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Centre for Marine Research - Zagreb
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Mediterranean Action Plan
United Nations Environment Programme

Zagreb, 18 October 1989

REPORT OF THE CONSULTATION MEETING ON DATA PROCESSING OF THE NATIONAL MONITORING PROGRAMME OF YUGOSLAVIA

UNEP
Athens, 1989

1. The meeting was opened by Mr. L. Jeftic, Senior Marine Scientist of the Co-ordinating Unit for the Mediterranean Action Plan (MEDU) of UNEP, at 9 a.m. on October 18, 1989. A list of participants is attached as Annex I to this report.

2. Ms. D. Hrsak, Director of the Centre for Marine Research-Zagreb, "Rudjer Boskovic" Institute, welcomed the participants, stressing the importance of consultation on the data processing of monitoring programme of Yugoslavia.

3. Mr. Jeftic chaired the Meeting. He explained that the purpose of the Meeting was to discuss the various aspects of MEDPOL monitoring data computerization and the exchange of information regarding the computerization of data collected through the national monitoring programme of Yugoslavia.

4. Mr. Aksel, Computer Operations Officer of MEDU, briefed the participants of the Meeting about the computer-related activities at MEDU which include: data processing, word processing, communications, graphical work/GIS applications. He summarized each activity, briefly described MEDU's hardware and software, and concluded with plans and future trends before going on to MEDPOL data processing activities.

5. In his presentation regarding MEDPOL data processing, Mr. Aksel covered three main issues:

   a. Overall view and design characteristics of this application;
   b. Peculiarities, sub-grouping and problems of the incoming data; and
   c. Present drawbacks of the application, MEDU's plans on its reorganization/customization, and possible distribution (with guidelines) to the institutes within the region.

   The following items describe the various topics covered in each issue.

6. Mr. Aksel explained to the participants the main characteristics of the computerized MED POL application which consists of two linked (but independent) databases (Annex II):

   a. Monitoring Agreements Database; and
   b. Monitoring Reports Database.

   The Monitoring Agreements Database consists of:

   a. Monitoring of sources of pollution;
   b. Monitoring of coastal waters;
   c. Monitoring of reference areas; and
   d. Monitoring of air-borne pollution (under development).

This database includes administrative information (such as institute name(s), responsible person(s), etc.) and parameter-specific information (standard/non-standard parameters included in the agreements, frequency of measurement for each, etc.).

The Reports Database consists of data from reports on:

a. Microbial pollution data;
b. Heavy metals;
c. Halogenated hydrocarbons;
d. Petroleum hydrocarbons (under development);
e. Effluents (under development); and
f. Nutrients (under development).

This database includes some administrative information but mainly scientific data-specific information.

7. Mr. Aksel explained that the two independent databases (Agreements and Reports) are connected by a pair of STATION-SPECIFIC PARAMETER data files. These keep details like geographical co-ordinates, bottom depth, shore distance, etc. separately for both Agreements Stations and Reports Stations. A mechanism of transferring station characteristics from one to another was also described.

8. Mr. Aksel informed the participants on the main combined key of the overall application by which sub-systems are linked, information is stored, altered and queried. This key is the following:

a. YEAR (2 numeric digits);
b. COUNTRY (3 characters);
c. AREA (6 characters); and
d. STATION (6 characters).

9. Mr. Aksel introduced the various codings employed and, giving examples, explained their utilization in the system (Annex III).

10. Mr. Aksel concluded the briefing on the overall structure by pointing out the three-level relational model, interactions between both various components of each database and the linking between them. Giving examples, he further explained alteration and growth possibilities of the existing system.

11. In the second part of his introduction, Mr. Aksel described how the incoming data is categorized as:

a. Essential (key/index part of each record, as specified in point 8 above); if missing, cannot be entered;
b. Crucial-certain must information; if missing, there is no meaning in entering the record into the system; and
c. Other; data other than essential or crucial in a record.

12. Mr. Aksel gave numerous examples of various problems of the monitoring data arriving at MEDU (Annex IV).

13. Mr. Aksel then briefly stated current data evaluation and presentation activities through both simple statistical tools and also specific consultant-prepared programs.

14. As drawbacks of the present system, Mr. Aksel pointed out the following:

- Presently, no interim data entry front-end database exists and all first hand entries, checks and corrections are done on the main application;
- System is not fully customized and needs competent, knowledgeable operator.

15. Mr. Aksel explained the MEDU plans for interim/main database separations, described extended checking procedures to be implemented, preparation of a MEDPOL GUIDE (Guidelines for data preparation and presentation to MEDU) and reorganization of the entire system as a customized application for distribution within the region.

16. Extensive technical discussion on the computerization of MEDPOL monitoring data followed the presentation.

17. Participants put particular emphasis on the coding and searchability of the marine pollution data.

18. A checking mechanism for the data by different authorities while being routed from originators to the final destination (MEDU data processing) was also emphasized. It was stressed that once the guidelines are established and distributed to the related bodies, the strong link from one stage to the other would be assured, eliminating the erroneous/missing information in the data.

19. Finally, it was agreed by the participants that the current structure utilized at MEDU is acceptable for the implementation and data exchange.

20. In conclusion, it was agreed that, in light of Mr. Aksel's presentation and technical discussions held during the meeting, Yugoslav institutes generating MED POL data would co-operate with each other on the preparation/transmission of the data to MEDU and establish a self-controlled mechanism within institutes.

21. Other subjects covered at the end of the meeting are listed below:

- Mr. R. Precali, Research Assistant and Computer Expert of the Centre for Marine Research - Rovinj, demonstated the use of Foxbase and PARADOX on hydrographic data. Discussions were held on the computerization of oceanographic and marine pollution data, comparing the utilization of dBase and the above mentioned software;

- Participants discussed the possibility of organizing an exchange of mails and data files with MEDU in such a way that diskette transfer could be avoided. Mr. I. Ruzic, Senior Scientist of the Centre for Marine Research - Zagreb, informed on the experience of the Centre on remote communications. Utilization of world-wide networks for both exchange of electronic mails and data files, and also on-line search/retrieval of data from the world databases was considered. Mr. Aksel pointed out the accessibility of certain free databases such as EEC's ECHO, and took notes on the current implementation status of YUPAC;

- The representatives of MEDU were informed about two professional graphics software products GRAPHER and SURFER, which are now often used in producing graphic products with interpolated scientific data. Common utilization of these graphic capabilities has been stressed;

- A discussion about GIS software also took place. An exchange of information comparing the use of ARC/INFO, MapInfo, and Dragon software took place; and

- Scientific and multi-lingual word processing packages were also discussed. The products Multi-Lingual Scholar and Chi-Writer were among the packages reviewed.

22. Before the conclusion of the meeting, participants expressed their satisfaction with the overall outcome and proposed that a similar meeting be held in the first half of 1990, preferably with participants from most of the Yugoslav participating institutions.

23. The meeting was closed at 4 p.m. on October 20, 1989.

Annex I

List of Participants

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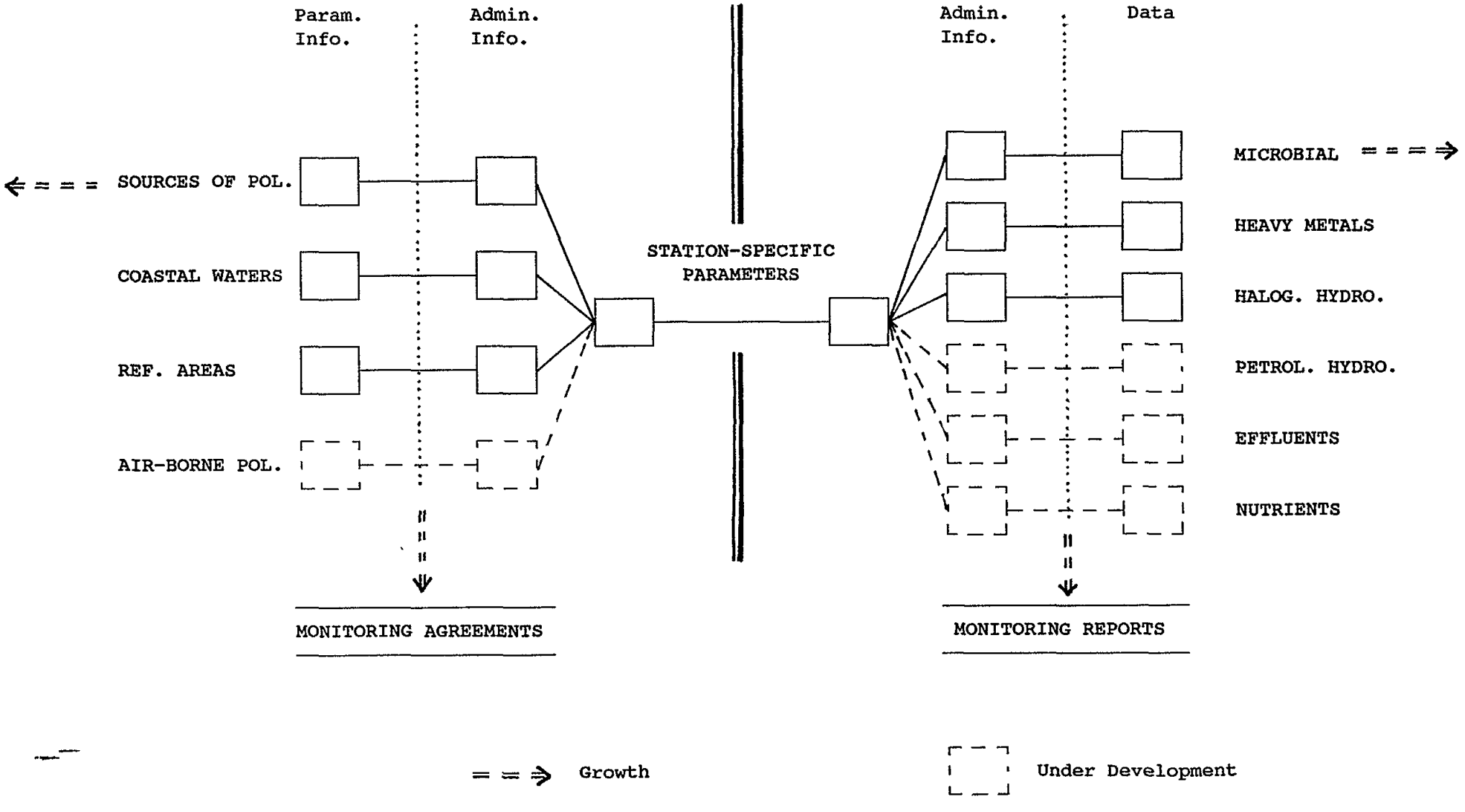
Annex II

MEDPOL Database Design Concept



Annex III

MEDPOL Specifics and Coding

A. General

1. Each data must be accompanied with **key** information:

YEAR	(2 num. digits);
COUNTRY	(3 characters);
AREA	(6 characters); and
STATION	(6 characters).

2. Each **station type** must be well defined or coded as being:

SOURCES OF POLLUTION	(S);
COASTAL WATERS	(C);
- Estuarine	(E);
- Recreational, Bathing	(B);
- Ports, Harbours	(P);
REFERENCE AREAS	(R); or
AIR-BORNE POLLUTION	(A).

3. Notation for **geographic co-ordinates** of stations are specified below:

Latitude or longitude DD MM.MM P
where
DD = degrees,
MM.MM = minutes with two decimals
P = position code (always N for latitude, W/E for longitude).

4. **Institutes** and **responsible investigators** must be explicitly stated. In cases of multi-parameters, all institutes and responsible investigators should be noted.

5. **Matrix** must always be stated; coding is given below:

MATRIX	CODE
Sea Water	SW
Suspended Matter	SM
Suspended Matter (Surface)	SMS
Suspended Matter (Bottom)	SMB
Sediment	SD
Seashore	SS
Plankton	PL
Phytoplankton	PLP
Zooplankton	PLZ
Biota	BI
Species Coding	???*

(*). Given in Table I.

6. **Remarks/comments** must not be longer than 30 characters.

B. Related to the Units

1. The following parameters should be specified in **metres** (m.):

PARAMETER	FORMAT
Bottom depth	9999.9
Sampling depth	9999.9
Shore distance	999999.9
Wind speed	99.9
Surface current speed	99.9
Wave height	9.99

2. Data measurement **units** must be clearly stated (e.g. MICROGR/KG, MICROGR/LTR, etc.).

3. **Formats** for various parameters are given below:

PARAMETER	FORMAT
EOM (%)	99.99
DW/FW (%)	99.99
Weight (Unit,Avg,Std)	XXXX 9999.9999 999.9999
Length (Unit,Avg,Std)	XXXX 999.99 99.99
Wind/Surface current direction (degrees)	999
Salinity	99.99
Temperature	99.9
Oxygen	999.99

C. Related to Monitoring Agreements

1. **Standard monitoring frequencies** are as follows. Any other frequency - if given - should be clearly stated.

FREQUENCY	CODING
Twice a day	T
Daily	D
Weekly	W
Fortnightly	F
Monthly	M
Bi-monthly	B
Quarterly	Q
Six-monthly	S
Yearly	Y

2. Measuring frequencies for **FC, TC, FS** and **PAT** must be separately stated for SUMMER and WINTER.

D. Related to Monitoring Reports

1. A **samplecode** (being up to 6 characters) must be supplied with each measurement.

2. **Zero-value** data must be explicitly separated from **missing/no** data.

3. **Date** (DD/MM/YY) and **time** (HH:MM) must accompany each reported data. The following coding is used for specific cases:

	REPORTED DATA		CODING		
Case	Date	Time	Date	Time	Remarks
1.	MARCH 86		01/03/86		Day Missing
2.		Morning		10:30	Morning
3.		Afternoon		16:30	Afternoon

4. For biota, **sex** coding is M, F, I (male, female, indeterminate).

5. For biota, **age** format is 99.9, indeterminate age should be entered as 99.9.

6. **Below detection level** (BDL) and **range** handling are as follows:

	REPORTED DATA		CODING
Case	BDL	Range	
1.		>5	5.111.....(*)
2.		<5	4.999.....
3.	Yes, without level		-1.000.....
4.	Yes, level x		y.999.....(y=x-1)
5.	Yes, level <0.01		-1.000.....

(*) All decimal digits are set as 1 or 9 depending on the case.

7. **Species coding** (where necessary) must be clearly given. 3-character species coding is as given in Table I.

8. **Tissue coding** (where necessary) must be clearly given. 2-character tissue coding based on FAO systematic and taxonomic terminology is given in Table II.

9. **Analysis method** (up to 20 characters in length) must accompany the data. For microbial data measurements, 3-character method must be supplied.

10. For each **element** measurement, a **remark** (up to 10 characters in length) can be added.

11. Different **forms of elements** (where applicable) must be clearly indicated. (e.g. Total mercury, inorganic mercury, etc..)

12. Data measurements with different **pH** values must be clearly indicated.

Table I

Species Coding

AT	Acanthocardia tuberculata (Syn. Rudicardium and Cardium tuberculatum)
AR	Argyrosomus regius (Syn. Sciaena aquila, Argyrosomus regium)
AA	Aristeus antennatus
BB	Boops boops
CS	Callinectes sapidus
CG	Chamelea gallina (Syn.Venus gallina)
CCG	Crassostrea gigas
DP	Diogenes pugilator
DC	Diplodus cervinus (Syn. Diplodus trifasciatus)
DS	Diplodus sargus
DT	Donax trunculus
LD	Liocarcinus depurator (Syn. Macropipus depurator)
LM	Lithognathus mormyrus (Syn. Pagellus mormyrus)
MC	Mactra corallina (Syn. Mactra stultorum)
MB	Mullus barbatus
MS	Mullus surmuletus
ME	Mytilus edulis
MG	Mytilus galloprovincialis
NG	Nassarius gibbosulus (Syn. Arcularia gibbosula)
NM	Nassarius mutabilis (Syn. Sphaeronassa mutabilis)
NN	Nephrops norvegicus
NE	Neverita josephinia (Syn. Natica josephinia)
OM	Oblada melanura
OE	Ostrea edulis
PGE	Pagellus erythrinus
PE	Palaemon elegans
PL	Parapenaeus longirostris
PK	Penaeus kerathurus
PP	Perna perna
PPL	Portunus pelagicus
SP	Sardina pilchardus
SM	Sardinella maderensis
SS	Sarpa salpa (Syn. Boops salpa)
SI	Scapharca inaequivalvis
SSS	Scomber scombrus
SST	Spisula subtrancata
TA	Thunnus alalunga
TT	Thunnus thynnus
TRM	Trachurus mediterraneus
TRT	Trachurus trachurus
UM	Upeneus moluccensis
XG	Xiphias gladius

Table II

Tissue Coding

	English	French	Category
39	Abdomen (crustaceans)	Abdomen (crustaces)	MUSCLES
35	Adductor	Adducteur	MUSCLES
41	Arms (cephalopods)	Bras (cephalopodes)	MUSCLES
63	Bile	Bile	BODY FLUIDS
61	Blood	Sang	BODY FLUIDS
56	Bone	Os	SKELETON AND ECTODERM
20	Brain	Cervelle	ORGANS
33	Brown	Brun	MUSCLES
57	Byssus	Byssus	SKELETON AND ECTODERM
22	Byssus gland	Gland a byssus	ORGANS
51	Carapace	Carapace	SKELETON AND ECTODERM
18	Digestive gland	Glande digestive	ORGANS
55	Feather(s)	Plume(s)	SKELETON AND ECTODERM
31	Fillet (general)	Filet (en general)	MUSCLES
36	Foot (gastropods)	Pied (gastropodes)	MUSCLES
16	Gall bladder (incl. bile)	Vesicule biliare (bile incluse)	ORGANS
19	Gills	Branchies	ORGANS
15	Gonads (sex indeterminate)	Gonades (sexe indetermine)	ORGANS
62	Hemolymph	Hemolymphe	BODY FLUIDS
12	Kidney	Rein	ORGANS
11	Liver	Foie	ORGANS
37	Mantle (gastropods)	Manteau (gastropodes)	MUSCLES
58	Mould	Mue	SKELETON AND ECTODERM
21	Nerves	Nerfs	ORGANS
99	Other (Description)	Autre (decrire)	
13	Ovary	Ovaire	ORGANS
34	Pectoral (birds)	Pectoral (oiseaux)	MUSCLES
38	Pincer (crustaceans)	Pince (crustaces)	MUSCLES
54	Scale(s)	Ecaille(s)	SKELETON AND ECTODERM
52	Shell	Coquille	SKELETON AND ECTODERM
53	Skin	Peau	SKELETON AND ECTODERM
01	Soft part	Partie molle	
17	Spleen	Rate	ORGANS
23	Stomach (empty)	Estomac (vide)	ORGANS
70	Subcutaneous fat	Graisse sous-cutanee	BODY FLUIDS
40	Tentacles (cephalopods)	Tentacules (cephalopodes)	MUSCLES
14	Testes	Testicule	ORGANS
64	Urine	Urine	BODY FLUIDS
32	White	Blanc	MUSCLES
00	Whole body	Corps entier	

Annex IV

COMMON PROBLEMS REGARDING MONITORING DATA
ARRIVING AT MEDU

(In addition to the problems arising from not obeying Annex III specifics, below are the commonly encountered extras).

A. On Monitoring Agreements

1. Missing AREA (area code) resulting in incomplete key.

2. AREA or STATION data more than 6 characters in length, resulting in difficulty to form the key.

3. Station types (sources of pollution, coastal, etc.) not given or clearly indicated.

4. Missing geographical co-ordinates for stations (unfortunately, maps in the agreements do not help).

5. Wrong geographical co-ordinates for stations (stations inland when mapped).

6. Inaccurate geographical co-ordinates for stations (stations on top of each other when mapped).

7. Matrix/frequency mapping to stations are ambiguous (not clearly indicated).

8. Unworkable frequencies (e.g. 3 times in May, monthly from June to September, etc. for one frequency data).

B. On Monitoring Reports

(The following are in addition to A1-A6, above).

1. New invented stations without co-ordinates or supplementary data (bottom depth, shore distance, etc.).

2. Stations with newer co-ordinates than those specified in the agreements.

3. Stations with different supplementary data than those specified in the agreements.

4. Missing date/time for measurements.

5. Ambiguous date/time for measurements (e.g. February-March 1987, morning).

6. Multiple date/time for a single measurement.