4.7 SCOR
   4.8 ECOR
   4.9 International Co-operative Investigations
5. Data and Information Management and Exchange
   5.1 ROSCP
   5.2 Format Standardization
   5.3 Geological/Geophysical Data Management
   5.4 Biological Data
   5.5 Satellite and Airborne Sensed Data
   5.6 Wave Data as Measured by Instrumented Methods
   5.7 Declared National Programmes
   5.8 National Co-ordinators for International Oceanographic Data Exchange
   5.9 Manual on International Oceanographic Data Exchange
   5.10 Marine Pollution Data
   5.11 International Experiments and Co-operative Investigations
6. Marine Environmental Quality
   6.1 Resolutions of the XXVIIth United Nations General Assembly Concerning the Human Environment
   6.2 Joint Task Team on Interdisciplinary and Interorganizational Data and Information Management and Referral
   6.3 Global Investigation of Pollution in the Marine Environment (GIPME) - related activities of SCOR
   6.4 IGOSS (pollution related activities)
   6.5 ICES (pollution related activities)

7. Integrated Global Ocean Station System (IGOSS)
   7.1 Manual on IGOSS Data Archiving and Exchange
   7.2 IGOSS Pilot Project for the Collection, Exchange and Evaluation of Bathythermograph Data
   7.3 Recommendations of the Joint IOC/WMO Planning Group for IGOSS (IPLAN)
   7.4 Air/Sea Interaction

8. Education and Training
   8.1 Assistance in the Development of National Oceanographic Data Centres
   8.2 Education and Training in Data Management

9. Arrangements for International Oceanographic Data Exchange

10. Other Business

11. Next Session
ANNEX II

Working Group on International Oceanographic Data Exchange

Seventh Session

(United Nations, New York, 9 to 13 July 1973)

RESOLUTIONS AND RECOMMENDATIONS

Resolution 1  Marine Pollution Data
Resolution 2  Manual on IGOSS Data Archiving and Exchange
Recommendation 1  Format Development
Recommendation 2  Marine Geological Data Management
Recommendation 3  Wave Data Management
Recommendation 4  Interdisciplinary and Interorganizational Data and Information Management and Referral
Recommendation 5  Air/Sea Interaction
Recommendation 6  Training and Education
Resolution 1 - Marine Pollution Data

The Working Group on International Oceanographic Data Exchange,

Having received the first report of the Ad Hoc Group on Marine Pollution Data,

Notes with satisfaction the substantive considerations of the Ad Hoc Group (presented in IOC/IODE-VII/10) which, in the course of approaching its terms of reference, provided an operational categorization of pollutant categories of most immediate concern to the Working Group (i.e., pesticides, petroleum products and certain heavy metals), from the point of view of data exchange or referral;

Recognizes the restrictions to routine exchange of marine pollution data which result from lack of internationally accepted analytical techniques and standards, and the reliance which must, in the interim, be placed upon data referral services based upon specific, well-documented descriptive inventories or indexes of these data. Such inventories or data directories may be automated and thus provide a useful international exchange mechanism;

Further recognizes the potential of such documented inventories for referral as a means whereby marine pollution data already stored in various informal archives can be identified and thus appraised as to usefulness in baseline studies or trend analyses. Since a certain centralization might be expected for these types of data (through national and regional centres, agencies, institutes, etc.) the effort expended to obtain such indexes should lend significant results, especially in those areas where Member States who have designated National Co-ordinators for international data exchange should employ this capability to focus national efforts in pursuit of such an inventory effort;

Further notes the potential support which the Ad Hoc Group may provide to the marine pollution aspects of such programmes of the Commission (IGOSS, GIMBE, CSK, CIM, etc.);

Decides to strengthen the Ad Hoc Group by adding members from Canada, United Kingdom and USSR, and by inviting participation of observers from ICES and from the WMO, and by revising the terms of reference of the Ad Hoc Group by adding:

"In close collaboration with the Ad Hoc Group on IGOSS Data Archiving and Exchange, provide support regarding data inventories, documentation standards, referral systems, etc., to the developing IGOSS Pilot Project for Marine Pollution Monitoring and maintain liaison with the Ad Hoc Group on oil and dissolved constituents of sea water of the IOC Group of Experts on Oceanographic Research as it relates to IGOSS (IRES)"

Calls upon the IOC Secretariat to invite the attention of the Commission's National Co-ordinators for International Oceanographic Data Exchange, members of the International Co-ordination Groups, Scientific Management Groups, and the Advisory Bodies, to the Working Group's continuing desire to assist each of their efforts, as appropriate, with data management co-ordination and planning regarding marine pollution data; specifically noting the increasing emphasis being placed upon
referral capabilities, data documentation standards, inventories, etc., and soliciting their co-operation in the development of these capabilities as a regular part of their activities relating to marine pollution monitoring and research;

Further decides to communicate with the National Co-ordinators for International Oceanographic Data Exchange, explaining in some detail the developing concept of documented inventories of marine pollution data collections as a potentially effective means of international exchange, calling upon them to both consider and advance this concept in relation to marine pollution studies ongoing in their respective States or regional studies in which their States are participating, and to establish communications with the Chairman of the Ad Hoc Group on Marine Pollution Data regarding the views of both scientists and data management specialists relating to the inventory and referral concepts advanced by the Ad Hoc Group;

Instructs the Ad Hoc Group to review and evaluate environmental inventory, directory and referral systems such as ROMBI (IOC/IODE-VII/INF.10) and DEBD (IOC/IODE-VII/INF.16) and others as appropriate, for their potential as marine pollution data and information exchange mechanisms as advanced by the first report of the Ad Hoc Group and further instructs the Ad Hoc Group to report to the eighth session of the Working Group regarding its review and evaluation.

Resolution 2 - Manual on IGOS Data Archiving and Exchange

The Working Group on International Oceanographic Data Exchange,

Having received with pleasure the Third Draft Edition of the Manual on IGOS Data Archiving and Exchange (IOC/IODE-VII/14) and the report of the Chairman of the Ad Hoc Group on IGOS Data Archiving and Exchange,

Noting the comments on the Second Draft Edition of the Manual prepared by the members of the WMO/CMM Working Group on Marine Climatology (IOC/IODE-VII/INF.14),

Instructs the Chairman of the Ad Hoc Group to take the WMO/CMM Working Group’s comments into consideration and amend the Manual as appropriate;

Approves recommendations 1 and 2 contained in document IOC/IODE-VII/12. Supplement on the publication of the Manual in two parts, one containing obligatory procedures and a second part being a "Planning Guide";

Endorses the Third Draft Edition of the Manual on IGOS Data Archiving and Exchange for transmittal to IPIAN and recommends it for adoption;

Further having reviewed the composition of the Ad Hoc Group, decides that its composition for the next intersessional period be the following:
Re-emphasizes that the Ad Hoc Group in accordance with its terms of reference will continue to assist the Working Committee for IGOS in matters dealing with data archiving and exchange and continue to keep the Manual and associated logs and instructions under continual review.

Recommendation 1 - Format Development

The Working Group on International Oceanographic Data Exchange,

Endorses for adoption for purposes of international data exchange the country codes already in use by ICES and others (see Appendix to Paper B of IOC/IODE-VII/13);

Recommends that the proposals for the general structure of new formats (Paper C of IOC/IODE-VII/13) be adopted as a model for the development of such formats;

Further recommends that the format for heterogeneous data (Paper B of IOC/IODE-VII/13) proposed by the United States National Oceanographic Data Center incorporating many elements of the WDC-B proposal (IOC/IODE-VII/4) and of the general structure referred to above, be adopted for experimental archiving and retrieval of such data. (The Working Group, recognizing the existence of large banks of historical physical oceanographic data (such as ICES physical data), proposes that such established data sets, since they are already commonly used in international exchange, continue to be recognized for years to come as acceptable exchange formats in their specific field.)

Recommendation 2 - Marine Geological Data Management

The Working Group on International Oceanographic Data Exchange,

Recalling the important rôle of inventories in any effective international data exchange scheme, both as a referral mechanism and as an alternative to centralization of all data at two or more world data repositories,

Noting the existence of the multidisciplinary IOC inventory format ROSCOP (Report on Observations/Samples Collected by Oceanographic Programmes),
Reaffirming the conclusions of the joint IUGS/CMG-Nesaco-SCOR Meeting in Kiel (December 1969) that for purposes of marine geological/geophysical scientists ROSECOP must be augmented by a "second level" inventory,

Recommends that the previously accepted "second level" inventory form IG/GCI, along with the inventory service scheme, again be publicized to the fullest extent, and that the IOC Secretariat be urged to release a circular letter calling attention to the IG/GCI inventory scheme managed by the World Data Centres, Oceanography, and urging support for this scheme by the scientific community;

Referring to the Proceedings of the Scientific Committee on Oceanic Research, Vol. 8, No. 2, La Jolla, December 1972, where the urgent need for basic descriptions of routinely collected geological samples has been emphasized by the SCOR Working Group 40 on Paleo-Oceanography,

Taking into consideration the comments given by international scientific organizations, such as IUGS CMG and CODEGEO on the proposed format,

Including in its considerations the principles for development of new data exchange formats introduced by the Ad Hoc Group on Format Development,

Recommends that the proposed International Marine Geological Data Format developed by the Ad Hoc Group for Development of Marine Geological/Geophysical Data Management, as adjusted to conform to the guidelines of the Ad Hoc Group on Format Standardization, be widely used by IOC Member States as a standard international exchange format for the next two to three years with a view to testing its effectiveness and usefulness and that Member States inform the IOC Secretariat of their experience and findings;

Further recommends that as its next task the Ad Hoc Group for Development of Marine Geological/Geophysical Data Management, with suitably reconstituted membership, develop procedures and formats for marine geophysical data archiving and exchange.

Recommendation 3 - Wave Data Management

The Working Group on International Oceanographic Data Exchange,

Recognizing the requirement for obtaining experience in the exchange of instrumental wave data and for the exchanges of wave data prior to completing of the work of the IODE Task Team designated to work on this question (cf. Annex III, IOC/IODE-VII/3),

Recommends that bilateral data exchanges begin between Member States using the formal scheme for new data proposed by the Ad Hoc Group on Format Development in document IOC/IODE-VII/13 and that Member States report relevant experiences to the Task Team on Wave Data Management.
Recommendation 4 - Interdisciplinary and Interorganizational Data and Information Management and Referral

The Working Group on International Oceanographic Data Exchange,

Reaffirms its support of the concept of the Joint Task Team on Interdisciplinary and Interorganizational Data and Information Management and Referral (FAO, IAEA, ICES, IHO, IOC, WHO, WMO) which was proposed by the sixth session of the Working Group (Recommendation 3) and approved by the seventh session of the Commission (Recommendation VII-25), and advises that it wishes to continue to provide the mechanism through which the Joint Task Team reports to the IOC;

Calls upon the IOC Secretariat to reissue invitations for participation in the activities of the Joint Task Team to WHO and IHO which presently participate only as observers and to IMCO (marine pollution by oil and hazardous materials);

Recommends, in view of the implications of Recommendations 91 and 101 of the United Nations Conference on the Human Environment, the establishment of the pilot International Referral Service to Sources of Environmental Information by the First Session of the Governing Council of the United Nations Environment Programme (12-22 June 1973), that the Secretary be authorized and instructed to arrange for the IOC member (and Chairman) of the Joint Task Team to be provided member or observer status, as may be appropriate, on whatever mechanism is established within UNEP to assist the development of the pilot phase of the International Referral Service; and further,

Recommends that the IOC Secretariat consider and advise the manner in which the terms of reference of the Working Group on IODE (as set forth in Resolution V-20A) may be amended to facilitate the exchange of, and access and referral to, information resulting from, or relating to, marine programmes.

Recommendation 5 - Air/Sea Interaction

The Working Group on International Oceanographic Data Exchange,

Recognizing that an increasing number of project-oriented IOC and WMO activities will be generating data from the air/sea interaction zone; that atmospheric data are commonly used in conjunction with BATHY, TESAG, current, wave and ice data; that some duplication of oceanographic and meteorological data exists in meteorological and oceanographic data centres,

Considering that both WMO and IOC are dealing with similar problems of data handling, management, storage and exchange; that data from the air/sea interaction zone are of mutual concern; that an increasing number of both international research projects and supporting operational programmes are being introduced for major oceanic areas; that joint consideration of data handling problems and procedures will facilitate more efficient management of data archiving in areas of common interest,
Noting that decisions of WMO/CMM at its sixth session include the need for closer working relationships with IOC,

Recommend that a Joint IOC/WMO Group on air/sea interaction data be established, composed of a small number of members nominated in consultation with the Chairman of the Working Group on IODE and the Presidents of CBS and CMM to:

(a) follow and review the scientific planning of international air/sea interaction studies and experiments concerning IOC and WMO in order to determine the types and characteristics of marine environmental data and specialized data products to be generated;

(b) assist such planning efforts in an advisory capacity as to the data handling procedures best suited for agreed archival procedures;

(c) recommend data handling procedures and where appropriate data formats (in co-operation with the Ad Hoc Group on Format Development) for use in future air/sea interaction studies and experiments;

(d) advise the Working Group on IODE and the CBS and CMM of WMO on problems and recommended procedures concerning the handling of air-sea interaction data within the framework of the international data archival and exchange systems of the two related disciplines;

Invites IOC and WMO to approve the establishment of the proposed group and to arrange for the designation of suitable air/sea interaction data experts, taking into account the need for the group to meet as the occasion demands.

Recommendation 6 - Training and Education

The Working Group on International Oceanographic Data Exchange,

Having recognized that the full participation of developing countries in the study of the oceans calls for the development of marine sciences and augmentation of expertise in those countries in order that they might meet their national and international requirements,

Being aware that the IOC Working Group on Training, Education and Mutual Assistance (IOC/TEMA-I/3) has already taken appropriate steps for providing assistance to the developing countries in the development of marine sciences in those countries and for inviting technologically advanced countries engaged in operational sea-going research to consider placing at the disposal of IOC and ICSPO agencies shipboard fellowships under bilateral arrangements for the benefit of qualified nationals from the developing countries,

Recalling IOC Resolution I-9 which prescribed that the mission of the Working Group on IODE shall, inter alia, be "the assistance of development of national oceanographic data centres", 
Noting the keen interest of some developing countries to establish national data centres,

Convinced of the importance of involving as many countries as possible in the global effort of oceanographic data collection, processing, storage and international exchange;

Aware of the difficulties facing many developing nations in participating fully in such global effort, principally because of the lack of trained manpower, necessary equipment and other resources;

Conscious of the important contribution towards improving the capability of such developing nations made by internationally sponsored training and education programmes;

Recommends that the IOC Secretariat take appropriate steps for providing all necessary assistance, including the services of consultants, the promotion of the exchange of experts and the provision of necessary equipment, in the establishment and/or development of national oceanographic data centres in developing countries taking into account their particular needs;

Commends the United States of America for providing useful training facilities in oceanographic data management to participants from developing countries at the United States National Oceanographic Data Center in co-operation with Unesco/Ioc;

Notes with appreciation the offer of the USSR at the current session of the Working Group to make available similar training facilities as from 1974 or 1975;

Expresses the hope that other technologically advanced countries will also consider providing similar training, including shipboard experience, to nationals of developing countries;

Considers that the development of expertise in oceanographic data management will also be facilitated through regional co-operation in the field of training and education.
ANNEX III

Working Group on International Oceanographic Data Exchange

Seventh Session

(United Nations, New York, 9 to 13 July 1973)

TERMS OF REFERENCE OF AD HOC TASK TEAMS

1. Task Team: 1

Guide for Establishing a National Oceanographic Data Centre.

2. Composition

Chairman selected by U.S.A.; members from Canada, Colombia, Norway, Thailand, United Kingdom, U.S.A., USSR and an observer from FAO.

3. Reference

IOC/IODE-VII/INF.11.

4. Objective

The preparation of a guide to the development and operation of a National Oceanographic Data Centre.

5. Terms of Reference

5.1 The Task Team, consulting as necessary with the IOC Working Group on Training, Education and Mutual Assistance, the Directors of World Data Centres (Oceanography), national oceanographic data centres and National Co-ordinators for IODE, SCOR, EOR, ACOMR and other activities as appropriate, shall review and, as necessary, modify the outline in IOC/IODE-VII/INF.11.

5.2 Will determine priority, schedule and responsibility for each chapter, and complete in accordance with the established schedule.

6. Schedule

The Task Team shall complete its work within eight months and submit the draft of the Guide to the IOC Secretariat. Action here will include: (a) translation into the working languages of the Commission; (b) distribution to members of the Working Group for IODE, National Co-ordinators and others as appropriate; and (c) report to the eighth session of the Working Group.

1. Task Team: 2

GARP Atlantic Tropical Experiment (GATE) Data Management.

2. Composition

Chairman selected by United Kingdom, members from Brazil, France, Federal Republic of Germany, U.S.A., USSR.
3. References

IOC/IODE-VII/INF.12
IOC/IODE-VII/4
IOC/IODE-VII/5
IOC/IODE-VII/13

4. Objectives

To ensure that the International Scientific Management Group (ISMG) for GATE is fully aware of the data management activities of IOC and to seek ways to harmonize the immediate data management objectives of GATE with those of the Working Group on IODE.

5. Terms of Reference

5.1 To establish procedures that ensure the assimilation of the GATE data set into the IODE system for the benefit of secondary users.

5.2 To assist the nominated representative of the Working Group on IODE to the ISMG meeting in September 1973 in the preparation of a preliminary statement identifying to the ISMG the main elements required for the successful assimilation of data into the IODE system.

The Task Team should take note of the work of the Ad Hoc Group on Format Development and recognize the opportunity that the GATE programme offers in the development of IODE procedures for the presentation of data from computer programmes.

6. Schedule

The Task Team shall make a preliminary statement on 5.2 to the IOC Secretariat by the end of August 1973 and make its final report by September 1974.

1. Task Team: 3

Wave Data Management

2. Composition

Chairman selected by Canada; members from Brazil, France, Federal Republic of Germany, Japan, Netherlands, Norway, United Kingdom, U.S.A., USSR and observers from EOCOR and WMO.

3. References

IOC/IODE-VII/13
IOC/IODE-VII/INF.9
IOC/IODE-VII/INF.15

4. Objective

To identify the minimum necessary documentation to accompany wave data exchanges to ensure proper interpretation; to recommend procedures, techniques and formats for the archival and exchange of wave data.
5. Terms of Reference

The Task Team on consultation with WMO/CMM, ECOR, PIANC and other international organizations as appropriate, shall:

- develop a draft of the minimum necessary documentation to accompany instrumental wave data exchanges;

- develop a draft of procedures, formats, and techniques for international exchange of instrumented wave data, considering the general format scheme developed by the Ad Hoc Group on Format Development;

- explore with PIANC possible mutual benefits of expanding the PIANC instrumented wave data inventory to offshore waters.

6. Schedule

The Task Team shall complete its work and submit its findings for approval at the eighth session of the Working Group.
ANNEX IV

Working Group on International Oceanographic Data Exchange

Seventh Session

(United Nations, New York, 9 to 13 July 1973)

REVISED TERMS OF REFERENCE
OF THE
AD HOC GROUP ON FORMAT DEVELOPMENT
(formerly named "Ad Hoc Group on Format Standardization")

Terms of Reference

1. To act in a supervisory rôle for any format development under the Working Group on IODE auspices.

   Reason: to ensure the harmonious development of formats.

2. To identify needs for new formats and, as necessary, delegate detailed format development in specific disciplines and multidisciplinary projects to members of the Working Group with appropriate expertise.

   Reason: although it is recognized that the expertise of the Ad Hoc Group will need to be supplemented by specialists from various disciplines, it is desirable that the Working Group exercise a co-ordination function.

3. To develop "common core" elements and related supporting codes.

   Reason: it is highly desirable that specialized formats be developed to conform (to be compatible) with each other as regards institution and ship codes, parameter codes, units of measurement, etc.

Composition

United Kingdom (Chairman), Canada, Colombia, France, Federal Republic of Germany, Japan, Netherlands, Pakistan, Sweden, U.S.A., USSR and ICES.
ANNEX V

Working Group on International Oceanographic Data Exchange

Seventh Session
(United Nations, New York, 9 to 13 July 1973)

ENGINEERING COMMITTEE ON OCEANIC RESOURCES

Report to the Intergovernmental Oceanographic Commission's
Working Group on International Oceanographic Data Exchange

ECOR has been asked by the Chairman of the Working Group on IODE to comment on engineering views of the following:

present and future oceanographic information needs;
types of data and publications needed for routine international exchange; and
methods for exchange and archiving of this information.

ECOR has concluded that, with the exception of measured wave data, it is premature to hope to comment upon these areas in any but general terms. The United States National Committee for ECOR is currently working on a listing of areas to ocean engineering activity and a concise, useful list of principal sources of ocean information and data in the United States. This published list will be used as a tool for judging the value of data archives and information to secondary engineering users.

A definitive treatment of present and future data needs is not possible at this time, either nationally or internationally. However, with the work of the wave group as a basis, members of the United States National Committee have tried to draw up individual experiences and on discussions with practising ocean engineers to offer the following observations. We hope that they will be helpful to the Working Group.

Wave Data. A need exists for information on measurements of waves. The report of the ECOR Working Group "Engineering Requirements for Wave Data" expands upon this need. This report will be discussed under agenda item 5.6.

Littoral Currents. Specific information is needed by engineers on littoral drifts of sediments in the maintenance and enhancement of beaches and shorelines. This information is also essential to the maintenance of navigation channels and the construction of pipelines in the coastal zone.

The needs of one specific project at a specific location may serve to offer a better idea of ocean engineering data needs. The needs of this specific project include the following: climatological conditions and sea surface
statistics, water column current profile and chemistry, topographic relief, bottom and sub-bottom sediment characterization, meteorological and surface oceanographic conditions, surface and sub-surface ocean currents, wind velocity spectra, sea-ice distribution, air-sea temperature and air humidity extremes; general ocean circulation, variation of chemical parameters, general bathymetry, local bottom slope and roughness, and soil mechanics properties.

Without further development of engineering needs, we are unable to address types of data available for exchange and methods for exchange and archiving at this time. It is our hope that these examples speak to the areas we have been asked to cover as well as we are able to at present. Requirements of the future will probably be generated by the most rapidly developing ocean industries - offshore oil and gas, offshore power plants, islands, etc.

One of our major shortcomings in the United States is the lack of knowledge on the part of engineering users of what data is now available. For example, while the BOMEX project in Barbados was both publicized and archived, the engineering community still did not demonstrate full awareness of its findings, particularly that of the measured wave data. Publication of our panel's proposed listing of sources, with its further expansion and refinement, should mark a beginning in efforts to solve this problem.

ECOR, through "its" working groups and national committees will continue to address these problem areas and hopes to be more specific with regard to needs and methods of archiving and exchange in the future. We support the expansion of the Working Group's activities to include the information aspects, and stand ready to assist within the capabilities of our resources.

ENVIRONMENTAL ENGINEERING DATA REQUIREMENTS

For In-Ocean System Installation:
An Example of One Current Need

1. To meet reliability and performance requirements, and in order to design for a successful system installation, the following environmental engineering data is required:

Climatological conditions and sea surface statistics.
Provide the data requisite to planning system installation procedures.

Water Column Current Profile.
Provides the direction and magnitude of load placed on the structure and the mooring components.

Water Column Chemistry.
Establishes design parameters to engineer against the corrosive action of the sea water (oxygen content, pH, salinity, etc.).
Topographic Relief (Fine Grain).  
Allows selection of the most favourable bottom interaction points within the general installation area.

Bottom and Sub-bottom Sediment Characterization.  
Provides engineering data to design the foundation and anchoring systems.

2. Table I summarizes the relationship between the environmental data and the engineering requirements for system design.

3. Detailed Environmental Data Requirements.

Meteorological and Surface Oceanographic Conditions.

1. Sea state (estimated to within a Beaufort Force Number) including sea swell spectra, probability of occurrence of maxima and average conditions and prediction of probable "weather window".

2. Surface ocean currents (estimated to 0.25 knot, 30°).

3. Wind velocity spectra.

4. Sea-ice distribution, maximum expected thickness and depth of ridges and bergs.

**TABLE I**

**ATMOSPHERIC WATER COLUMN, BOTTOM AND SUB-BOTTOM ENGINEERING DATA**

<table>
<thead>
<tr>
<th>Site Data</th>
<th>Structural Design</th>
<th>Material Selection</th>
<th>Site Selection</th>
<th>Anchor Design</th>
<th>Installation System</th>
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<tbody>
<tr>
<td>Climatological/Waves</td>
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<tr>
<td>Current Profile</td>
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<td>Water Column Chemistry</td>
<td></td>
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<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Topographic Relief</td>
<td>X</td>
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<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Sediment</td>
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<tr>
<td>Surface properties</td>
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<td></td>
<td>X</td>
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<tr>
<td>Depth/Structure</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Shear Strength</td>
<td></td>
<td></td>
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<td>X</td>
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<tr>
<td>Penetration Resistance</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Subsurface Properties</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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</tr>
</tbody>
</table>

5. Air-sea temperature and air humidity extremes.

Oceanographic Conditions.

1. Surface and subsurface ocean currents (estimated to .25 knot, 15°) including maxima, average, their spectra, mean period of current oscillation (or reversals) and seasonal variation.
2. General ocean circulation including location of oceanic fronts and their seasonal position and shape changes.

3. An estimate of the variation of the chemical oceanographic parameters (salinity, oxygen, pH, temperature) as might affect materials.

Bottom Conditions.

1. General bathymetry (estimate depths to 2 metres, contours, located to 1/4 mile).

2. Local bottom slope and roughness (slope estimated to within 2°).

3. Sediment geology including type and distribution of sediments, sub-surface structure and local variability.

4. Soil mechanics properties including:
   (a) Shear strength (to 0.1 psi) and phi angle (to 1°).
   (b) Water content (to 5%).
   (c) Bulk density (to 10 lb./ft.³).
   (d) Porosity (to 5%).
ANNEX VI

Working Group on International Oceanographic Data Exchange

Seventh Session

(United Nations, New York, 9 to 13 July 1973)

LIST OF ACRONYMS

ACMRR  Advisory Committee on Marine Resources Research

ACOMR  Advisory Committee on Oceanic Meteorological Research

BATHY  Bathythermograph

ENDO   Bureau National des Données Océaniques

BOMEX  Barbados Oceanographic and Meteorological Experiment

CBS    Commission for Basic Systems

CICAR  Co-operative Investigations of the Caribbean and Adjacent Regions

CIM    Co-operative Investigations in the Mediterranean

CINECA Co-operative Investigation of the Northern Part of the Eastern Central Atlantic

CMG    Commission for Marine Geology

CMM    Commission for Marine Meteorology

COGEODATA Committee on Storage, Automatic Processing, and Retrieval of Geological Data

CSK    Co-operative Study of the Kuroshio and Adjacent Regions

DNA    Designated National Agency

DNP    Declared National Programme

EAMFRO East African Marine Fisheries Research Organization

ECOR   Engineering Committee on Oceanic Resources

ECOSOC United Nations Economic and Social Council
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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</thead>
<tbody>
<tr>
<td>EDBD</td>
<td>Environmental Data Base Directory</td>
</tr>
<tr>
<td>EDS</td>
<td>Environmental Data Service</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<tr>
<td>GARP</td>
<td>Global Atmospheric Research Programme</td>
</tr>
<tr>
<td>GATE</td>
<td>GARP Atlantic Tropical Experiment</td>
</tr>
<tr>
<td>GIPME</td>
<td>Global Investigation of Pollution in the Marine Environment</td>
</tr>
<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
</tr>
<tr>
<td>ICES</td>
<td>International Council for the Exploration of the Sea</td>
</tr>
<tr>
<td>ICSPRO</td>
<td>Inter-secretariat Committee on Scientific Programmes Relating to Oceanography</td>
</tr>
<tr>
<td>ICSU</td>
<td>International Council of Scientific Unions</td>
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<tr>
<td>IG/GOSS</td>
<td>Integrated Global Ocean Station System</td>
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<tr>
<td>IG/GCI</td>
<td>International Geological/Geophysical Cruise Inventory</td>
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<td>IHO</td>
<td>International Hydrographic Organization</td>
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<td>IMS</td>
<td>International Marine Science</td>
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<td>IOC</td>
<td>Intergovernmental Oceanographic Commission</td>
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<td>IODE</td>
<td>International Oceanographic Data Exchange</td>
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<td>IPLAN</td>
<td>Joint IOC/WMO Planning Group for IGOSs</td>
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<td>IRES</td>
<td>IOC Group of Experts on Oceanographic Research as it Relates to IGOSs</td>
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<td>IRS</td>
<td>International Referral Service</td>
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<td>ITECH</td>
<td>IOC Group of Experts on IGOSs Technical Systems Design and Development and Service Requirements</td>
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<td>IUGS</td>
<td>International Union of Geological Sciences</td>
</tr>
<tr>
<td>JODC</td>
<td>Japan Oceanographic Data Centre</td>
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<tr>
<td>NERC</td>
<td>Natural Environment Research Council</td>
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<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>NODC</td>
<td>National Oceanographic Data Centre</td>
</tr>
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<td>PIANC</td>
<td>Permanent International Association of Navigation Congresses</td>
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<tr>
<td>PIC</td>
<td>IGOSS Programme Information Circular</td>
</tr>
<tr>
<td>PSMSL</td>
<td>Permanent Service for Mean Sea Level</td>
</tr>
<tr>
<td>RNODC</td>
<td>Responsible National Oceanographic Data Centre</td>
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<tr>
<td>ROMBI</td>
<td>Results of Marine Biological Investigations</td>
</tr>
<tr>
<td>ROSCOP</td>
<td>Report of Observations/Samples Collected by Oceanographic Programmes</td>
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<td>SCOR</td>
<td>Scientific Committee on Oceanic Research</td>
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<td>STD</td>
<td>Salinity/Temperature/Depth</td>
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<td>TEMA</td>
<td>IOC Group of Experts on Training, Education and Mutual Assistance</td>
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<td>TESAC</td>
<td>Temperature/Salinity/Currents</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>United Nations Environment Programme</td>
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<td>VNIRO</td>
<td>All-Union Institute for Marine Fisheries and Oceanography</td>
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<td>WDC</td>
<td>World Data Centre</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WMO</td>
<td>World Meteorological Organization</td>
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<tr>
<td>XBT</td>
<td>Expendable Bathythermograph</td>
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# Annex VII

## Working Group on International Oceanographic Data Exchange

*(Seventh Session, United Nations, New York, 9 to 13 July 1973)*

## List of Documents

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<td></td>
<td>/2 Explanatory Memorandum relating to the Provisional Agenda</td>
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<td>/3 Summary Report of the Seventh Session of the Working Group on International Oceanographic Data Exchange</td>
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<td></td>
<td>/4 Brief Instructions for Filling in the Unified Form for Results of Oceanographic Research</td>
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<td>/5 Report of the Secretariat</td>
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<td>/6 Report of the Task Team on International Exchange of Marine Biological Data</td>
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<td>/7 Final Report of the Task Team on Inventories of Marine Data and Samples</td>
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<td>/9 Report of the Task Team on the Development Arrangements for International Oceanographic Data Exchange</td>
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<td>/10 Report of the Ad Hoc Group on Marine Pollution Data</td>
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<td>/11 First Report of the Joint Task Team on Interdisciplinary and Interorganizational Data and Information Management and Referral</td>
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<td>/11 Add.1 (Preliminary) Second Report of the Joint Task Team on Interdisciplinary and Interorganizational Data and Information Management and Referral</td>
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<td>/12 Report of the Ad Hoc Group on IGOSS Data Archiving and Exchange</td>
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<td>/12 Supplement - Supplementary Note to the Report of the Ad Hoc Group on IGOSS Data Archiving and Exchange</td>
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<td>/13 Report of the Ad Hoc Group on Format Standardization</td>
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<td>/14 Manual on IGOSS Data Archiving and Exchange (Third Draft Edition)</td>
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<td>/15 First Report of the Ad Hoc Working Group on Exchange of Satellite and Airborne Sensored Data</td>
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<td>/INF.1 Activities on Oceanographic Data Exchange and Related Matters (ICES)</td>
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<td>/INF.4 Report of Observations/Samples collected by Oceanographic Programmes (ROSCOP) (Second Edition)</td>
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<td>IOC/IODE-VII/INF.5</td>
<td>Global Atmospheric Research Programme - Atlantic Tropical Experiment (GATE)</td>
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<td>&quot;/INF.5 Add.1</td>
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<td>Report on National Co-ordinators for International Oceanographic Data Exchange</td>
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<td>&quot;/INF.16</td>
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## Others

- Summary Report of the Sixth Session of the Working Group on International Oceanographic Data Exchange (SC/IOC.WG-1(VI)/10)
- Summary Report of the First Session of the Joint IOC/WMO Planning Group for IOSS (IOC-WMO/IPLAN(I)/3)
- IOC-WMO/ITECH-I/5: Decisions of the Sixth Session of the WMO Commission for Marine Meteorology on Matters Related to IOC
- IOC-WMO/ITECH-I/Doc.21: Acquisition of IOSS Data Remote -ensed Observations
IOC/WMO/ITECH-I/25: Reporting Form and Code for Currents from Ships' Set


IGOSS Programme Information Circular No. 6: An Evaluation of the First Year of IGOSS

IOC/INF-194: Aquatic Sciences and Fisheries Information System (ASFIS) - a Computer-Oriented System offering Integrated Information Services


Manual on IGOSS Data Archiving and Exchange (Third Draft Edition) - Chapter IV through VIII

User's Guide to NODC's Data Services

World Data Center A, Oceanography - Oceanographic Data Exchange 1972

Centro Colombiano de Datos Oceanograficos - Informe, Bogota - 1975

Documents available in limited number

IGOSS Programme Information Circular No. 2: IOC and WMO Subsidiary Bodies dealing with the Integrated Global Ocean Station System (IGOSS)

UNISIST Newsletter No. 1

ICES Oceanographic Data Lists and Inventories No. 8: Inventory of Oceanographic Investigations at North Atlantic Ocean Weather Stations in 1971

Summary Report of the First Session of the Joint IOC/WMO Group of Experts on IGOSS Technical Systems Design and Development and Service Requirements (ITECH)
ANNEX VIII

Working Group on International Oceanographic Data Exchange
(Seventh Session, United Nations, New York, 9 to 13 July 1973)

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<td>Mr. E.F. Akyuz</td>
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<td>Food and Agriculture Organization of the United Nations</td>
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