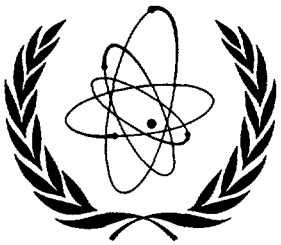


International Atomic Energy Agency

THE AGENCY'S BUDGET FOR 1971 AND PROGRAMME FOR 1971-76

GC(XIV)/433

Printed by the
International Atomic Energy Agency
in Austria - August 1970

CONTENTS

LIST OF ABBREVIATIONS

ACC	Administrative Committee on Co-ordination (of the United Nations)
Agency	International Atomic Energy Agency
Board	Board of Governors (of the Agency)
CCAQ	Consultative Committee on Administrative Questions
CINDA	Computer Index of Nuclear Data
D	Director
DDG	Deputy Director General
DG	Director General
EACRP	European-American Committee on Reactor Physics
ECOSOC	Economic and Social Council of the United Nations
ENEA	European Nuclear Energy Agency
EURATOM	European Atomic Energy Community
FAO	Food and Agriculture Organization of the United Nations
Fourth Geneva Conference	Fourth International Conference on the Peaceful Uses of Atomic Energy
GS	General Service category (staff)
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ICRU	International Commission on Radiation Units and Measurements
ICSH	International Committee for Standardization in Haematology
ICSU	International Council of Scientific Unions
IG	Inspector General
ILO	International Labour Organisation
IMCO	Inter-Governmental Maritime Consultative Organization
INDC	International Nuclear Data Committee
INIS	International Nuclear Information System
IOMP	International Organization for Medical Physics
IUPAC	International Union of Pure and Applied Chemistry
IWGFR	International Working Group on Fast Reactors
Joint FAO/IAEA Division	Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture
M&O	Maintenance and Operatives Service (staff)
MHD	Magnetohydrodynamics
Monaco Laboratory	International Laboratory of Marine Radioactivity at Monaco
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NPY	Co-operative research project in reactor physics between the Agency and the Governments of Norway, Poland and Yugoslavia
P	Professional category (staff)
PNE	Peaceful nuclear explosions
SAC	Scientific Advisory Committee (of the Agency)

SIDA	Swedish International Development Authority
SMPR	Small- and medium-power reactors
TLD	Thermoluminescent dosimetry
Trieste Centre	International Centre for Theoretical Physics at Trieste
UNDP	United Nations Development Programme
UNDP(SF)	Special Fund Component of the United Nations Development Programme
UNDP(TA)	Technical Assistance Component of the United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNJSPF	United Nations Joint Staff Pension Fund
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
WHO	World Health Organization
WMO	World Meteorological Organization

NOTE

All sums of money are expressed in United States dollars.

I. INTRODUCTION

I.1. In accordance with Article XIV.A of the Statute, the Board of Governors hereby submits to the General Conference the budget estimates for the expenses of the Agency in 1971, preliminary estimates for 1972, and the programme of work for the Agency for the six-year period 1971-76. The Board requests the General Conference to approve its budgetary recommendations for 1971.

The Regular Budget

I.2. The appropriations proposed for the Regular Budget for 1971 amount to $13 778 000. After deducting an amount of $726 000 for expected income the total amount of the assessments on Member States is $13 052 000. This figure is $1 199 000 or 10.1% more than the assessment in 1970. Approximately 5.1% is attributable to the safeguards programme, after allowance is made for miscellaneous income, and 5.0% to all other Agency activities. The Department of Safeguards and Inspection must plan for a greatly increased level of activity with the coming into force of NPT. While there is a need to budget for an expansion in the safeguards programme, the Board feels that the additional expenditure on this activity is fully justified in order to provide a trained personnel of the numbers and competence required to carry out the functions entrusted to the Agency. A detailed explanation regarding the expenditure on this activity is provided in the relevant parts of this document.

I.3. This programme and budget is the second in which the Agency's programme is presented for a six-year period, 1971-76, approval of the budgetary proposals being sought only for 1971. The estimates shown for the second year of the six-year period, 1972, are preliminary and will be presented to the General Conference in 1971 together with such supporting data as will be required in respect of the two-year programme and budget cycle adopted by the Agency.

I.4. In 1971 the Agency's budget for the first time is presented entirely on a programme basis as proposed in the Introduction to the Agency's Budget for 1970 [1] and as recommended by the General Assembly's Ad Hoc Committee of Experts to Examine the Finances of the United Nations and the Specialized Agencies [2]. It should be noted, however, that the amounts relating to the years 1969 and 1970, which are shown for purposes of comparison, are not absolutely comparable in all instances because the accounts were kept for this period on the basis of objects of expenditure and it has not been possible to give a detailed breakdown of expenditure on each programme. In subsequent years this situation will correct itself.

I.5. Programme budgeting is a valuable procedure since it enables the Secretariat, the Board and the General Conference to plan programmes, using the most effective combinations of manpower, material and financial resources to achieve the desired objectives. This procedure is used to allot resources to a programme, to ascertain the extent to which the objectives have been attained, and to determine the rate of expenditure.

I.6. It is also a control procedure to ensure that expenditure is kept within certain limits. Planning and control can both be successfully carried out only if a reasonable degree of flexibility can be exercised in re-allocating resources within approved limits. Otherwise the danger exists that the procedure will serve only a control purpose and not as a management aid as well.

I.7. It is therefore recommended that the Agency's programme of work should be subdivided into nine parts. The parts recommended as providing a reasonable balance for

---

[1] GC(XIII)/405, para.7.

[2] See United Nations document A/6343.

both control purposes and operational effectiveness are as follows:

1. Policy-making organs
2. Executive management and administration
   (a) Executive management and technical programme planning
   (b) Administration
   (c) Service and support activities
3. Common services
4. Technical assistance and training
5. Research and isotopes
   (a) Food and agriculture
   (b) Life sciences
   (c) Physical sciences
6. Operational facilities
   (a) Seibersdorf Laboratory
   (b) Trieste Centre
   (c) Monaco Laboratory
7. Technical operations
   (a) Nuclear power and reactors
   (b) Health, safety and waste management
   (c) Information and technical services
8. Safeguards
9. Contingent extraordinary expenditures

I.8. In order to give, for purposes of comparison, a true picture of the budgetary situation in 1970 the adjusted estimated expenditure is shown for that year. Such an adjustment is necessary because the programme budget is prepared long before the start of the fiscal year; some of the factors influencing each programme inevitably alter. The 1970 budget is therefore referred to in the document as the adjusted budget for 1970. The original 1970 estimates have only been adjusted within the amounts previously approved by the General Conference.

I.9. Where possible, proposed expenditures have been shown as gross amounts. Thus, where the expected revenue from an activity could be accurately assessed the amount has not been deducted from the amount budgeted for, as in the past. Instead the total cost of the activity has been budgeted for as an expenditure and the expected income is shown as receipts.

I.10. The Director General informed the Board in 1969 that he intended to have a survey of the deployment and utilization of staff made during the year to determine whether the staff

was being utilized fully or whether a reassignment of staff or posts might provide for a greater utilization of the manpower and funds available.

I.11. The results of the survey, in the Director General's view, demonstrate that certain posts within Departments other than the Department of Safeguards and Inspection can be utilized temporarily to meet the expanding requirements of the latter Department. The results of the survey also justify the assumption that staff turnover and delays in recruitment will leave 20 Professional posts unfilled throughout the year.[3]

I.12. To allow for delays in recruitment, the cost of salaries of staff to fill new posts is shown at 75% of the annual rate. However, it has been assumed that recruiting will have been completed by the beginning of the fiscal year 1971 for the Department of Safeguards and Inspection and the provision for salaries at the full annual rate is therefore proposed.

I.13. The cost of GS and M&O salaries for 1971 has been calculated on the basis of the cost of actual average salaries in 1969 plus a 5.5% increase approved by the Board which took effect on 1 January 1970. The 1971 average salary rates of $3520 for GS staff and $2150 for M&O staff are 2.6% and 1.9% higher than the rates used in the 1970 budget, which were $3430 and $2110 respectively, except for staff at operational facilities.

I.14. The average cost of holding a symposium has been estimated at $7000 and the cost of holding a panel at $6000, which were the average costs in recent years. These amounts have been calculated as the net cost of such meetings; in this case the method of gross budgeting [4] was not used because when the budget was being prepared there was no accurate way of estimating what host Governments' contributions were likely to be.

I.15. The Fourth International Conference on the Peaceful Uses of Atomic Energy will be held at Geneva in 1971, and a number of topics normally discussed at the Agency's scientific meetings will be considered at the Conference. Accordingly, the number of such meetings to be convened by the Agency in that year will be reduced, and the money thus saved will be used to finance the Agency's out-of-pocket expenses for participation at the Conference.

I.16. The 1970 budget first provided for the gradual transfer of the remaining Seibersdorf Laboratory charges from the Operational Budget to the Regular Budget. A second portion of these costs is transferred in 1971 and it is proposed to complete this transfer in 1972 so that thereafter the entire cost of the Laboratory will be borne by the Regular Budget.

Target for voluntary contributions to the General Fund

I.17. Although the target of $2 million for voluntary contributions to the General Fund has not been reached in the past, it is proposed to increase this target to $2.5 million for 1971. It is hoped that this will induce Member States to increase their contributions. The Board is encouraged by the fact that about 83% of the $2 million target for 1970 may be reached by the end of the year, thus radically improving the situation that has obtained up to now.

United Nations Development Programme

I.18. It is not possible for the Board to make a forecast of how much money will be allocated to the Agency from UNDP in 1971 or 1972. It should be noted, however, as indicated in Table 3, that the UNDP funds available and used by the Agency during 1969 totalled $696 658. No comparative figure relating to 1970 and 1971 can be provided.

---

[3] See Annex VI.

[4] See para. 9 above.

Working Capital Fund

I.19. The Board proposes that for 1971 the Agency's Working Capital Fund should remain at the same level as before, namely $2 million. This is reflected in draft recolution C in Annex VII, which deals with the use of this Fund in 1971.

Report on the budget to the United Nations General Assembly

I.20. In accordance with Article XVI of the Agency's relationship agreement with the United Nations [5], the budget will be reviewed by the Advisory Committee on Administrative and Budgetary Questions (of the General Assembly), which will report on the administrative aspects thereof to the Assembly.

[5] INFCIRC/11, part I.

II. THE CONSOLIDATED BUDGET

Table 1

Item	1969 Actual $	1970 Budget $	1971 Estimate $
INCOME			
Regular Budget			
Assessed contributions of Member States	9 637 651	11 853 000	13 052 000
Miscellaneous income	397 981	397 000	726 000
General Fund			
Voluntary contributions	1 550 158	2 000 000	2 500 000
Special contributions	289 640	295 000	295 000
Miscellaneous income	156 090	60 000	80 000
Operating Fund I			
Direct contributions for Trieste Centre	82 634	160 000	225 000
Reimbursable laboratory services	59 509	72 000	76 000
Miscellaneous income	18 005	-	10 000
Drawings on unobligated balance	66 767	-	-
Savings on prior years' operations	8 540	-	-
Operating Fund II			
Government contributions in respect of experts' services	48 509	-	65 000
Miscellaneous income	6 843	-	-
	12 322 327[a]	14 837 000	17 029 000
EXPENDITURES			
Regular Budget	11 234 761	12 250 000	13 778 000
Operating Fund I	736 095	650 000	669 000
Operating Fund II	1 550 600	1 937 000	2 582 000
	13 521 456[a]	14 837 000	17 029 000

a/ The difference of $1 199 129 between expenditures and receipts represents the provisional cash deficit for 1969.

III. THE REGULAR BUDGET

Summary of expenditures and income

Table 2

Item	1969 Actual $	1970 Budget $	Increase or (decrease) in 1971 $	1971 Estimates $
Expenditures				
Policy-making organs	526 899	560 000	11 000	571 000
Executive management and technical programme planning	329 621	330 400	17 600	348 000
Technical assistance and training	614 775	611 800	16 200	628 000
Food and agriculture	618 939	553 600	(600)	553 000
Life sciences	636 753	600 200	8 800	609 000
Physical sciences	713 723	701 400	12 600	714 000
The Laboratory	755 310	819 000	151 000	970 000
Trieste Centre	119 845	150 000	-	150 000
Nuclear power and reactors	603 637	706 000	(12 000)	694 000
Health, safety and waste management	461 051	634 100	38 900	673 000
Monaco Laboratory	133 233	160 800	16 200	177 000
Information and technical services	895 525	1 165 000	93 000	1 258 000
Safeguards	952 650	1 272 000	613 000	1 885 000
Service and support activities	758 580	780 600	61 400	842 000
Administration	1 396 416	1 367 300	32 700	1 400 000
Common services	1 717 804	1 737 800	468 200	2 206 000
Contingent extraordinary expenditures	- [a]	100 000	-	100 000
	11 234 761	12 250 000	1 528 000 [b]	13 778 000
Income				
Assessed contributions of Member States	9 637 651	11 853 000	1 199 000 [c]	13 052 000
Sale of Agency publications	-	-	195 000	195 000
Sale of INIS publications including microfiches	1 715	-	45 000	45 000
Sale of CINDA publications	-	-	10 000	10 000
Advertising	-	-	3 000	3 000
Investment and short-term deposits	125 593	125 000	5 000	130 000
Refund from UNJSPF	15 057	50 000	-	50 000
Allocation from the United Nations Special Account	178 403	172 000	13 000	185 000
UNIDO programme sharing				
- Computer service	-	-	30 000	30 000
- Reproduction service	-	-	15 000	15 000
Other	77 213	50 000	13 000	63 000
	10 035 632	12 250 000	1 528 000	13 778 000

a/ Of the $130 000 provided for contingent extraordinary expenditures in 1969, $113 761 was used; total expenditures in the various programmes exceed the 1969 budget estimates (excluding contingent extraordinary expenditures) by that amount.

b/ Includes revenues of $210 000 which are deducted from 1970 expenditures. Based on 1970 gross expenditures, the increase is $ 1 318 000 (10.6%).

c/ The proposed assessment of $ 13 052 000 is 10.1% higher than the 1970 assessment.

IV. THE OPERATIONAL BUDGET

Summary of income, expenditures and allocations

Table 3

Item	General Fund			Operating Fund I			Operating Fund II		
	1969 Actual	1970 Budget	1971 Estimates	1969 Actual	1970 Budget	1971 Estimates	1969 Actual	1970 Budget	1971 Estimates
INCOME									
Voluntary contributions of Member States	1 550 158	2 000 000	2 500 000	-	-	-	-	-	-
Special contributions of Member States:									
Italian Government	250 000	250 000	250 000	-	-	-	-	-	-
Monaco Government	39 640	45 000	45 000	-	-	-	-	-	-
Direct contributions for special projects:									
Ford Foundation	-	-	-	55 000	10 000	50 000	-	-	-
UNESCO	-	-	-	4 988	150 000	150 000	-	-	-
SIDA	-	-	-	12 646	-	25 000	-	-	-
Danish Atomic Energy Commission	-	-	-	10 000	-	-	-	-	-
Reimbursable laboratory services	-	-	-	59 509	72 000	76 000	-	-	-
Income from investment and short-term deposits	156 090	60 000	80 000	-	-	-	-	-	-
Government contributions in respect of experts' services	-	-	-	-	-	-	48 509	-	65 000
Miscellaneous income	-	-	-	18 005	-	10 000	6 843	-	-
Drawings on unobligated blance	-	-	-	66 767	-	-	-	-	-
Savings on prior years' operations	-	-	-	8 540	-	-	-	-	-
TOTAL	1 995 888	2 355 000	2 875 000	235 455	232 000	311 000	55 352	-	65 000
Transfers from General Fund to Operating Fund I:									
Laboratory	(176 000)	(123 000)	(63 000)	176 000	123 000	63 000	-	-	-
Trieste Centre	(285 000)	(250 000)	(250 000)	285 000	250 000	250 000	-	-	-
Monaco Laboratory	(39 640)	(45 000)	(45 000)	39 640	45 000	45 000	-	-	-
to Operating Fund II	(1 495 248)	(1 937 000)	(2 517 000)	-	-	-	1 495 248	1 937 000	2 517 000
TOTAL	-	-	-	736 095	650 000	669 000	1 550 600	1 937 000	2 582 000
EXPENDITURES AND ALLOCATIONS									
Operating Fund I:									
Laboratory				280 967	195 000	139 000			
Trieste Centre				412 715	410 000	485 000			
Monaco Laboratory				42 413	45 000	45 000			
Operating Fund II:									
Technical Assistance: Experts and equipment							974 247	1 250 000	1 900 000
Fellowships and training							527 789	687 000	682 000
Research contracts							(1 618)	-	-
Unobligated earmarkings							50 182	-	-
TOTAL				736 095	650 000	669 000	1 550 600	1 937 000	2 582 000
UNDP(TA): Fellowships							174 970		
Experts and equipment							521 688		
							696 658		
							2 247 258		

FIGURE 1
Total expenditures 1971
Regular Budget, Operating Fund I, Operating Fund II

$17 029 000

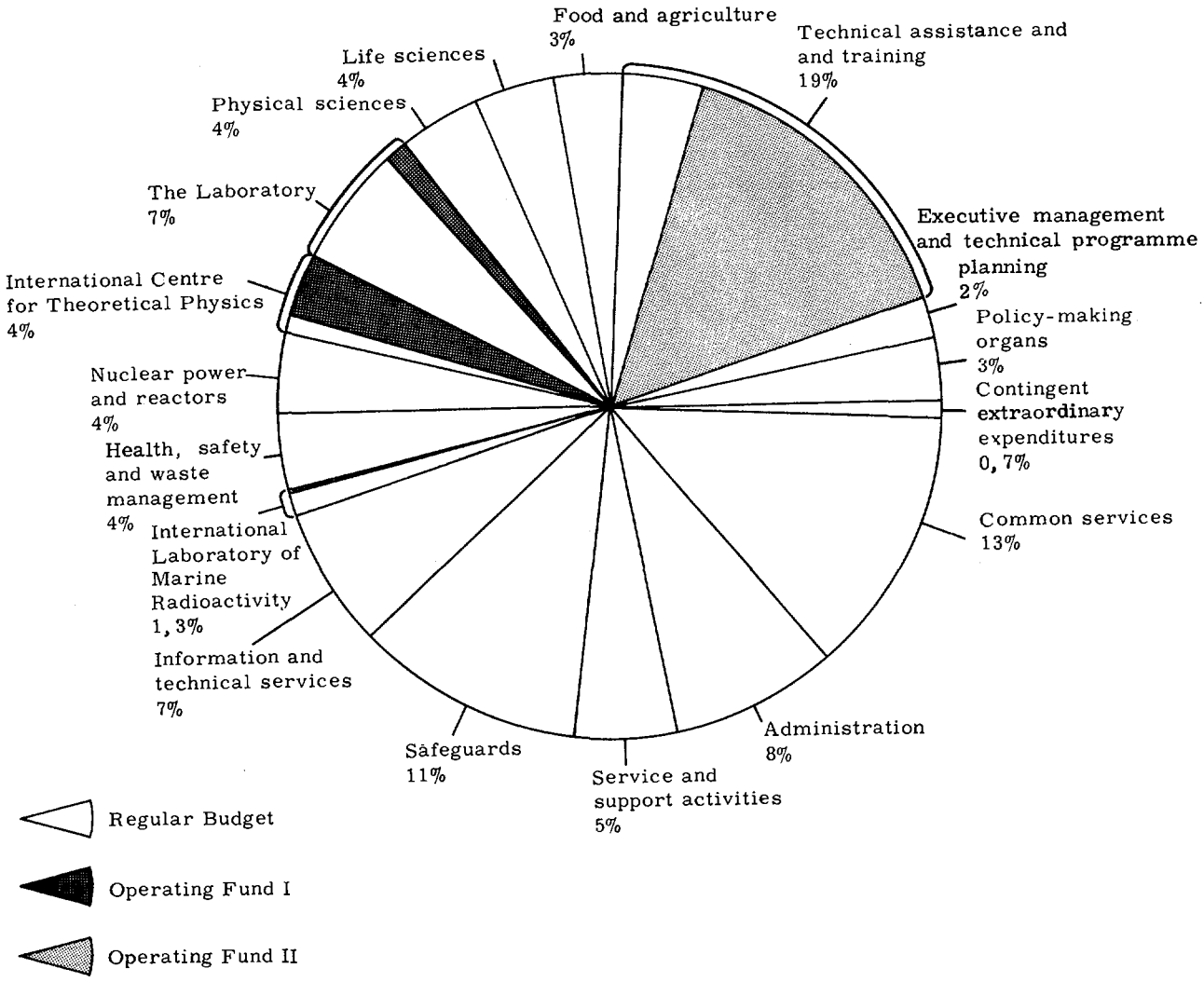
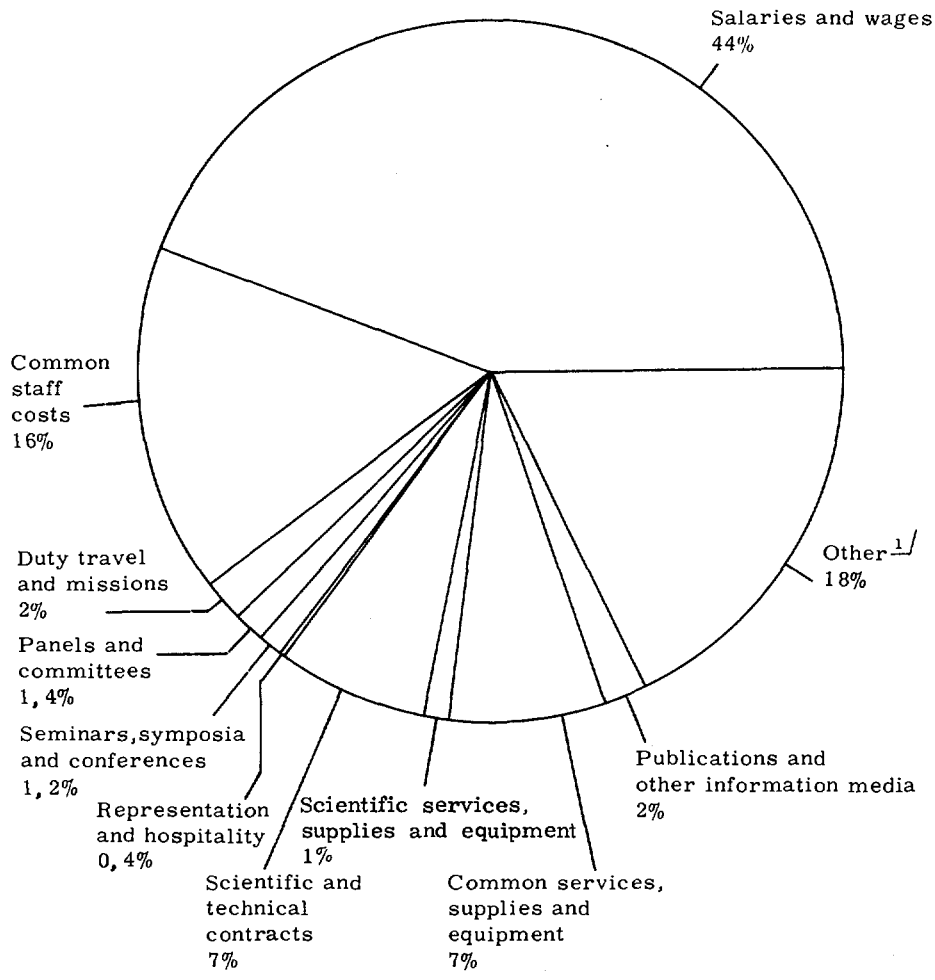


FIGURE 2 $17 029 000
Total costs for 1971 by item of expenditure

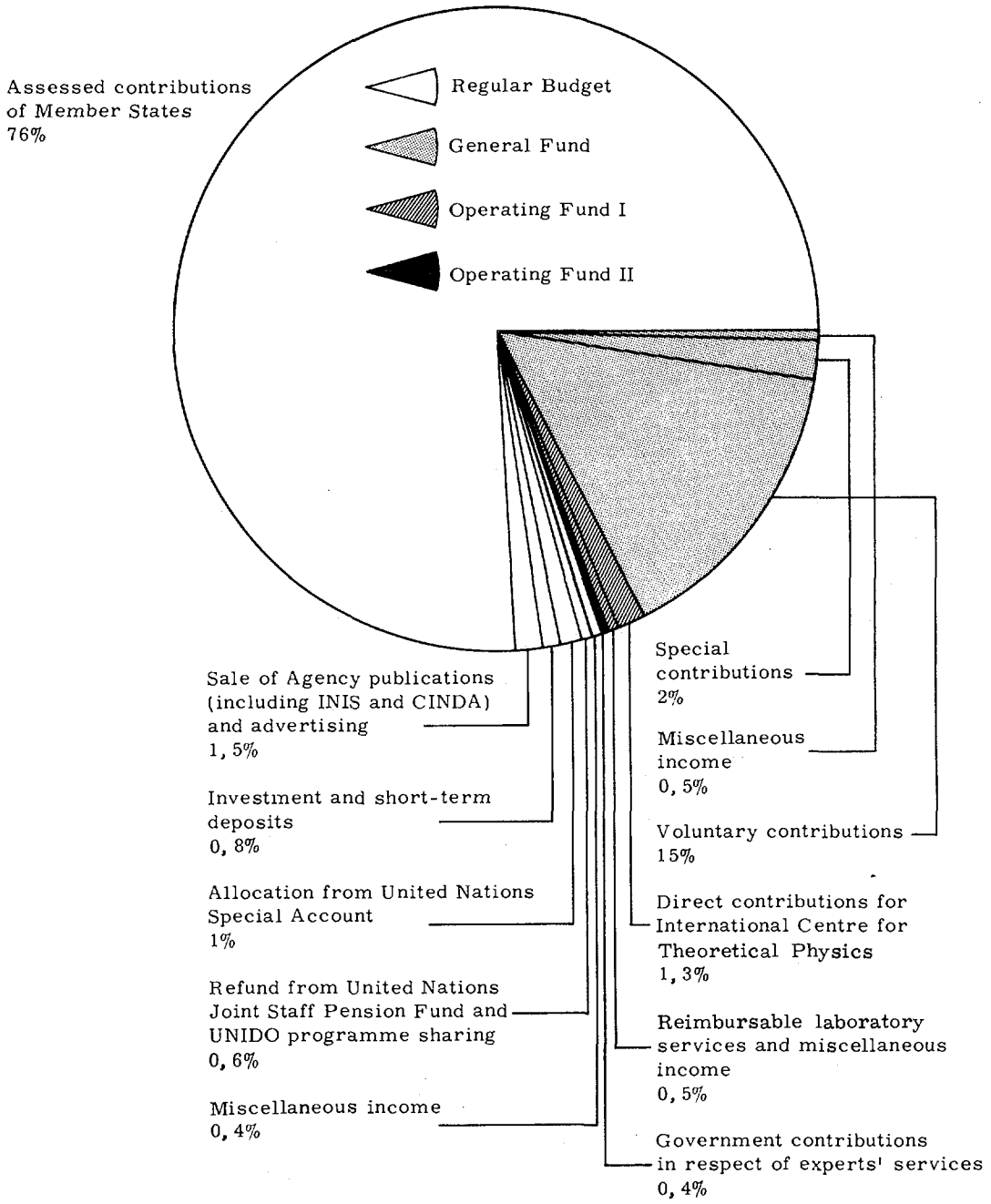


1/ Consists of:

Operating Fund II	$	2 582 000
Safeguards plutonium laboratory		50 000
International Centre for Theoretical Physics		275 500
Contingent extraordinary expenditure		100 000
External Audit		6 000
Total	$	3 013 500

FIGURE 3 $17 029 000

Total income for 1971 by source



Total price and programme increase by programme, 1970-1971

Table 4

Programme	Adjusted 1970 budget (gross)	Transfer between funds	Price increase		Programme increase		Total change		1971 estimate	Preliminary 1972 estimate	
	$	$	$	%	$	%	$	%	$	$	%
1. Policy-making organs	560 000		8 500		2 500	0.4	11 000	2.0	571 000	597 000	
2. Executive management and technical programme planning	330 400		17 600		-		17 600	5.3	348 000	371 000	
3. Technical assistance and training											
Regular Budget 611 800			18 200		(2 000)	(0.3)	16 200	2.6	628 000	695 000	
Operating Fund II 1 937 000			-		645 000	33.3	645 000	33.3	2 582 000	3 145 000	
	2 548 800		18 200		643 000		661 200		3 210 000	3 840 000	
4. Food and agriculture	553 600		6 400		(7 000)	(1.3)	(600)	(0.1)	553 000	603 000	
5. Life sciences	600 200		8 800		-		8 800	1.5	609 000	716 000	
6. Physical sciences	701 400		16 600		(4 000)	(0.6)	12 600	1.8	714 000	848 000	
7. The Laboratory											
Regular Budget 819 000		60 000	84 700		6 300	0.8	151 000	18.4	970 000	1 220 000	
Operating Fund I 195 000		(60 000)	4 000		-		(56 000)	(28.7)	139 000	-	
	1 014 000	-	88 700		6 300	0.6	95 000	9.4	1 109 000	1 220 000	
8. International Centre for Theoretical Physics											
Regular Budget 150 000			-	-	-	-	-		150 000	150 000	
Operating Fund I 410 000			15 000		60 000	14.6	75 000	18.3	485 000	490 000	
	560 000		15 000		60 000		75 000	13.4	635 000	640 000	
9. Nuclear power and reactors	706 000		12 800		(24 800)	(3.5)	(12 000)	(1.7)	694 000	782 000	
10. Health, safety and waste management	634 100		17 400		21 500	3.4	38 900	6.1	673 000	759 000	
11. International Laboratory of Marine Radioactivity											
Regular Budget 160 800			13 200		3 000	- 1.9	16 200	10.1	177 000	198 000	
Operating Fund I 45 000			-		-		-		45 000	45 000	
	205 800		13 200		3 000	1.5	16 200	7.9	222 000	243 000	
12. Information and technical services											
Regular Budget (net 1970) 1 165 000											
Income [a] 25 000											
(gross 1970)	1 190 000		30 700		37 300	3.1	68 000	5.7	1 258 000	1 515 000	
13. Safeguards	1 272 000		80 000		533 000	41.9	613 000	48.2	1 885 000	2 644 000	
14. Service and support activities	780 600		3 900		57 500	7.4	61 400	7.9	842 000	891 000	
15. Administration	1 367 300		49 700		(17 000)	(1.2)	32 700	2.4	1 400 000	1 578 000	
16. Common services											
Regular Budget (net 1970) 1 737 800											
Income [a] 185 000											
(gross 1970)	1 922 800		131 000		152 200	7.9	283 200	14.7	2 206 000	2 371 000	
17. Contingent extraordinary expenditures	100 000								100 000	100 000	
TOTAL	15 047 000		518 500	3.4	1 463 500	9.7	1 982 000	13.2	17 029 000	19 718 000	15.8
Source of funds:											
Regular Budget (gross)	12 460 000	60 000	499 500	4.0	758 500	6.1	1 318 000	10.6	13 778 000	16 038 000	16.4
Operating Fund I	650 000	(60 000)	19 000	2.9	60 000	9.2	19 000	2.9	669 000	535 000	(20.0)
Operating Fund II	1 937 000	-	-		645 000	33.3	645 000	33.3	2 582 000	3 145 000	21.8
TOTAL	15 047 000	-	518 500	3.4	1 463 500	9.7	1 982 000	13.2	17 029 000	19 718 000	15.8
Regular Budget (gross)	12 460 000	60 000	499 500	4.0	758 500	6.1	1 318 000	10.6	13 778 000	16 038 000	16.4
Less: Income [a]	210 000	-	-		88 000		88 000		298 000	348 000	
Regular Budget (net)	12 250 000	60 000	499 500	4.1	670 500	5.5	1 230 000	10.0	13 480 000	15 690 000	16.4
Less: Miscellaneous income	397 000	-	-		31 000		31 000		428 000	504 000	
Assessments on Member States	11 853 000	60 000	499 500	4.2	639 500	5.4	1 199 000	10.1	13 052 000	15 186 000	16.3

[a] Resulting from programme activities.

Income - Regular Budget

Table 5

	1970	Increase	1971
(a) Not attributable to specific programmes			
Investment and short term deposits	125 000	5 000	130 000
Refund from United Nations Joint Staff Pension Fund	50 000	-	50 000
Allocation from the United Nations Special Account	172 000	13 000	185 000
Other	50 000	13 000	63 000
Sub-total	397 000	31 000	428 000
(b) Attributable to specific programmes			
Publications of the Agency	185 000	10 000	195 000
INIS publications	25 000	20 000	45 000
CINDA publications	-	10 000	10 000
Advertising	-	3 000	3 000
UNIDO programme sharing: computer	-	30 000	30 000
reproduction	-	15 000	15 000
Sub-total	210 000[a/]	88 000	298 000
TOTAL	607 000	119 000	726 000

a/ Was deducted from expenditure in 1970; in the budget for 1970, miscellaneous income amounted to $ 397 000 only.

Summary of total costs

Table 6

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	6 420 115	6 854 000	279 700	333 200	612 900	7 466 900	8 758 100
Common staff costs	2 334 780	2 472 000	156 200	121 600	277 800	2 749 800	3 239 800
Duty travel and missions	286 668	318 100	13 100	67 400	80 500	398 600	511 400
Meetings: Panels and committees	189 596	222 000	3 700	7 500	11 200	233 200	249 700
Seminars, symposia and conferences	175 842	200 000	-	9 000	9 000	209 000	224 300
Representation and hospitality	37 497	41 500	-	3 400	3 400	44 900	42 400
Scientific and technical contracts	1 029 046	1 090 400	11 600	59 000	70 600	1 161 000	1 246 000
Scientific services, supplies and equipment	164 551	181 500	7 500	-	7 500	189 000	222 500
Common services, supplies and equipment	1 032 795	1 071 500	34 700	113 900	148 600	1 220 100	1 285 800
Publications and other information media	81 301	110 000	8 000	225 000	233 000	343 000	409 500
Other	1 769 265	2 276 000	4 000	733 500	737 500	3 013 500	3 528 500
GRAND TOTAL	13 521 456	14 837 000	518 500 3.49%	1 673 500 11.28%	2 192 000 14.77%	17 029 000	19 718 000
Source of funds:							
Regular Budget	11 234 761	12 250 000	499 500	1 028 500	1 528 000	13 778 000	16 038 000
Operating Fund I	736 095	650 000	19 000	-	19 000	669 000	535 000
Operating Fund II	1 550 600	1 937 000	-	645 000	645 000	2 582 000	3 145 000
GRAND TOTAL	13 521 456	14 837 000	518 500 3.49%	1 673 500 11.28%	2 192 000 14.77%	17 029 000	19 718 000

Major components of price increases in the 1971 budget [1]

Table 7

Item of expenditure	Regular budget	Operational budget	Total
Salaries and wages	279 700	4 000	283 700
Common staff costs	155 200	1 000	156 200
Duty travel	16 800	-	16 800
Scientific and technical services, supplies and equipment	15 100	4 000	19 100
Common services, supplies and equipment	32 700	10 000	42 700
Total, price increases	499 500	19 000	518 500

1/ Includes only items of expenditure which are not provided for in the 1970 budget estimates but are already being incurred in 1970 so that provision has been made for them in the 1971 estimates. They include a post adjustment for Professional staff, GS and M&O salary rate increases approved by the Board, changes in airfares and per diem rates, and utility and commodity price increases.

Summary of total manpower by grade

Table 8

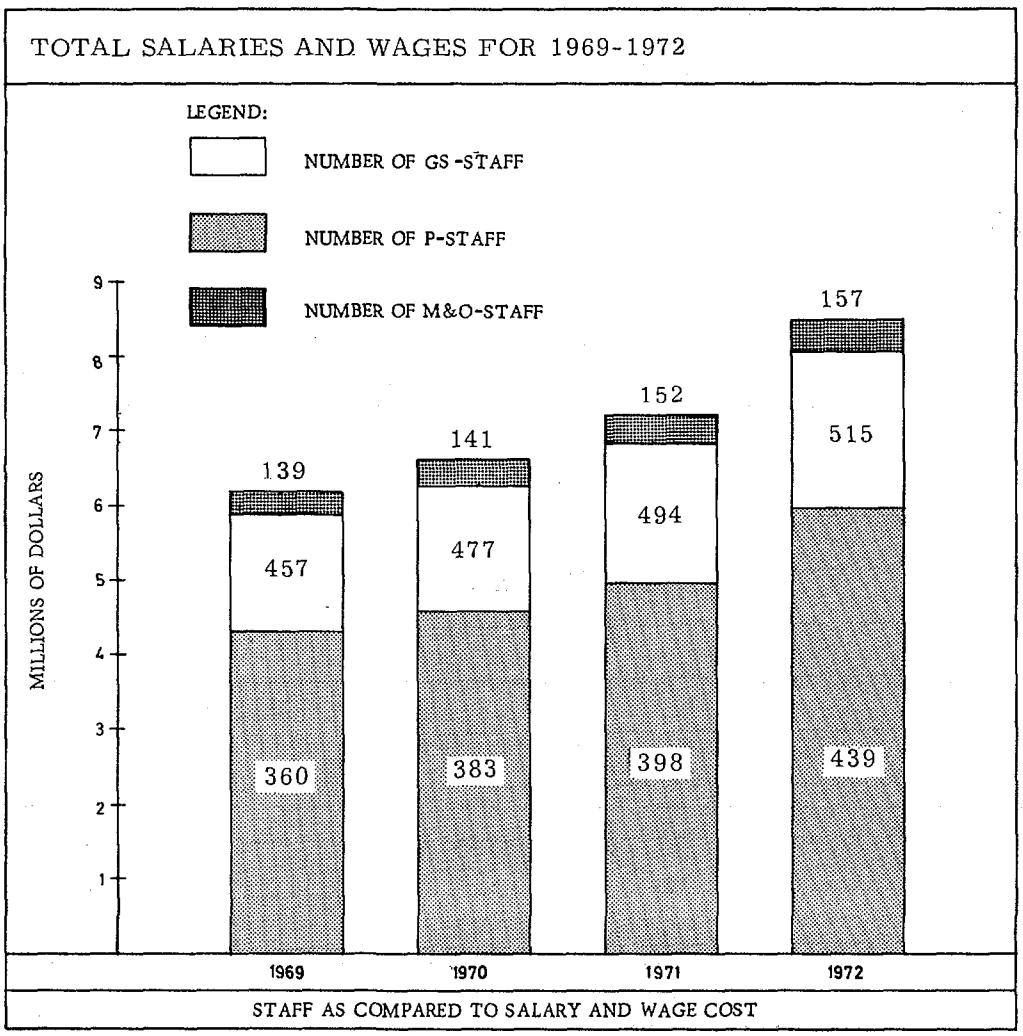
Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	1	1	-	1	1
DDG/IG	5	5	-	5	5
D	18	19	-	19	20
P-5	76	83	4	87	94
P-4	110	111	1	112	123
P-3	83	92	7	99	109
P-2	36	41	4	45	55
P-1	31	31	(1)	30	32
Sub-total	360	383	15	398	439
GS	457	477	17	494	515
M&O	139	141	11	152	157
TOTAL	956	1 001	43	1 044	1 111

Summary of total manpower by department

Table 9

Grade of post	Number of established posts				
	1970	Change	1971	Change	1972
Office of the Director General	7	-	7	-	7
Department of Administration	373	11	384	9	393
Department of Research and Isotopes	233	2	235	9	244
Department of Safeguards and Inspection	79	19	98	35	133
Department of Technical Assistance and Publications	159	7	166	2	168
Department of Technical Operations	150	4	154	12	166
TOTAL	1 001	43	1 044	67	1 111

FIGURE 4



1. Policy-making organs

Summary of costs

Table 10

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	353 228	373 000	5 000	2 500	7 500	380 500	398 900
Common staff costs	114 660	126 500	3 500	-	3 500	130 000	137 600
Duty travel and missions	-	500	-	-	-	500	500
Meetings: Panels and committees	-	-	-	-	-	-	-
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	-	-	-	-	-	-	-
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	53 091	54 000	-	-	-	54 000	54 000
Publications and other information media	-	-	-	-	-	-	-
Other	5 920	6 000	-	-	-	6 000	6 000
TOTAL	526 899	560 000	8 500 1.52%	2 500 0.44%	11 000 1.96%	571 000	597 000

Summary of manpower

Table 11

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
P	16	16	-	16	16
GS	28	27	-	27	27
M&O	4	4	-	4	4
TOTAL	48	47	-	47	47

Highlight summary

V.1.1. This part of the programme deals with the work of the statutory policy-making organs of the Agency, including the annual session of the General Conference and the meetings of the Board of Governors and its committees. No need is foreseen for additional staff in support of this programme during the next two years, except for minor increases in temporary assistance and overtime costs in support of meetings of Board committees. All other estimated increases are due to normal increases in salary and other emoluments of existing staff.

Programme

The General Conference

V.1.2. The composition and functions of the General Conference are laid down in Article V of the Statute. It is assumed that the Conference's sessions in 1971 and 1972 will each last about seven days and consequently that the level of the expenditures on them will be comparable to that of recent years.

The Board of Governors

V.1.3. The composition and functions of the Board of Governors are laid down in Article VI of the Statute. At present the Board has two "standing" committees – the Administrative and Budgetary Committee and the Technical Assistance Committee; as the need arises, it sets up ad hoc committees to deal with specific questions. Except for general increases in the salaries of staff, in related common staff costs and in the cost of services, the annual expenditure on the Board is not expected to change substantially in the immediate future.

Budget estimates

Explanation of major cost increases in 1971

V.1.4. The major components of costs under this programme are shown in Table 10, which indicates that in 1971 total costs will increase by $11 000, of which $8 500 is for salary and price increases and the remaining $2500 is to provide supporting services for somewhat more meetings of the Board and its committees in 1971 than were held in 1969.

V.1.5. The manpower shown in Table 11 comprises staff working for the Agency's policy-making organs in the Secretariat of the General Conference and the Board of Governors, including the Interpretation Service, in the Languages Division and in the Division of Publications. Corresponding deductions are reflected in the manning tables and cost summaries of these Divisions.

Preliminary budget estimates for 1972

V.1.6. It is foreseen that costs will increase by an additional $26 000 in 1972 as a result of increases in salaries and other emoluments for existing staff.

Distribution of estimated costs between the General Conference and the Board

V.1.7. The distribution of estimated costs for 1970 through 1972 compared with actual costs in 1969 is shown below:

Policy-making organ	1969 Actual	1970 Adjusted budget	1971 Estimate	1972 Preliminary estimate
The General Conference	$227 532	$235 000	$241 000	$250 000
The Board of Governors	299 367	325 000	330 000	347 000
TOTAL	$526 899	$560 000	$571 000	$597 000

V.1.8. The costs charged to the policy-making organs of the Agency include the total cost of the Secretariat of the General Conference and the Board of Governors, less interpretation costs as a whole, plus a surcharge consisting of a percentage of the costs of interpretation, translation and documentation services. This percentage is determined by an annual detailed analysis of workload statistics. The above breakdown of costs has been arrived at on the basis of these statistics and an expected minor increase in committee meetings.

2. Executive management and technical programme planning

Summary of costs

Table 12

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	214 155	209 300	11 900	-	11 900	221 200	236 400
Common staff costs	75 587	76 900	5 100	-	5 100	82 000	88 900
Duty travel and missions	16 406	18 000	400	-	400	18 400	18 800
Meetings: Panels and committees	8 454	11 000	200	-	200	11 200	11 700
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	15 019	15 200	-	-	-	15 200	15 200
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	329 621	330 400	17 600 5.33%	-	17 600 5.33%	348 000	371 000

Summary of manpower

Table 13

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	1	1	-	1	1
DDG/IG	2	2	-	2	2
D	1	1	-	1	1
P-5	2	2	-	2	2
P-4	-	-	-	-	-
P-3	2	2	-	2	2
P-2	1	1	-	1	1
P-1	2	2	-	2	2
Sub-total	11	11	-	11	11
GS	8	8	-	8	8
M&O	-	-	-	-	-
TOTAL	19	19	-	19	19

Highlight summary

V.2.1. This part of the programme covers the work of the Office of the Director General, who is appointed by the Board of Governors with the approval of the General Conference, SAC, the Office of the Deputy Director General for Research and Isotopes, excluding the Research Contract Administration Section, and the Office of the Deputy Director General for Technical Operations.

V.2.2. The general management and scientific aspects of the work of each of these Offices make it advisable to group them together into a single senior management unit for budget purposes rather than to charge the expenditure involved to other programmes of the Agency. No changes in staff or increases in the programme are foreseen for 1971 and 1972.

Budget estimates

Explanation of major cost changes in 1971

V.2.3. The various price increases anticipated for 1971 for this programme amount to $17 600, or 5.33%, as shown in Table 12. All cost increases are due to the general rise in the cost of operation because of increased salary and other emoluments of staff and increases in travel costs for staff members and members of SAC resulting from higher air fares and per diem rates.

Preliminary budget estimates for 1972

V.2.4. An additional increase of $23 000 is foreseen for 1972 because of expected further increases in salaries and per diem costs for existing staff members and members of SAC.

3. Technical assistance and training

Summary of costs

Table 14

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	427 164	427 500	11 400	-	11 400	438 900	480 500
Common staff costs	165 957	162 200	6 800	-	6 800	169 000	186 400
Duty travel and missions	18 868	19 000	-	(2 000)	(2 000)	17 000	17 000
Meetings: Panels and committees	-	-	-	-	-	-	8 000
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	2 786	3 100	-	-	-	3 100	3 100
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
Sub-total, Regular Budget	614 775	611 800	18 200 2.97%	(2 000) (0.32%)	16 200 2.65%	628 000	695 000
Operating Fund II	1 550 600	1 937 000	-	645 000 33.30%	645 000 33.30%	2 582 000	3 145 000
TOTAL	2 165 375	2 548 800	18 200 0.71%	643 000 25.23%	661 200 25.94%	3 210 000	3 840 000

Summary of manpower

Table 15

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	1	1	-	1	1
D	1	1	-	1	1
P-5	6	6	-	6	6
P-4	10	10	-	10	10
P-3	5	4	-	4	4
P-2	2	2	-	2	2
P-1	-	-	-	-	-
Sub-total	25	24	-	24	24
GS	30	30	-	30	30
M&O	-	-	-	-	-
TOTAL	55	54	-	54	54

Highlight summary

V.3.1. This programme covers the work relating to technical assistance carried out by the Department of Technical Assistance and Publications. The estimates shown above cover the costs in respect of the Office of the Deputy Director General and the Division of Technical Assistance as well as the technical assistance projects and the fellowship and training programmes administered by the Department. The Department is also responsible for the administration and implementation of that part of the UNDP(TA) programme executed by the Agency and several UNDP(SF) projects; furthermore, it is expected that it will administer a number of projects financed under bilateral arrangements.

V.3.2. The technical assistance programme, irrespective of the source of funds, is drawn up on the basis of requests by Governments and reflects priorities established by the Governments themselves. The form and content of assistance to be provided is determined in programmes formulated jointly by the Government and the Agency. Governments submit their requests, in accordance with a system of integrated programming, for the three components of technical assistance, viz., experts, equipment, and fellowships and training; these three elements are co-ordinated as far as possible to make the maximum impact on development.

V.3.3. The net increase in Regular Budget support for this programme in 1971 amounts to $16 200, which represents $18 200 for salary and other emoluments of staff due to price increases, partially offset by a $2000 reduction in the estimated level of travel costs. No increase in staff is expected for either 1971 or 1972. A programme increase of $8000 is foreseen for 1972 to cover a panel on nuclear science teaching. All other increased costs shown in the preliminary estimate for 1972 pertain to additional salary increases and associated common staff costs for existing staff members.

V.3.4. A substantial increase in funds for the Agency's programme of technical assistance financed from Operating Fund II is foreseen for 1971. The projected increase of $645 000 is largely due to the proposed increase in the annual target for voluntary contributions to the General Fund from the $2 million level established for the past several years to a new target level of $2.5 million. It is also proposed to complete the full transfer of the costs of the Agency's Laboratory to the Regular Budget during 1971 and 1972, which will increase funds available for technical assistance by $60 000 in 1971 and by $63 000 in 1972. Of the remaining programme increase, $20 000 represents funds estimated to be available from additional miscellaneous income and $65 000 Governments' contributions in respect of experts' services.

Programme

The programme for 1971-72

V.3.5. The magnitude of the programme will depend on the resources available to the Agency. In recent years it has been possible to grant only about one quarter of the assistance requested. The transfer of certain charges from the Operational Budget to the Regular Budget will bring about some improvement in the resources available, but rising costs will, to a large extent, offset this increase. The annual target of $2 million for voluntary contributions has not been met in the past, but there now seems some hope that by the end of the two-year period 90% of the target may be reached for the first time, compared with 60 - 70% in the past.

V.3.6. Several countries which have received or are receiving technical assistance have built or plan to build nuclear power reactors; they are not only making systematic efforts to build up local capabilities, but are showing increasing interest in the whole range of civil nuclear technology. These countries are at the stage where the economic and scientific benefits will have a real impact on the economy. It is therefore expected that requests for assistance from the Agency will reflect:

(a) Acceleration and consolidation of nuclear raw materials development programmes as the need for nuclear fuel increases both at the national level and in the international market;

(b) Increasing demands for specialized training in connection with power reactor operation; and

(c) Increasing emphasis on industrial applications of radioisotopes, particularly in the chemical processing industry, in thickness measurements, in various processes in the wood, fertilizer, cement and textile industries, as well as in the sterilization of medical equipment.

V.3.7. Experience has shown that developing countries initially utilize nuclear technology on a modest scale, beginning with applications of radioisotopes. Programmes now being carried out in these countries are expected to continue. Some countries, embarking for the first time on an atomic energy programme, will require the services of planning specialists to identify projects in which nuclear techniques may play a positive role. At the same time, most developing countries are also building up their scientific infrastructure; this is reflected in the demand for trained personnel and nuclear facilities in universities and technical institutes. In co-operation with UNESCO, encouragement will be given to strengthening the teaching of science at all levels and to the introduction of nuclear science into university curricula. In the light of the success of the first panel on this subject which was held jointly with UNESCO in Bangkok in 1968 and is to be followed by a second one in Latin America in 1970, it is proposed to hold a similar panel for the Middle East and Eastern Europe in 1972.

V.3.8. As nuclear facilities are established, it is essential that professional personnel in such establishments be supported by skilled and well-trained technicians. Recent requests have shown that emphasis is placed on meeting this need. It is, therefore, intended to hold further training courses, if possible in co-operation with ILO at their centre in Turin, Italy.

Efforts will also be made to arrange other forms of specialized training at institutes and university laboratories in advanced countries. In-service training will also be given by experts in nuclear instrumentation and electronics who are engaged in establishing services at the national level.

V.3.9. Efforts will be made to alleviate the chronic lack of resources by using, where possible, Headquarters staff to carry out expert assignments, by identifying projects of a similar nature which could be serviced by the same expert, and by periodic visits of relatively short duration by experts or Headquarters staff in preference to long-term assignments. It is also proposed to continue the provision of equipment in appropriate cases without the services of an expert.

V.3.10. Governments receiving technical assistance have had some difficulties in formulating projects and in elaborating the necessary plans of operations. This applies to short-term projects as well as to those long-term programmes usually carried out under UNDP, which may eventually lead to pre-investment-stage projects, under UNDP(SF). Governments have, therefore, requested regular visits of small missions of one or two staff members, who in addition to carrying out consultations concerning the implementation of current projects, could assist in elaborating proposals for assistance designed to be integrated into national development plans.

V.3.11. In addition, these missions can identify problems common to several Governments within a region and suggest possible joint regional projects for financing under UNDP. Such projects will, in the future, be programmed and submitted by Governments directly to the UNDP authorities and assistance will be needed in formulating them both at the national and regional levels. The missions which are expected to visit each region in 1971 and 1972 can give this assistance.

V.3.12. The Agency is acting as executing agency for two projects under UNDP(SF) and expects to do so in 1971 and 1972 for several additional projects which are now under consideration. It will also continue to act as a sub-contractor in UNDP(SF) projects for which other United Nations organizations are executing agencies.

V.3.13. It is also expected that the Agency will expand its participation in a bilateral assistance programme financed by SIDA. This will cover field projects involving the assignment of experts and provision of equipment as well as training courses of a regional or interregional nature. It is also hoped to collaborate with other bilateral programmes to ensure that resources are made available for atomic energy development programmes where appropriate.

V.3.14. The Agency awards fellowships only for specialized training in nuclear science; these fellowships do not provide training in the basic sciences nor for academic studies leading to advanced degrees, except in cases where the degree is ancillary to the fulfilment of the practical objectives of the training requested. Over 3500 fellowships have now been awarded by the Agency and it is expected that about 300 will continue to be awarded each year.

V.3.15. The Agency will continue to utilize to the fullest extent possible the increasing resources offered in kind in the form of Type II fellowships, and efforts will be made to broaden the range of locations and subjects within host countries and to make stipends comparable to those of Type I fellowships so that these resources can be more fully exploited.

V.3.16. Governments are asked to continue to employ fellowship holders for at least two years after they have completed their training in the field in which they have been trained. The Agency requests a report from each fellow on his return to his country; over 90% returning fellows are appropriately employed.

V.3.17. Continued attention will also be paid to expediting the process of awarding fellowships. One major delaying factor is still the obtaining of suitable placement in a host country; another is obtaining agreement to the training arrangements proposed by nominating

countries; and a third lies in the need to ensure that those to be awarded fellowships have an adequate knowledge of the language to be able to study in the host country. Added delays are caused when countries have not budgeted for the travel expenses of their nominees to take up their training awards; discussions with appropriate authorities are, therefore, necessary.

V.3.18. Training courses and study tours to be financed under UNDP now require the written expression of support of at least three Governments in the region for submission direct to UNDP headquarters. It is expected that the Agency will receive many requests and suggestions for the organization of training courses, both under UNDP and from the Agency's own resources, and for seminars and study tours in 1971-72. It is expected that funds for only about ten courses and two study tours each year will be available.

V.3.19. Because the establishment of a scientific infrastructure in developing countries requires a base of trained scientific personnel, the Agency expects to continue to receive requests for visiting professors to teach in universities and research institutes. It is foreseen that provision will be made annually for up to ten visiting specialists.

V.3.20. As research workers in institutes in developing countries become familiar with basic and applied research in local problems and as local atomic energy programmes are consolidated, it is desirable for them to study the development of nuclear science and technology in more advanced countries. Provision will, therefore, continue to be made for scientific visits for participation in research and other activities in specific areas of interest. Research fellowships will also continue to be awarded to scientists who have considerable experience and are working on promising research in their own countries.

The programme for 1973-76

V.3.21. During 1973-76 it is expected that the programme will follow the same general lines as indicated above, but its nature and content will, of course, be determined by the requests of Governments and the resources contributed by Member States.

Budget estimates

Explanation of major cost changes in 1971

V.3.22. The major increases in costs for 1971 over the approved budget level for 1970 are shown in Table 14, which shows the amounts attributable to price increases and to programme changes and summarizes the distribution of such cost increases by source of funds.

V.3.23. Regular Budget. As shown in Table 14 the Regular Budget increase in 1971 is $16 200 or 2.65% and is entirely due to increases in the salaries and other emoluments of existing staff members, partially offset by a reduction of $2000 in respect of staff travel.

V.3.24. Operational Budget. As explained above, the increase of $645 000, or 33.3%, is due to an increase of $500 000 in the target for voluntary cash contributions to the General Fund, an increase of $60 000 because of the second partial transfer of Laboratory costs to the Regular Budget, an increase of $20 000 in miscellaneous income and an increase of $65 000 representing Governments' contributions in respect of experts' services.

FIGURE 5

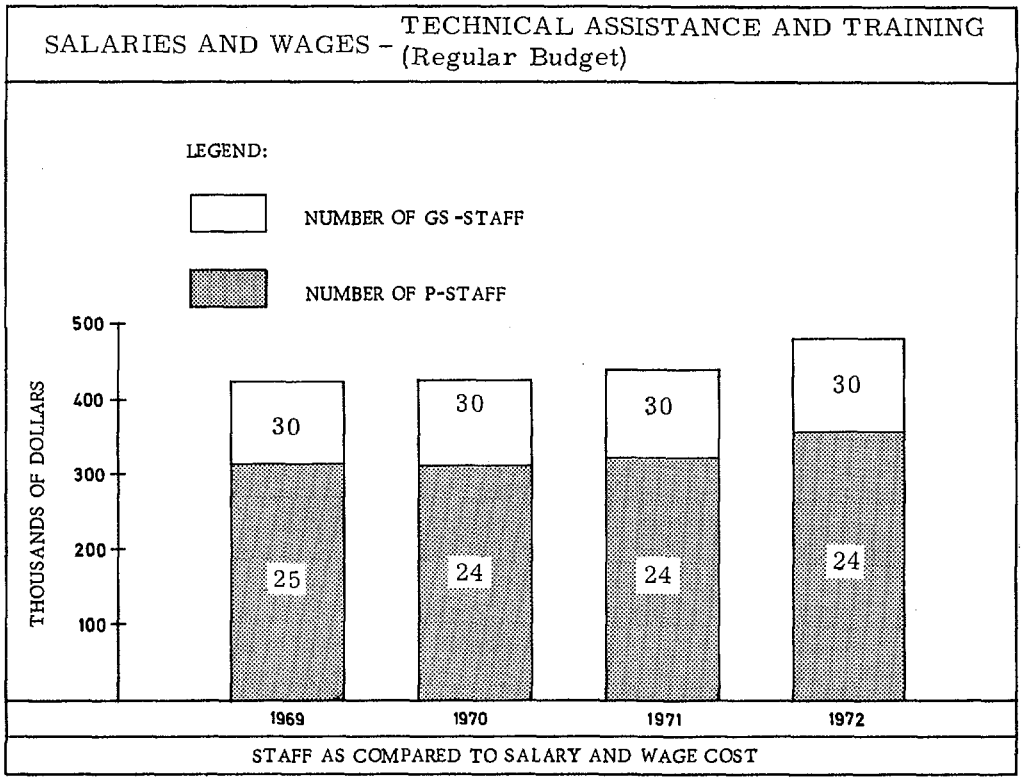
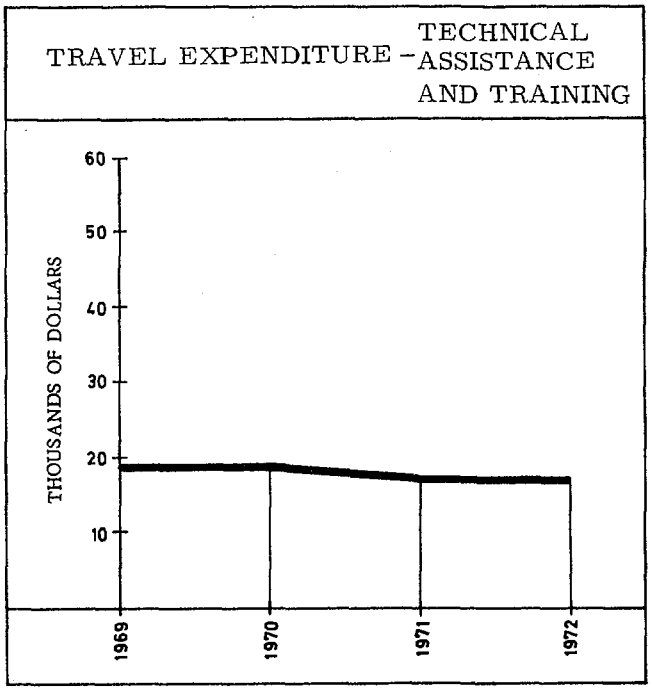


FIGURE 6



4. Food and agriculture

Summary of costs

Table 16

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	179 307	197 300	2 900	-	2 900	200 200	222 600
Common staff costs	63 464	69 200	2 700	-	2 700	71 900	80 300
Duty travel and missions	19 747	22 000	800	-	800	22 800	25 000
Meetings: Panels and committees	16 405	28 000	-	-	-	28 000	28 000
Seminars, symposia and conferences	21 568	17 000	-	(7 000)	(7 000)	10 000	17 000
Representation and hospitality	388	1 100	-	-	-	1 100	1 100
Scientific and technical contracts	318 060	219 000	-	-	-	219 000	219 000
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	-	-	-	10 000
Other	-	-	-	-	-	-	-
TOTAL	618 939	553 600	6 400 1.16%	(7 000) (1.26%)	(600) (0.10%)	553 000	603 000

Summary of manpower

Table 17

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1 (1)[a]	1 (1)	-	1 (1)	1 (1)
P-5	3 (1)	3 (1)	-	3 (1)	3 (1)
P-4	7 (4)	7 (4)	-	7 (4)	7 (4)
P-3	-	-	-	-	-
P-2	-	-	-	-	-
P-1	-	-	-	-	-(1)
Sub-total	11 (6)	11 (6)	-	11 (6)	11 (7)
GS	7 (6)	8 (6)	-	8 (6)	8 (6)
M&O	-	-	-	-	-
TOTAL	18(12)	19(12)	-	19(12)	19(13)

[a] FAO staff in brackets.

Highlight summary

V.4.1. The Joint FAO/IAEA Division conducts a single programme on behalf of both FAO and the Agency. The main aim is to assist and advise Member States on the use of irradiation and isotope techniques to solve the problems which arise in trying to achieve better food production and protection. Particular attention is given to the problems of developing countries.

V.4.2. The programme provides for the continuing exploitation of irradiation and isotope techniques in the following principal activities:

(a) The more efficient use of fertilizers and water, with particular reference to high-yielding varieties of plants, plant nutrition and the nutrient value of harvested food crops;

(b) The use of induced mutations in plant breeding, with special reference to high yield and protein content;

(c) Work relating to animal production and health, with particular reference to nutrition, physiology and parasitology;

(d) The use of the sterile-male technique for pest control, together with the necessary clarification of the basic biology and ecology involved;

(e) The study of problems relating to food and environmental pollution by pesticides and radioactive residues, and the safer and more effective use of pesticides; and

(f) The irradiation preservation and protection of food.

V.4.3. No increase in staff is requested for either 1971 or 1972 except for one P-1 post to be financed by FAO in 1972. There is a reduction of $600 in estimated costs in 1971 as compared with 1970, since price increases of $5600 for salaries and other emoluments of existing staff and an increase of $800 in travel and per diem costs are offset by a saving of $7000 resulting from a reduction of one in the number of symposia to be held in view of the Fourth Geneva Conference. The preliminary estimate for 1972 provides for an increase of $50 000 over the level for 1971, primarily to cover additional price and salary increases and to restore the number of symposia to the normal level, and a provision of $10 000 to cover production of a film on the use of the sterile male technique to combat the tsetse fly.

Programme

V.4.4. The major parts of the programme are explained in detail below, special emphasis being placed on the programme for 1971-72.

Soils, irrigation and crop production

V.4.5. The programme centres on the use of isotopes and radiation in field, greenhouse and laboratory investigations of a range of soil and crop production factors which limit productivity, with special reference to the production of protein-rich food. The Agricultural Section of the Agency's Laboratory at Seibersdorf will continue to support the co-ordinated programmes.[1]

The programme for 1971-72

V.4.6. Activities proposed for this period include:

(a) Co-ordination of the programme on wheat fertilization with regard to the use of nitrogen and phosphorus fertilizers for high-yielding varieties. This programme will be reviewed by a combined co-ordination meeting and panel of experts in 1972;

(b) A panel, which will pay particular attention to nitrogen transformation in soils and specific aspects of the nitrogen cycle;

(c) Co-ordination of the rice production programme, in association with the working parties of the International Rice Commission, including studies of the effect of water management and nitrogen fertilizer practices on the efficiency of fertilizer nitrogen utilization;

(d) A symposium in 1971 on the use of isotopes and radiation in soil-plant nutrition studies, in co-operation with the Department of Forestry of FAO. A special session of the symposium will be concerned with fertilization, physiology and and water relations of tree crops;

(e) The gradual phasing-out of the existing programme on tree crop fertilization. A consultant will review the overall conduct of the programmes;

(f) The initiation of a co-ordinated programme on efficiency of conversion of fertilizer nitrogen into grain protein. The conduct of the studies will be closely integrated with the Plant Breeding and Genetics Programme on plant protein improvement;

---

[1] Details on the Laboratory's work are given in paras 25-34 in Section 7 - The Laboratory.

(g) The initiation in 1971, following the recommendations of the 1970 panel of experts, of a new programme on water use efficiency, with special reference to the effect of irrigation régimes on fertilizer management practices;

(h) A training course in 1972 on the use of isotopes and radiation in the study of soil-plant relationships; and

(i) A review centred on achievements in the International Biological Programme projects in which ^{14}C and ^{15}N have been extensively applied for micronutrient research.

The programme for 1973-76

V.4.7. A new programme involving the use of isotopically labelled fertilizers in some important agricultural crops will gradually replace the wheat fertilization programme. Consideration will also be given to placing increased emphasis on the use of C in photosynthesis studies of crop productivity.

V.4.8. The co-ordinated programmes on the use of nuclear techniques in rice production, on efficiency of conversion of fertilizer nitrogen into plant protein, on moisture, and the physical-chemical studies on soils and plant nutrition will be continued. In response to requests from Member States it is foreseen that a new programme on the use of isotopes in fertilizer management studies of other important agricultural food crops will be introduced.

V.4.9. A regional seminar for the countries of Latin America is planned with a view to acquainting scientists fully with recent developments in the use of isotopes and radiation in soil-plant nutrition studies.

V.4.10. Extensive developments in the use of isotopes and radiation in soil physics, irrigation and drainage which are of practical significance to agriculture underline the urgency of convening symposia on this subject.

V.4.11. Training courses on the use of nuclear techniques in soil science and plant nutrition may be held, depending on the availability of funds.

V.4.12. With increasing application of major fertilizer nutrients and resulting higher crop yields, the problems arising from a deficiency of micronutrients will become more acute, and a new co-ordinated research programme on the use of nuclear techniques in minor element nutrition may be initiated.

V.4.13. Orientation of the protein production programme, with increased activity in this important subject, is foreseen. If developments so warrant, studies on the use of isotopes and radiation in forestry will be started.

V.4.14. Revision of the laboratory manual on the use of isotopes and radiation in soil science and plant nutrition may be undertaken towards the end of this period; this widely used manual was first printed in 1964, and a second edition was issued in 1970.

Plant breeding and genetics

V.4.15. Recent dramatic increases in crop production in India and the Far East resulting from the introduction of new varieties have made it clear that the genetic improvement of existing crop plants represents one of the best ways to provide an adequate diet to the world's expanding population. For such crop improvement, the induced mutation technique is a valuable tool for the plant breeder, complementing other methods of achieving specific plant breeding goals.

V.4.16. The means of carrying out these scientific programmes are those which have proven so effective in past years: the co-ordinated programme of research, with financial

support provided to scientists in developing countries and with cost-free agreements in developed countries. Essential adjuncts to the several co-ordinated programmes in plant breeding are the related activities of the Laboratory, which provides supporting services for co-ordinated programmes, trains fellows, and to an ever-increasing extent, provides mutagenic treatment services [2].

The programme for 1971-72

V.4.17. Proposed activities include:

(a) Continuation of the co-ordinated programme on the application of nuclear techniques for the improvement of protein in cereal grains and legumes, including a research co-ordination meeting;

(b) Co-ordination of research programmes on the use of induced mutations to improve rice, wheat and barley;

(c) Continuation of uniform regional field trials for rice and wheat, the former in co-operation with the International Rice Research Institute in the Philippines. Computer analysis of all data will be done by the Agency's computer section;

(d) An expert panel to consider the application of radiation-induced sterility in plant breeding and insect eradication;

(e) Phasing-out of the co-ordinated programme of research on the use of seeds as biological monitors for neutron irradiations, at the end of the two-year period;

(f) Evaluation of the results of the co-ordinated field trials set up in 1969 to determine the extent of yield increase in economic crops induced by low-dose radiation treatment of seed;

(g) Training courses on mutation plant breeding supported by SIDA in 1971 and on the application of nuclear techniques for improving protein quality and quantity in crop plants in 1972, subject to the availability of funds; and

(h) Advisory panels in 1972 to evaluate the use of induced mutations for the improvement of vegetatively propagated and asexual crops and to provide guidance in the initiation of a co-ordinated programme on the use of radiation-induced mutations for the improvement of industrial crops.

The programme for 1973-76

V.4.18. The programme will probably be aimed at achieving more specific plant breeding goals with the result that greater emphasis will be placed on screening for specific induced mutations, including the use of nuclear methods. By 1974 the co-ordinated programme on the use of nuclear techniques for protein improvement will have provided useful experience in the application of sophisticated techniques to solve practical plant breeding problems. Emphasis will be placed on pest and disease resistance and on various factors affecting crop yield and nutritional quality. Research will be encouraged on development of further high-yielding varieties and on specific correction of deficiencies in otherwise high-performance varieties in integral plant breeding programmes.

V.4.19. Certain activities will be phased out, in particular the co-ordinated programme on the use of neutrons for seed irradiation, which is expected to be continued by the Division of Life Sciences. Mutation breeding of vegetatively propagated and of cross-pollinated crops will receive attention, and it is expected that the Agency will be asked to support and co-ordinate research on this subject.

---

[2] Details of the Laboratory's work are given in paras 35-51 in the section - The Laboratory.

V.4.20. Co-ordinated research programmes will be developed on a regional basis, for example in Latin America, the humid zone of Africa, South East Asia. Here the need for study groups, training courses, technical assistance and expert advice will be great.

Animal production and health

V.4.21. Isotopes offer unique advantages in research on utilization of food components, metabolism of minerals and organic compounds, synthesis of animal protein from different sources, formation of milk, and metabolic and deficiency diseases. Through research agreements or contracts the Agency supports the use of isotopes in protein metabolism studies, and especially the use of non-protein nitrogen compounds as a substitute for dietary protein for ruminants and other herbivores, with a view to examining ways of increasing the amount of animal protein available for human consumption.

V.4.22. Radiation-attenuation of helminthic larvae still appears to be the only means by which vaccines against certain debilitating helminthic diseases can be produced. Commercially produced lungworm vaccines are gaining increasing acceptance in several countries. Work is continuing on the investigation of the possibilities of applying this technique to several other helminths and to certain protozoan diseases. Emphasis will be placed on the use of radioisotopes to evaluate the effects of environmental stress upon domestic animals. Close collaboration is maintained with WHO on parasitic disease control, since many problems of human and animal parasitology are almost identical.

The programme for 1971-72

V.4.23. Activities proposed for this period include:

(a) A symposium on the use of isotopes in the study of environmental physiology of farm animals;

(b) Reorientation of the co-ordinated programme on the use of radiation in parasitology and the convening of a panel of experts on nuclear techniques for the control of tropical and sub-tropical parasitic diseases; continuation of the co-ordinated programme on trace element studies;

(c) A regional study group or travelling seminar in Latin America;

(d) The convening of panels on animal protein production from non-protein nitrogen in 1971, and in 1972 on the use of isotopes and radiation in fish production, and on trace element studies as part of the co-ordinated programme on this subject; and

(e) A training course on nuclear sciences in animal research is planned for Latin America in 1972.

The programme for 1973-76

V.4.24. Emphasis will be placed on the use of radiation and isotopes in the study of parasitology, trace elements and animal protein production in developing countries. It is expected that the demand for animal products will increase greatly, that higher productivity will become common and that attention will have to be given to new problems relating to animal diseases and metabolic disorders associated with intensive animal husbandry. The co-ordinated programme on the use of isotopes in the production of animal protein from non-protein nitrogen will receive attention.

V.4.25. A panel of experts will review the application of isotopes to the study of environmental stress on domestic animals under tropical and sub-tropical conditions. Environmental stress is probably the greatest limiting factor to animal production in tropical and sub-tropical areas.

V.4.26. Because of increasing commercial production, the current co-ordinated research programme in helminth control will probably be phased out and activities reoriented with a view to carrying out a programme on the use of radiation and isotopes for the study of protozoal and viral diseases of domestic animals under tropical and subtropical conditions.

V.4.27. It is expected that towards the end of this period emphasis will increasingly be placed on the use of isotopes in the study of problems resulting from intensification of animal production. The use of single-cell protein derived from hydrocarbons for feeding swine and poultry and the use of non-protein nitrogen for ruminants may be important subjects for investigation by isotopic techniques. Emphasis will also be placed on the use of radiation and isotopes to improve the efficiency of fish rearing and production.

Insect eradication and pest control

V.4.28. The programme is mainly concerned with one of the most promising alternative methods to the use of pesticides in insect control, namely the application of the sterile-male technique. This includes the use of isotope labelling of insects for ecological and physiological investigations. Because the sterile insect release method requires large numbers of sterilized insects it is imperative that emphasis be placed on effective sterilization, without causing undue damage to the released insect, and mass rearing of various insect species before the implementation of control or eradication programmes. Adequate ecological data on given insect species are also essential. Extension of this programme to the control of other noxious pests is planned.

The programme for 1971-72

V.4.29. Activities proposed for this period include:

(a) Continuation of the large-scale programme for eradicating the Mediterranean fruit fly in Central America, provided that funds are available from UNDP or other sources;

(b) Field demonstrations of the control of the Mediterranean fruit fly in the Mediterranean basin; possibly an island demonstration of olive fly control involving the use of the sterility principle and field experiments to investigate the efficiency of the sterile-male technique for the control of the codling moth and Heliothis species;

(c) Continuation of co-ordinated research programmes dealing with rice stem borers, insects affecting animals, fruit flies and the Heliothis complex;

(d) Continuation of the Information Circular and, as recommended by the panel and co-ordination meeting on fruit flies held in September 1969, the establishment of an international training centre for fruit fly research and sterilization, subject to the availability of funds;

(e) Panels to review progress on the practical applications of insect control by the sterile insect release method, and to consider induced sterility in insects and plants to be held in conjunction with the Plant Breeding and Genetics Section of the Division; a third panel on the use of the sterile-male technique to control animal insect pests will also consider the feasibility of applying the sterile-male technique to control mammals and noxious birds. In 1972 a panel is planned to consider the use of isotopes in insect physiology, with special reference to insect reproductive systems;

(f) A training course for participants from Member States on the use of isotopes and radiation in entomology;

(g) A symposium in 1972 on the current concepts of the sterility methods of pest control;

(h) A study group to assess the status and accomplishments of the sterile insect release method of pest control in relation to other methods of control, including economic considerations; and

(i) A research co-ordination meeting on the use of the sterile-male technique for lepidopterous insects.

The programme for 1973-76

V.4.30. With continuing emphasis on the development of alternative methods of insect control to reduce the use of pesticides, an increasing amount of interest in the sterile insect release method during this period is foreseen. It is expected that extension of this method to other pests of economic importance (rodents and birds) may be feasible. Regional programmes aimed at eradication or economic control of various insect pests will require increased assistance and technical guidance. The preparation of a technical manual on the various aspects of the sterile insect release method will be given priority.

V.4.31. By 1975 the effectiveness of the sterile insect release method for the eradication and control of various species of insects will have been tested on a large scale, and it is expected that developing countries will increase the number of requests for advice and assistance in implementing new projects and training personnel. Training courses will continue, emphasis being placed on the methodology and practical field applications of induced sterility for insect population suppression.

Pesticide residues and pollution

V.4.32. The steadily increasing volume and variety of chemicals (insecticides, fungicides, nematocides, herbicides, etc.) used for crop and livestock protection against pests and disease have created an urgent need for greatly extended studies of the inevitable problems which arise with regard to food and environmental pollution and of the associated problems relating to human and wildlife toxicology. Isotopic tracers provide a useful and often unique tool for these studies.

V.4.33. As a result of recommendations of expert panels, it is planned to initiate a co-ordinated programme on the use of isotopic tracer and radioactivation techniques for studying pesticide contamination problems. This programme will take fully into account the recommendations, needs and priorities stated or implied in the joint FAO/WHO programme on pesticide residues. Such background information is essential for the establishment of "acceptable daily intake" and "tolerance" parameters. The programme will involve close collaboration with WHO and IUPAC.

V.4.34. The periodical surveys of radioactive contamination for UNSCEAR will continue, but only to the extent requested, together with a study of the implications of such contamination in collaboration with WHO.

The programme for 1971-72

V.4.35. Proposed activities include:

(a) Co-sponsorship with IUPAC of the Second International Congress of Pesticide Chemistry and, by invitation of the Congress organizers, establishment of an IUPAC-designated "section workshop" on the use of radioactive tracers for the study of the fate of pesticide residues in the food chain;

(b) A panel on the use of isotope tracer and radioactivation techniques for the study of pesticide residue problems, which would also advise on the preparation of suitable publications with the participation of industry, e.g. through Groupement international des Associations nationales de Fabricants de Pesticides (GIFAP);

(c) Continuation of co-ordinated programmes on problems of food and environmental contamination by pesticide residues;

(d) A panel in 1972 on the use of isotopic tracer and radioactivation techniques in studies on pesticide breakdown and metabolism, with emphasis on the toxic products;

(e) Identification of problems concerning resistance of agricultural pests to pesticides which lend themselves to solution by the use of isotopic tracer techniques;

(f) Maintenance of global surveys of radioactive contamination of food for UNSCEAR as requested, and review of acceptable levels of radionuclides in the human diet;

(g) A seminar, in collaboration with WHO, in 1972 on the agricultural and public health aspects of environmental contamination, with particular reference to unified monitoring programmes; and

(h) Implementation of the recommendations of the earlier expert panels, with particular reference to suitable publications and the establishment of training courses on the use of isotopic tracer and radioactivation techniques for studying pesticide contamination and residue problems.

The programme for 1973-76

V.4.36. It is expected that the principal activities during this period will largely be determined by the co-ordinated research programme on pesticide contamination problems and the use of labelled pesticides for studying the problems concerning resistance of agricultural pests.

V.4.37. A panel of experts on the use of radioisotope techniques for the study of pest resistance to pesticides, with particular reference to the mechanisms of detoxification in agricultural pests, should be held.

V.4.38. The longer-term recommendations of the earlier panels on pesticide residues will continue to be implemented, as will the use of isotopes and activation analysis techniques in studies of food contamination by the environment.

V.4.39. A comprehensive review will be made of the metabolic fate of pesticides in plants, animals and the associated environments following their use in agriculture. Progress in national and international programmes of monitoring for food and environmental contamination will also be reviewed.

Food preservation

V.4.40. Irradiation can be used to disinfest agricultural products, to rid food and feed of health hazards in the form of micro-organisms and parasites as a quarantine measure and thus aid in the free flow of trade, to prolong the market life of perishable food products and to preserve foods. Many pilot plants have been established or are under construction with a view to evaluating this new technique for commercial use, including the consideration of matters such as pilot plant design and operational and economic questions.

V.4.41. Several irradiated food products have been approved for general consumption in certain countries and clearances are in preparation in others. In order to extend the clearance of irradiated foods for human consumption, increased attention will be given to wholesomeness studies.

V.4.42. The Agency will continue to take part in the planning and the evaluation work of the International Food Irradiation Project, in collaboration with ENEA. This project is con-

cerned with the wholesomeness of irradiated foods. Close collaboration will be maintained with WHO.

The programme for 1971-72

V.4.43. Activities proposed for this period include:

(a) A panel of experts to consider the economics of food preservation by irradiation;

(b) As a result of the recommendations made in 1969 by the Joint FAO/IAEA/WHO Expert Committee on Wholesomeness of Irradiated Food, the convening of a panel to consider the acceptability of certain irradiated food items, in order to facilitate international agreement on the wholesomeness aspects;

(c) A study group meeting in Asia to consider the potential use of food preservation by irradiation in that region;

(d) Studies, at pilot-plant level, of disinfection by irradiation to control the widespread infestation of fresh fruits by insects;

(e) An advanced training course in food irradiation technology and techniques;

(f) Continuation of the co-ordinated programme on the microbiological aspects of food irradiation, with special reference to pathogens, and of disinfestation studies, both for conservation and quarantine purposes, on dried agricultural products and fresh fruits;

(g) With regard to the wholesomeness of irradiated food, a co-ordinated programme on the effects of radiation on food constituents;

(h) In 1972 panels to consider enzymological aspects of food irradiation and the application of food irradiation in the developing countries;

(i) An international symposium in 1972 on food irradiation to review and evaluate accomplishments since the previous meeting in 1966;

(j) A travelling seminar in Latin America to review the use of food preservation by irradiation;

(k) Special missions to advise Governments, upon request, on prospective pilot plants for the study and demonstration of the feasibility of food and feed irradiators; and

(l) Co-ordination of various other activities, such as the collection of wholesomeness and legislative data, lists of radiation sources, and published information relating to research.

The programme for 1973-76

V.4.44. The general acceptance of irradiation as a preservation technique by the food industry and the general public will require time and education. The crucial element in this acceptance appears to be the clearance of a sufficient number of irradiated foods. This clearance should be promoted through international agreements on wholesomeness testing, which may be the subject of a panel of experts convened in co-operation with WHO. The growing recognition of the problems arising in the use of chemicals for food protection will also be an important factor. The co-ordinated research programme on microbiology and wholesomeness of irradiated food will be continued. The Agency will continue to discharge its responsibilities under the ENEA/IAEA International Food Irradiation Project, to act as

co-ordinator of wholesomeness and legislative data, lists of radiation sources, etc., and of the provision of such information to the Member States.

V.4.45. Other matters of interest will be economics, process improvement and improvement in plant design. It will be appropriate to continue investigative work on the establishment of pilot plants for irradiated products that appear commercially competitive and which have been cleared by the health authorities. In this connection, a panel of experts might be convened to consider the design and operation of the various possible pilot plants.

V.4.46. It is envisaged that by 1975-76 the irradiation process in food preservation will be in commercial use to some extent. In order to assist in the application of this technique in different Member States, cost benefit studies will be encouraged.

Budget estimates

Explanation of major cost changes in 1971

V.4.47. There is a net reduction of $600 in costs in 1971 for this programme. No increases in staff are foreseen and no programme increases are requested for 1971.

V.4.48. Research contract funds are expected to remain at $219 000 in both 1971 and 1972, that is, at the same level as in the adjusted 1970 budget. Continuation at this level reflects the extensive and fruitful use which has been made of research contracts in this field during the past several years.

V.4.49. Funds provided for seminars, symposia and conferences in 1971 have been reduced by $7000 because the Fourth Geneva Conference is being held in that year. The funds thus freed are shown under the programme for "Service and Support Activities", where the Agency's direct financial support for the Fourth Geneva Conference is shown.

FIGURE 7

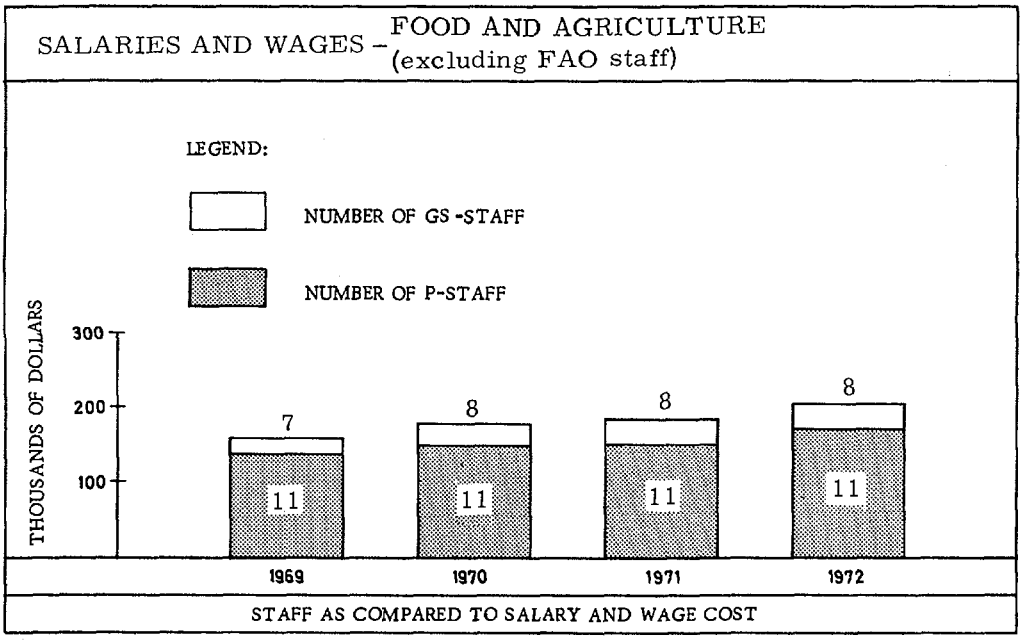


FIGURE 8

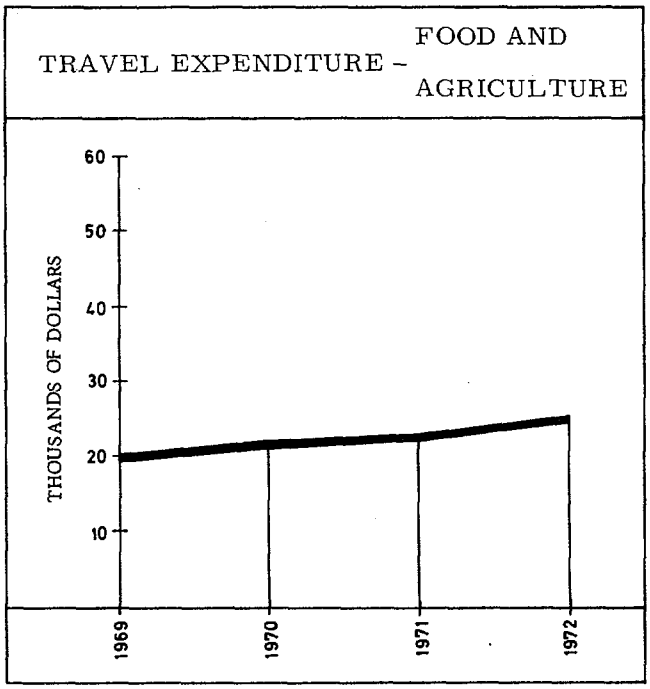
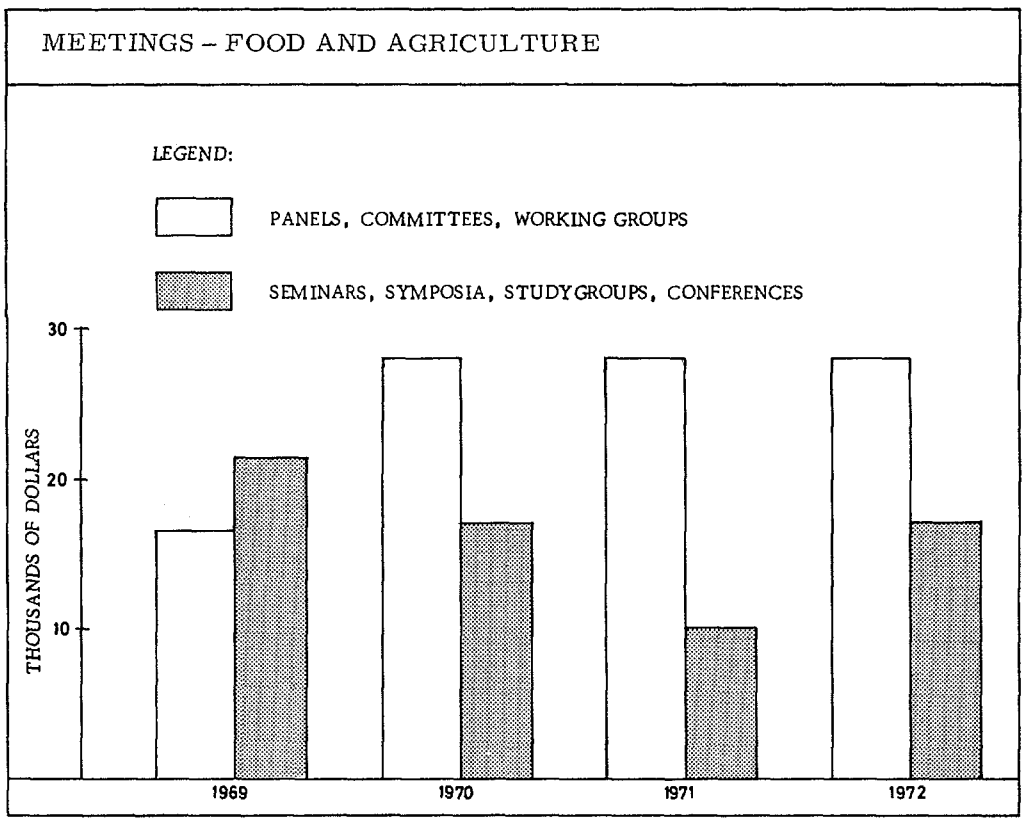


FIGURE 9



Preliminary budget estimates for 1972

V.4.50 The preliminary estimates for 1972 provide for additional salary and price increases for the existing staff, for restoring the number of seminars, symposia and conferences to the normal level, and for production of a training film on the use of the sterile-male technique to combat sleeping sickness borne by the tsetse fly in East and Central Africa. Total increases in 1972 amount to $50 000, or 9.0% above the level requested for 1971.

Combined FAO/IAEA support for the food and agriculture programme

V.4.51. In addition to the Agency's expenditures listed in Table 16, the programme of the Joint FAO/IAEA Division is supported by financial contributions from FAO. The budget for FAO is prepared on a biennial basis, and the biennial programme of FAO covers different years from those of the Agency.

V.4.52. The staff provided by FAO to the Joint Division for 1970-71 will consist of the Director and five Professional officers. Funds are provided for GS posts under Contractual Services.

V.4.53. For 1970-71 it is proposed that the FAO contribution to the financing of the joint programme will be $540 000, an increase of $73 850 (15.8%) over 1968-1969. The FAO contribution to the joint programme is as follows:

	Approved budget 1968-69	Changes 1970-71	Approved budget 1970-71
Salaries for Professional staff	$146 800	$30 250	$177 050
Common staff costs	90 300	-	90 300
Consultants	38 100	-	38 100
Duty travel	23 500	-	23 500
Contractual services and equipment [3]	62 000	39 700	101 700
Meetings	83 100	-	83 100
Documents	22 350	3 900	26 250
Total	$466 150	$73 850 (15.8%)	$540 000

V.4.54. With regard to salaries there is a cost increase of $30 250 for increments and other staff entitlements. There is an increase of $39 700 for contractual services and equipment of which $35 000 is for the joint activities in the plant protein improvement programme and $4700 for the GS staff. The increase of $3900 for documents is to meet higher printing and translation costs.

[3] Includes GS staff.

5. Life sciences

Summary of costs

Table 18

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	224 105	229 100	5 200	-	5 200	234 300	298 300
Common staff costs	84 371	82 500	3 100	-	3 100	85 600	110 100
Duty travel and missions	10 305	14 500	500	-	500	15 000	16 500
Meetings: Panels and committees	23 453	30 000	-	-	-	30 000	30 000
Seminars, symposia and conferences	14 550	7 000	-	-	-	7 000	24 000
Representation and hospitality	227	1 100	-	-	-	1 100	1 100
Scientific and technical contracts	279 742	236 000	-	-	-	236 000	236 000
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	636 753	600 200	8 800 1.47%	-	8 800 1.47%	609 000	716 000

Summary of manpower

Table 19

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	1	-	1	1
P-5	4	4	-	4	5
P-4	6	6	-	6	7
P-3	1	1	-	1	1
P-2	-	-	-	-	-
P-1	2	2	-	2	3
Sub-total	14	14	-	14	17
GS	10	10	-	10	10
M&O	-	-	-	-	-
TOTAL	24	24	-	24	27

Highlight summary

V.5.1. This programme covers the work carried out by the Division of Life Sciences in its three sections dealing with dosimetry, medical applications and radiation biology. No increase in staff is foreseen for 1971 but three additional Professional posts are expected to be required in 1972 to meet the need for increased emphasis on radiation biology and medical applications of radioisotopes. Emphasis will be placed on expansion of work relating to radiation damage and similar subjects, and on work on the standardization of radioisotope techniques.

V.5.2. The cost increase of $8800 estimated for 1971 is entirely due to increased emoluments of existing staff, plus a minor cost increase for travel. No programme increases or changes in staff are foreseen for 1971.

V.5.3. The preliminary estimates for 1972 provide for three additional Professional posts, further increases in costs in respect of existing staff, a minor cost increase for travel, and additional funds for study groups and symposia. All other costs, including $236 000 for research and technical contracts, are expected to be kept to the level approved for 1970.

Programme

V.5.4. The programmes of the three sections of the Division of Life Sciences are presented below, special emphasis being placed on the programme for the biennial period 1971-1972.

Dosimetry

V.5.5. Radiation dosimetry, which is concerned with the quantitative and qualitative determination of radiation energy absorbed in matter, is necessary in most of the peaceful uses of atomic energy. The importance of dosimetry in medical applications of radiation and radioisotopes has long been recognized, but in recent years the use of radiation has expanded rapidly and extended into many new fields of application such as agriculture and industry. Simple dosimetric methods must also be employed to measure the dose contributions arising from natural and artificial radiation sources in the ecosystem.

V.5.6. The Agency will continue to assist in the introduction and establishment of modern dosimetric techniques in radiation and radioisotope laboratories. The present programme represents an attempt to achieve even closer co-ordination of activities within and outside the Agency.

V.5.7. Together with WHO the Agency will continue to devote attention to problems relating to clinical dosimetry. In order to help medical institutions throughout the world in achieving the necessary accuracy in clinical dosimetry the Agency has organized a postal dose intercomparison service based on thermoluminescent dosimetry (TLD) which makes it possible for such institutions to check and compare the accuracy of their dosimetric procedures.

V.5.8. The application of radiation in agriculture, industry and other fields leads to a demand for suitable dosimetric techniques. The Agency will continue to develop and evaluate techniques for such purposes. In this connection it will devote particular attention to the development of chemical dosimeters other than the Fricke dosimeter.

V.5.9. The lack of facilities in national laboratories in developing countries for the standardization of radiation measurements and the lack of adequately trained personnel for such work warrant the establishment of regional reference laboratories for dosimetry. The Agency will continue to collaborate with WHO in helping to set up such laboratories. This work is supported by the Agency's Laboratory [1].

V.5.10. The Agency will continue to provide advisory services and technical assistance in the use of dosimetry at the request of Member States. Whenever possible, short-term assignments for this purpose will be undertaken by staff members.

V.5.11. The Agency's research contract programme on dosimetry will consist of the following activities:

(a) Development of new dosimetric techniques;

(b) Investigation of existing dosimetric systems for special applications;

(c) Research on biophysical aspects of radiation quality; and

(d) Investigations of direct methods of measurement of absorbed dose.

The programme for 1971-72

V.5.12. The Agency will continue to collect information concerning dosimetry on a worldwide basis, analyse and evaluate it and make it widely available. Such services are considered a valuable help by scientists in developing countries. The work being carried out or planned includes:

(a) The preparation of a register of high-energy radiation therapy centres;

---

[1] Details on the work of the Laboratory are given in paras 60-69 in Section 7 - The Laboratory.

(b) The preparation of atlases of dose distributions for radiation therapy. On completion of the fifth atlas, which is now in preparation, this work will be terminated;

(c) The collection and distribution of physical data and annotated bibliographies on various aspects of dosimetry; this information is stored on microfilm and is available at a minimal fee. Requests for such information at present average 300 per year;

(d) The preparation of a directory on available instruments for dosimetry; and

(e) The preparation of manuals and other technical guides.

V.5.13. With regard to many of the above-mentioned activities continual reassessment of techniques, regional needs, etc. will be required and it is to be expected that periodic meetings of study groups and consultants will be necessary.

V.5.14. In view of the increasing demand for dose intercomparison services, involving the use of TLD and other techniques, and the need for regional reference laboratories for dosimetry, a panel on national and international radiation dose intercomparison will be convened. It is expected that WHO will collaborate with the Agency in holding this panel.

V.5.15. It is recommended that a further panel on advances in physical aspects of radiation therapy should be convened, in which WHO would be invited to collaborate.

V.5.16. A symposium on dosimetric techniques as applied to agriculture, industry, biology and medicine with the participation of the Joint FAO/IAEA Division is planned, in which WHO would also be invited to collaborate. This would be the first international meeting on the subject; it would co-ordinate the manifold aspects of dosimetry and attract participants from advanced and developing countries.

V.5.17. The proposed establishment by the Agency and WHO of regional reference laboratories for dosimetry in different regions will make it desirable to convene a joint study group in a selected region to co-ordinate the necessary activities within that region. A training course in dosimetric techniques for the personnel of such laboratories is planned.

V.5.18. A research co-ordination meeting may be necessary for the Agency's various research projects relating to dosimetric systems.

V.5.19. In 1972 the following meetings are planned:

(a) A panel on the practical use of definitions of internationally accepted units for high-energy radiation;

(b) A symposium on new high-energy dosimetric methods, in conjunction with the Division of Health, Safety and Waste Management; and

(c) A symposium on advances in neutron and mixed neutron-gamma-ray dosimetry.

V.5.20. The Agency will continue to gather and publish information on dosimetry to meet the needs of developing Member States. The fifth and last atlas of dose distribution in radiation therapy will be published. Work on certain other publications (including the register of high-energy radiation therapy centres) may be terminated, or transferred to WHO as appropriate.

The programme for 1973-76

V.5.21. During the period 1973-74, the further development of thermoluminescent, chemical and calorimeter dosimeters is expected to play an important role in the Agency's dosimetry programme and it is expected that requests from Member States for assistance

in dosimetry will increase steadily. A small increase in staff and facilities may be necessary to meet these requests.

V.5.22. The Agency will continue to provide Member States with dose intercomparison services, calibrate instruments for dosimetry, give advice on special problems in dosimetry and provide training for the personnel of national and regional reference laboratories.

Medical applications

V.5.23. The applications of radioisotopes are an essential part of modern medical practice and continue to grow in number and scope. Many applications in clinical diagnosis and therapy have already reached the routine stage, while others are still in the course of development. At the same time, research applications in such fields as biochemistry, endocrinology, immunology, nutritional studies and parasitology are increasing rapidly and permit new approaches to many long-standing medical problems.

V.5.24. Facilities for work with radioisotopes in clinical medicine and in medical research have been available for many years at major medical institutions in advanced countries and have now also been set up, or are being set up, in a number of developing countries. The use of radioisotopes in medical research can contribute significantly to the solution of some of the overriding public health problems, such as the control of the great endemic diseases and the relief of nutritional deficiencies.

V.5.25. The Agency will continue to assist in the introduction and establishment of facilities for work with radioisotopes throughout the world, by providing technical assistance and training, promoting research, undertaking the intercomparison and standardization of instruments and techniques, providing information and holding conferences, symposia and other meetings. In all of these activities it will maintain close liaison with WHO, as well as with other interested international organizations, notably ICRU, ICSH and IOMP. The Agency's own work on medical applications of radioisotopes will be concerned with technical aspects of such applications. It will be the Agency's policy to hand over gradually to WHO the responsibility for these applications as they reach the routine stage, and to concentrate its own efforts on the development of new techniques and the improvement of existing ones, in particular those of potential value to developing countries.

V.5.26. It is expected that the number of requests made to the Agency for advisory services and technical assistance in the introduction and establishment of facilities will continue, at least at the present level, for some years. A significant proportion of these requests are for the services of an expert for a short period to advise local staff on the facilities needed, to assist them in the installation of equipment and to train them in specific techniques. Such short-term assignments will be undertaken wherever possible by staff members.

V.5.27. Adequate training schemes for physicians in medical applications of radioisotopes have already been established in many countries, though opportunities for medical physicists, biochemists, electronics engineers and other scientific and technical personnel for training in medical radioisotope laboratories are still inadequate and need to be expanded. The Agency will continue to grant fellowships and support training schemes for general training in medical applications of radioisotopes, but in accordance with the recommendations of the Joint IAEA/WHO Expert Committee on Medical Radiation Physics convened in 1967 it will give particular support to training schemes for scientific and technical personnel. Through the medium of short training courses it will itself provide training in specific techniques of potential value to the developing countries.

V.5.28. Special emphasis will be placed on co-ordinated research programmes embracing research contracts with institutions in developing countries, cost-free research agreements with institutions in advanced countries and supporting work in the Agency's Laboratory [2]. Progress made will be reviewed at periodic research co-ordination meetings.

---

[2] Details on the Laboratory's work are given in paras 52-59 in Section 7 - The Laboratory.

V.5.29. In the applications of radioisotopes in clinical diagnosis, it is important to select techniques which ensure that the radiation dose to the patient is minimal, and here again the Agency will continue to collaborate with WHO.

V.5.30. The Agency will continue to act as a clearing-house for information on the medical applications of radioisotopes and will prepare bibliographies, registers and manuals on specific aspects of the subject as appropriate. Distribution of the publication "Nuclear Medicine - A Guide to Recent Literature" is to cease during 1970 since the information it provides is now available from other organizations.

The programme for 1971-72

V.5.31. Activities proposed for this period are discussed below:

(a) Radioimmunoassay techniques for the measurement in vitro of hormones and other substances of medical importance have developed rapidly in recent years and their use is important as an alternative to that of complex bioassay techniques. There is a growing need, especially in the developing countries, for specific training in these techniques. A short training course on selected radioimmunoassay techniques will therefore be held, possibly in conjunction with WHO, in 1971, and a second course is planned for 1972;

(b) The joint IAEA/WHO co-ordinated research programme on iron nutrition, initiated during 1969, will be continued during 1971, as will the co-ordinated research programme on medical applications of activation analysis, initiated during 1970 as a joint project of the Agency and WHO. The advice of consultants will be sought in the initiation of two further co-ordinated research programmes on subjects to be chosen, and WHO will again be invited to collaborate;

(c) Other intercomparison and standardization projects relating to the medical applications of radioisotopes are expected to be initiated or continued during this period, either as independent projects or in connection with co-ordinated research programmes. These projects would include:

(i) Intercomparison of scintigraphic techniques by computer analysis of experimental data;

(ii) Intercomparison of techniques for the measurement of radioisotopes of iron in biological materials;

(iii) Intercomparison of techniques for the measurement of trace elements in biological materials by activation analysis;

(iv) Intercomparison of radioisotope techniques for the measurement in vitro of hormones, vitamins and other substances of medical importance; and

(v) Intercomparison of techniques for the computer analysis of data in medical applications of radioisotopes other than scintigraphy;

Medical institutions in Member States will be invited to collaborate in all the above-mentioned projects, for which supporting work will be done in the Agency's Laboratory or Computer Section. The Agency will also continue to collaborate in the work of the ICSH Panel on Isotope Procedures in Diagnostic Haematology;

(d) Following the meeting in 1970 of the panel to discuss the requirements of medical radioisotope laboratories with regard to accommodation, equipment and staff, a manual on the planning of medical radioisotope laboratories will

be prepared for publication during 1971. The register of medical radioisotope laboratories in developing countries initiated in 1970 will be maintained;

(e) The applications of radioisotopes in immunological studies of communicable diseases have developed rapidly in recent years and may be of considerable significance to developing countries in the solution of their public health problems. A panel will be convened during 1971 to discuss the progress made, and WHO will be invited to collaborate;

(f) The establishment of radioimmunoassay techniques on a routine basis raises many problems relating to standardization. A panel on the standardization of these techniques will therefore be convened during 1971 to discuss these problems and recommend activities which the Agency might appropriately undertake, and WHO will be invited to collaborate;

(g) In view of the inadequacy of existing opportunities for the training of scientific and technical personnel for work in medical radioisotope laboratories, a study group will, if possible, be convened during 1971 to discuss this problem as it arises in any particular region, and WHO would be invited to collaborate; a second study group may be convened in 1972;

(h) The role of computers in data analysis in medical applications of radioisotopes is becoming increasingly significant, and it would be appropriate to hold a symposium during 1971 to review the progress made, once again with the possible collaboration of WHO;

(i) Applications of radioisotopes in studies of parasitic diseases may be of considerable significance to developing countries in the solution of their public health problems. A panel will be convened during 1972 to discuss the progress made and WHO will be invited to collaborate;

(j) The use of in vivo activation analysis techniques for the measurement of various elements in the organs and tissues of the human body are now the subject of increasing attention, as are the medical applications of short-lived and other radioisotopes produced in cyclotrons. It may be appropriate to convene a panel during 1972 to review the progress made in one of those fields; and

(k) In 1960, 1964 and 1968, the Agency held highly successful symposia on medical radioisotope scintigraphy. It would be appropriate to hold a further symposium in 1972 to review the progress made, and WHO would be invited to collaborate.

The programme for 1973-76

V.5.32. During 1973-74 the Agency's programme on medical applications of radioisotopes will continue along the same lines as during 1971 and 1972. Efforts will be concentrated on the introduction and establishment of new techniques.

V.5.33. As far as is possible, further short training courses on radioimmunoassay techniques, activation analysis techniques or other specific techniques of potential value to the developing countries will be held, possibly jointly with WHO.

V.5.34. Intercomparison and standardization activities will be further developed.

V.5.35. The register of medical radioisotope laboratories in developing countries will be maintained. The establishment of a register of computer programmes for use in medical applications of radioisotopes is envisaged.

V.5.36. A further panel will be convened to discuss the progress made with regard to some aspects of the applications of radioisotopes which are of significance to the developing countries in the solution of their public health problems, and WHO will be invited to collaborate.

V.5.37. It may be appropriate to convene a panel during 1973 to discuss problems relating to the standardization of certain radioisotope techniques in diagnostic haematology in collaboration with ICSH and WHO.

V.5.38. A panel may be convened in 1974 on the preparation and control of radiopharmaceuticals from short-lived radioisotopes in medical radioisotope laboratories in collaboration with WHO.

V.5.39. Two symposia, one on in vitro procedures with radioisotopes in clinical medicine and research, and the other on radioautographic techniques, may also be held.

Radiation biology

V.5.40. Knowledge of the fundamental mechanisms underlying the biological effects of ionizing radiations has led to the increased use of such radiations in medicine, industry and agriculture. The ability to control such effects makes a further increase in the beneficial uses of radiation possible.

V.5.41. The Agency's programme in radiation biology is aimed at gaining an understanding of the fundamental mechanisms of radiation damage and repair in biological systems and using the basic knowledge of these mechanisms to develop the beneficial uses of radiation. The activities proposed for 1971 and subsequent years are designed:

(a) To provide increased opportunities for developing countries to benefit from the techniques developed;

(b) To make the co-operation between international organizations in radiation biology more effective;

(c) To initiate services relating to radiation biology; and

(d) To ensure the earliest possible use of basic knowledge of radiation biology for the development of beneficial uses of radiation.

V.5.42. The radiation biology programme will continue to have as its central theme the response of biological systems to ionizing radiation, but will be modified so as to promote the beneficial utilization of knowledge of radiation biology more rapidly. The work being done on radiation sterilization of medical supplies and equipment will be concluded. The activities dealing with subjects such as radiation therapy that have become a part of routine medical practice and those in which the biological effects of radiation are not directly involved will be given less emphasis.

The programme for 1971-72

V.5.43. The activities proposed are discussed below:

(a) It is planned to publish two manuals during 1971, one on the radiosterilization of biomedical supplies and products, and one on the pathophysiology of radiation damage. In 1972, manuals on radiobiology and its applications and on the radiation genetics of beneficial mutant micro-organisms will be published. These manuals will be part of a series prepared and published in collaboration with WHO;

(b) It is recommended that two training courses be held in 1971, one on radiobiological methods in the life sciences and one on radiation sterilization of

biomedical products and biological tissues; a training course in radiation haematology would be appropriate in 1972;

(c) Information on the use of radiation in the induction of beneficial mutants in micro-organisms for medical, industrial or agricultural use will be made available in the form of a register of beneficial mutant micro-organisms;

(d) Widespread acceptance of radiation-sterilized biomedical supplies and products by Member States depends on the establishment of standards for bacterial sterility testing of such supplies and products under the different conditions of use. A panel will be convened during 1971 to discuss the establishment of such standards, and in 1972 a working group to recommend an international code of practice is envisaged; UNIDO and WHO will be invited to collaborate;

(e) If possible, a panel will be convened during 1971 to discuss the abscopal effects of irradiation. It will consider the functional changes and radiation damage to irradiated organisms in tissues and organs not themselves exposed to radiation. A panel to discuss the radiobiological applications of neutron irradiation might also be appropriate; and

(f) New methods of controlling mechanisms of radiation damage and repair at the molecular level are making possible new applications of the biological effects of radiation. A symposium on the molecular basis of radiation damage and repair processes to review recent progress in this field will be considered. Alternatively, a symposium on the effects of radiation on the sensory organs, to review recent findings on the functional and morphological aspects of the effects of radiation on sensory organs and on behaviour, is recommended;

(g) It is proposed to hold an advanced course on radiation microbiology during 1972 to train microbiologists and radiation biologists from developing Member States so that they can establish training courses on a regular basis in their own countries;

(h) Research reactors are available in many developing countries but their effective use in research on radiation biology has not been fully explored. It is therefore proposed to convene a panel in 1972 to discuss this subject. In addition, studies in microbiology can also be carried out effectively in developing countries and it would therefore be appropriate to convene a panel to discuss radiation effects on population kinetics of micro-organisms. The information provided would be useful in relation to the controlling effects of radiation on mixed populations of micro-organisms as they occur in the different environments; and

(i) It would also be appropriate to hold a symposium in 1972 on the biological effects of neutron and heavy-particle irradiation which would provide an opportunity for scientists to discuss newly obtained data relating to the biological action of neutrons and to evaluate possibilities for further research. An alternative recommendation is to hold a symposium on the use of radiation sterilization in the medical industry to provide opportunities for an exchange of information between institutions carrying out experiments on radiation sterilization or producing radiation-sterilized biomedical products.

The programme for 1973-76

V.5.44. The programme in radiation biology during this period will continue along the same lines as during 1971 and 1972. It may be appropriate to convene panels to discuss the effects of radiation on subcellular particles and on enzymes, since such fundamental aspects of radiation biology are considered important in the development of new beneficial uses of ionizing radiation in the life sciences. A further panel dealing with the late effects of irradiation might identify areas where additional research on radiation damage and repair

phenomena is needed, while a panel to discuss the applications of radiation biology in the improvement of medical practice might similarly identify areas of interest.

V.5.45. For 1973-74 consideration will be given to the desirability of convening several symposia on the effects of radiation on the sensory organs and neuro-endocrine systems, the applications of nuclear techniques for the improvement of biosphere resources, the molecular and functional effects of incorporated radionuclides and the effects of radiation on regulatory processes in the cell.

V.5.46. Training courses in the use of reactors in radiobiological research, radiobiological methods in the life sciences, and the radiation sterilization of biomedical products and biological tissues may also be considered.

V.5.47. The publication of manuals on different aspects of radiation biology will continue, in collaboration with WHO, and finally, particular attention will be given to the use of new mutant micro-organisms in the improvement of biosphere resources.

Budget estimates

Explanation of major cost changes in 1971

V.5.48. The proposed increases in the budget for this programme in 1971, compared with the approved level for 1970, are shown in Table 18, from which it is seen that the entire increase of $8800 is due to salary and price increases, of which $8300 is for salaries and wages and the associated common staff costs for existing staff, and a minor increase of $500 is to cover higher air fare and per diem rates which became effective in 1969.

FIGURE 10

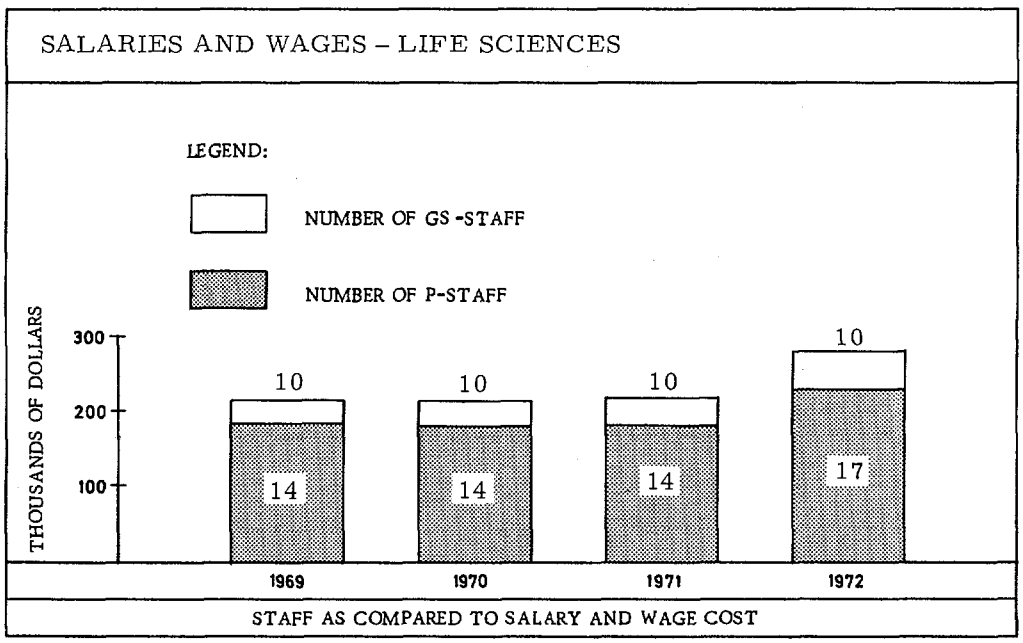


FIGURE 11

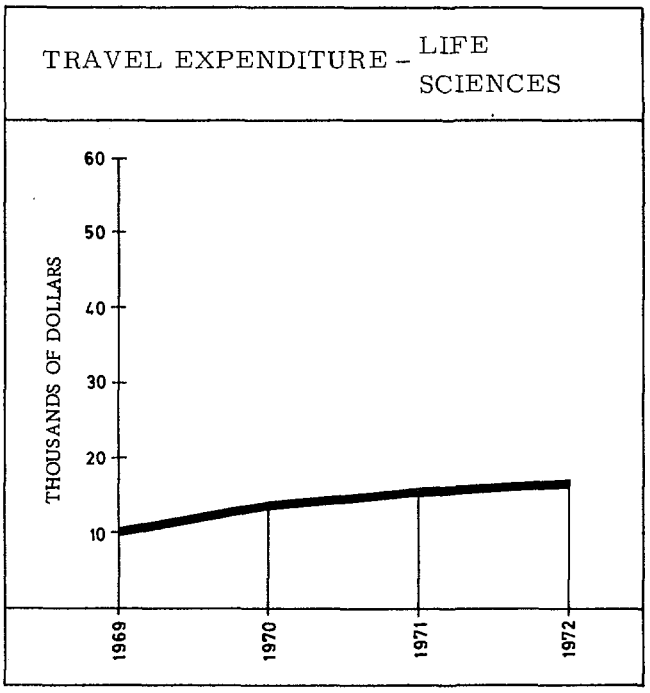
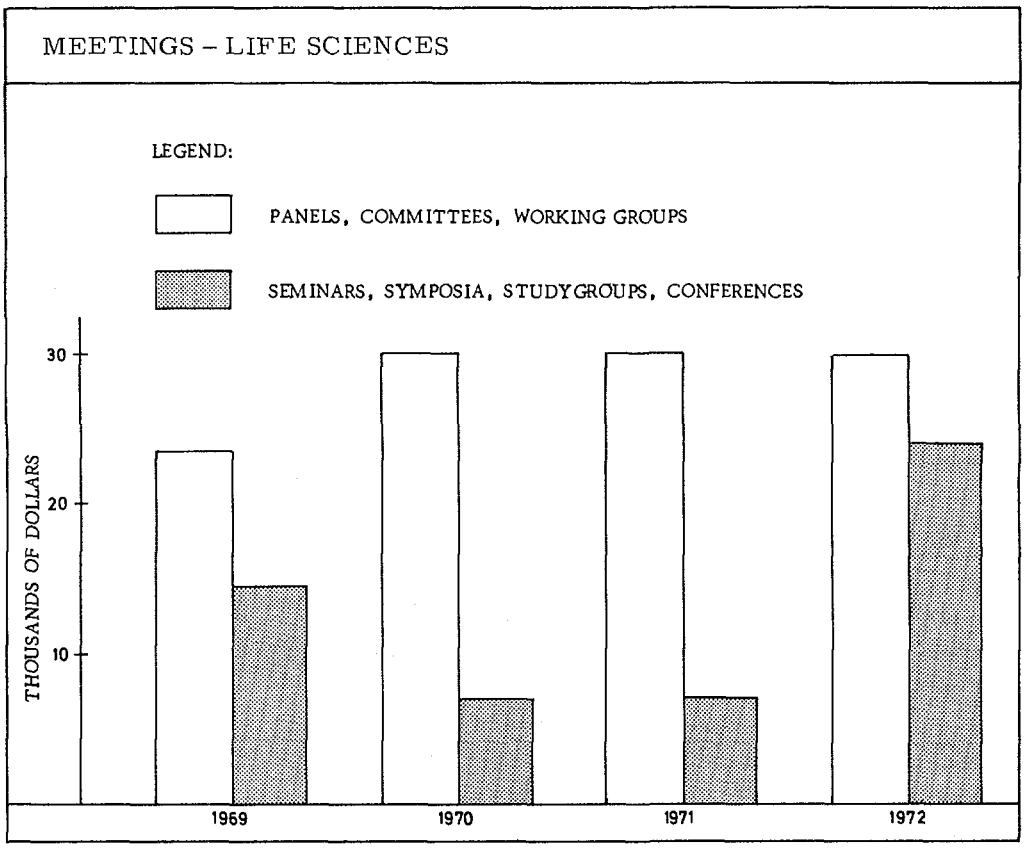


FIGURE 12



V.5.49. Scientific and technical contracts are kept at a level of $236 000 for 1971 and 1972, which is the level of the adjusted budget for 1970. Of this amount, $4000 represents support to ICRU. Apart from a technical contract in medicine, the balance is for research contracts.

Preliminary budget estimates for 1972

V.5.50. Increases totalling $107 000 are provided for in the preliminary budget estimates for 1972 as compared with 1971. These increases are $64 000 for salaries and wages, $24 500 for associated common staff costs, $1500 for increased travel of staff, and $17 000 for two more study groups or symposia.

V.5.51. In 1972 a P-5 post will be required by the Radiation Biology Section in order to expand its work on radiation damage, radiation haematology and radiation starilization of biomedical products and biological tissues. The upgrading of one P-3 post to the P-4 level and an additional P-1 post will also be required by this section. A P-3 post is required by the Medical Applications Section for work on intercomparison and standardization of radioisotope techniques.

V.5.52. In addition to these increases in manning table posts, some additional provision has also been made for increased utilization of consultant services and temporary assistance staff.

6. Physical sciences

Summary of costs

Table 20

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	354 217	365 800	8 000	-	8 000	373 800	436 100
Common staff costs	132 170	130 700	5 000	-	5 000	135 700	160 400
Duty travel and missions	33 446	29 000	1 000	-	1 000	30 000	33 000
Meetings: Panels and committees	47 548	38 000	2 000	-	2 000	40 000	40 000
Seminars, symposia and conferences	21 584	26 000	-	(12 000)	(12 000)	14 000	31 000
Representation and hospitality	685	1 500	-	-	-	1 500	1 500
Scientific and technical contracts	124 073	110 400	600	-	600	111 000	111 000
Scientific services, supplies and equipment	-	-	-	-	-	-	25 000
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	8 000	8 000	8 000	10 000
Other	-	-	-	-	-	-	-
TOTAL	713 723	701 400	16 600 2.37%	(4 000) (0.57%)	12 600 1.80%	714 000	848 000

Summary of manpower

Table 21

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	1	-	1	1
P-5	6	6	-	6	7
P-4	6	6	-	6	9
P-3	7	8	-	8	5
P-2	3	3	-	3	3
P-1	-	-	-	-	-
Sub-total	23	24	-	24	25
GS	13	14	-	14	14
M&O	-	-	-	-	-
TOTAL	36	38	-	38	39

Highlight summary

V.6.1. This programme covers the work of the Division of Research and Laboratories in the utilization of radioisotopes and radiation sources in physics, nuclear data, chemistry, hydrology and industry. This Division is responsible for keeping abreast of new developments in these subjects and for rendering assistance or giving advice to Member States by means of expert visists, study tours, panels, symposia, dissemination of information, advisory missions, research contracts, or nuclear data exchange.

V.6.2. The net increase in costs for this programme in 1971 has been kept to $12 600 or 1.80% above the approved level for 1970. This net increase is made up of $13 000 for increased emoluments of existing staff, including common staff costs, plus minor price increases amounting to $3600 for travel, meetings and technical contracts, partially offset by a net programme reduction of $4000, or 0.57%. The reduction of $4000 in programme costs represents a reduction of $12 000 for symposia, which is to be used to finance the Agency's participation in the Fourth Geneva Conference, offset by a programme increase of $8000 for a training film. No increases in staff are requested for 1971.

V.6.3. The preliminary estimates for 1972 provide for increased costs of $134 000 over the level requested for 1971, made up of $62 300 for salaries and wages to cover four upgradings plus one additional P-4 post, $24 700 for common staff costs, $3000 for duty travel, $17 000 for meetings (partially for restoration of the number of meetings to the normal level following the Fourth Geneva Conference), $25 000 for neutron targets in respect of nuclear data work, and $2000 for increased costs of a training film.

Programme

V.6.4. The five major sub-programmes included in this programme are outlined below, special emphasis being placed on the programme for the biennial period 1971-1972.

Physics

V.6.5. Progress in nuclear technology continues to depend on co-ordinated research, and in the developing countries physics research work contributes to the establishment of a basis for the more advanced applications of technology. The Agency proposes to continue to place emphasis on research problems of importance in current or future nuclear energy applications.

The programme for 1971-72

V.6.6. An important event in information exchange during 1971 will be the Fourth International Conference on Plasma Physics and Controlled Fusion Research, which will continue to be held every three years. Experimental work now under way offers the possibility of exciting breakthroughs with regard to the feasibility of controlled thermonuclear reactions.

V.6.7. The Agency has agreed with ENEA to co-sponsor the Joint Liaison Group on Thermionic Electrical Power Generation. The research on this subject offers prospects for the direct conversion of thermal energy to electricity with reasonable efficiency.

V.6.8. A panel on the use of low energy accelerators in materials technology will consider such new subjects as channelling ion implantation and atomic beam research, which hold out prospects of significant research for developing countries. A second panel will deal with non-neutron nuclear data in preparation for a symposium to be held before 1973, as recommended by INDC.

V.6.9. At least one study group meeting in 1971 on other nuclear interactions, nuclear forces or very high energy accelerators will be convened.

V.6.10. A study group on the subject of laser applications in nuclear research is recommended for 1972 since plasma physics and fusion physics have benefited substantially from the use of lasers in research.

V.6.11. The Agency will continue to explore projects aimed at establishing regional research facilities in physics, such as neutron sources and generators.

V.6.12. An international symposium on neutron inelastic scattering research is planned for 1972. Panels on fission isomers and on the promotion of scientific research in Africa are envisaged.

V.6.13. As the various research co-ordination programmes are initiated, it will become more important to seek the advice of specialized consultants to provide effective guidance during their implementation. The increased use of such experts is foreseen.

The programme for 1973-1976

V.6.14. During this period, symposia, panels and consultants' meetings are planned on the following subjects: non-neutron nuclear data, fission, fusion, low-energy accelerators and solid state research.

Chemistry

V.6.15. The programme of the Chemistry Section covers both the fundamental and the applied aspects of chemistry. During the first biennial period the work on reactor-produced

isotopes will be terminated. Emphasis will be placed on:

(a) The critical evaluation of physico-chemical data pertinent to the production of nuclear energy;

(b) Radiation and "hot-atom" chemistry;

(c) The chemistry of the nuclear fuel cycle and the chemical aspects of nuclear energy production;

(d) Radiopharmaceuticals, their production and analytical control;

(e) The production and utilization of short-lived isotopes;

(f) The chemistry of nuclear materials;

(g) The provision of advisory and training services to developing countries; and

(h) Co-operative regional projects.

The programme for 1971-1972

V.6.16. One of the two meetings listed below will be held in 1971:

(a) A conference on the production of labelled molecules, which are important tools for research and development in pure and applied science. They are widely used in industry and the Agency has not yet held any meetings on this particular topic. Although the subject is of primary interest to the developed countries, knowledge of the techniques involved, their cost and scope is also of great importance to the developing countries;

(b) A symposium on analytical chemistry in the nuclear fuel cycle. In spite of the rapid growth in the production of electricity from nuclear energy, no universally acceptable methods exist for the assay of commercially important nuclear materials. There is considerable interest in such subjects as the determination of burn-up and the measurement of uranium and plutonium, all of which are relevant to many of the Agency's programmes such as safeguards, fuel management, economics and waste management.

V.6.17. The subjects for panels and consultants' meetings will be selected from the following: chemical dosimetry, hot-atom chemistry, radiation chemistry, corrosion and mass transport in nuclear reactors, the production of short-lived isotopes, the quality control of radioisotopes and radiopharmaceuticals, activation analysis and the thermodynamics of nuclear materials.

V.6.18. It is proposed to hold regional training courses on the analytical control of radiopharmaceuticals and activation analysis, if funds can be made available.

V.6.19. For 1972 it is proposed to hold one of the two symposia listed below:

(a) A symposium on "hot-atom" and radiation chemistry. Two previous symposia have been held on this topic and restricted, informal meetings dealing with a few advanced topics are held every two years. A considerable amount of work is done in this branch of chemistry and this has led to many practical applications of interest to developing countries;

(b) A symposium on the chemistry of the transuranium elements. The amount of work and the level of interest in this topic warrants holding a symposium to review and publicize past work and indicate lines for future work.

V.6.20. It is proposed to hold panels and consultants' meetings on subjects selected from the following: the production of radiopharmaceuticals from short-lived radioisotopes and their quality control, methods for the analysis and quality control of nuclear materials, the chemical determination of burn-up, the separation process in nuclear and radiation chemistry, the production of isotope generators, transport processes in nuclear fuels and nuclear and radiation chemistry.

V.6.21. Regional training courses are planned on the analytical control of radiopharmaceuticals (South East Asia) and activation analysis (Latin America).

The programme for 1973-1976

V.6.22. During the two-year period 1973-74, symposia, panels and consultants' meetings are planned on topics selected from the following: exchange reactions, the thermodynamics of nuclear materials, the processing of fast-reactor fuels, separation processes in the nuclear fuel cycle, deuterium and tritium in the physical sciences, the preparation of tracers and the chemistry of molten salts and liquid metals. It is envisaged that training activities will be continued and recommended analytical methods and reference material will be collected and disseminated.

V.6.23. In 1975-76 meetings should be held to consider synergism in the solvent extraction of nuclear materials, chromatographic separations of the fission products, use of isotopes in studying reaction mechanisms, nuclear activation techniques, computer-coupled activation analysis, non-aqueous fuel processing and the production and processing of isotopes suitable for power generators. More emphasis will be placed on the provision of advisory services to developing countries, and field activities will be adjusted accordingly.

Isotope hydrology

V.6.24. The Isotope Hydrology Section works largely in co-operation with other United Nations organizations to promote the uses of nuclear and isotope techniques in hydrologic studies.

V.6.25. The main purpose of the work is to continue and intensify the education of hydrologists – including hydrology programme administrators who plan and carry out water resources investigations and development, especially in the developing countries – to understand the usefulness and appropriate applications of isotopes in hydrologic work. This is done in the following two principal ways:

(a) By training programmes and courses, on the-job training, technical meetings (symposia, working groups and special panels) and related educational techniques; and
(b) By carrying out a programme of applications of isotopic techniques in hydrologic investigations as well as encouraging and advising on research in isotope techniques and applications in hydrologic work. The investigations result in "case studies" showing what can be done with isotope applications in hydrologic studies and provide convincing evidence to the hydrologist of the benefits of using isotopes in conjunction with other methods.

V.6.26. Studies in which isotope techniques were used have recently been completed by the Agency in several countries. Although this type of activity may increase somewhat during the next few years, support work can be handled by the Agency's Laboratory [1] and new laboratories that are starting or are about to start analytical work in other countries. During the next two years, therefore, the increase in the volume of work will not entail any increase in the budgetary provisions.

---

[1] Details on the work of the Laboratory are given in paras 70-75 in Section 7 – The Laboratory

The programme for 1971-72

V.6.27. The activities for 1971 include continuation of collaboration in hydrologic studies through UNDP(SF) projects to be approved and those now being carried out, which include:

(a) Water resources in the Chad Basin;

(b) Community water supply and sewerage drainage in Dakar, Senegal;

(c) Hydrology of the Chott-el-Hodna Basin, Algeria;

(d) Water resources survey in the Northern Sahara, Algeria and Tunisia; and

(e) Ground water investigations in Nicaragua.

V.6.28. The Agency will provide analytical laboratory services, offer interpretation of the results in terms of hydrogeologic conditions and give advice on isotope applications to assist in solving hydrologic problems.

V.6.29. In 1972, one or more of the UNDP projects in Senegal, Nicaragua, Algeria, and the Northern Sahara may be completed, but the isotope work will continue.

V.6.30. It is expected that the technical assistance and advisory services to be provided as well as the research contracts work will remain at about the present level.

The programme for 1973-76

V.6.31. As specific proposals for projects in 1973-76 have not yet been received, details of activities cannot be forecast for this period but, in general, the activities under way in 1971-72 will continue. In 1973 a symposium on nuclear techniques in hydrology will be organized. Panel meetings on special topics will be convened as appropriate and the number of advisory missions will increase slightly as more Member States develop analytical capabilities but require interpretative advice.

V.6.32. By 1975-76 there will be a substantial increase in the need for development of water resources in many parts of the world. It is expected that an increase in the budget and staff may be needed and that an increased work-load will result from requests for advice in the use of specific isotope techniques to solve hydrologic problems and for information on the latest interpretative methods from groups with recently installed analytical facilities.

Industrial applications

V.6.33. Work relating to industrial applications of radioisotopes covers analysis, testing and control, industrial radiation processing, tracers and radioisotope-powered energy sources, but the emphasis with regard to each of these subjects will change as technology develops and as the requirements of developing countries demand.

V.6.34. Radiation processing has developed into one of the most intensive activities in Member States and it is expected that the Agency's participation in large projects in developing countries will increase. Meetings and services will be directed towards rationalizing work in this area. The programme in nuclear geophysics, particularly in regard to geochemical and geobotanical prospecting, is expanding and will be consolidated. The potential usefulness of nuclear techniques in environmental control is still not widely known and an increased effort will be made to provide both information and advice to Member States.

V.6.35. The use of non-destructive testing and quality control in dealing with industrial problems in developing countries is expanding. Other subjects, such as instrumentation, tracers and radioisotope power sources will be covered as before.

V.6.36. During 1969 considerable assistance was given to several developing countries in the preparation of UNDP(SF) requests. This work is now expected to expand as more countries make such requests and as the Agency's role in administering these projects becomes defined.

V.6.37. Co-operation with UNIDO will be extended to cover the integration of nuclear techniques into industry and cost benefit studies relating to particular processes and techniques.

The programme for 1971-72

V.6.38. The practice of convening symposia on the use of nuclear techniques in specific industries will be continued; efforts will be concentrated on those industries where improvements in the technology can be adapted to the needs of developing countries. Subjects which look particularly promising and in which the economic benefit is likely to be great will be evaluated at meetings. These meetings will be concerned not only with the technical aspects of such activities as radiation processing, mineral prospecting and non-destructive testing, but also with the practical problems encountered in introducing the technology into developing countries. It is therefore proposed to convene symposia on nuclear techniques in the basic metal industries and on nuclear techniques in the petroleum-based industries and panels on practical aspects of radiosterilization, nuclear techniques in the textile industries and non-destructive testing in developing countries.

V.6.39. Subject to the availability of funds, it is planned to organize study groups on radiation processing in Latin America and on activation analysis in mineral prospecting, a study tour on industrial applications of radioisotopes and radiation and a training course on industrial radiation processing in Latin America. A consultants' meeting on the use of accelerators in industrial processes is also planned.

The programme for 1973-76

V.6.40. Non-destructive testing, radiation processing and nuclear geophysics will require more long-range demonstration projects and co-operative projects with UNIDO. Symposia dealing with the food and chemical processing industries are planned, as well as interregional study groups on the treatment of textiles and the use of nuclear techniques in pollution control and panels on radiation engineering techniques and the role of nuclear techniques in automatic control.

V.6.41. It is expected that more Member States will require assistance, either through missions or advisory services, on particular aspects of radiation processing. The results of the co-ordinated research programme on the use of activation analysis in geochemical and geobotanical prospecting should be demonstrated in field trials and the laboratory programme will be developed towards this end.

V.6.42. Special attention will be given to the economic evaluation of radiation processing in developing countries. Radioisotope power sources should by this time be available for terrestrial applications in developing countries, and it will be necessary for the Agency to co-ordinate some activities in this field. Study group meetings on the application of nuclear techniques in the metal, ceramic and glass industries are also foreseen and the development of automatic control techniques in industrial gauging systems will be supported.

Nuclear data

V.6.43. The programme of the Agency's Nuclear Data Section is primarily designed to promote the world-wide dissemination of nuclear data information and to co-ordinate the individual national nuclear data programmes, with emphasis on neutron physics. This programme has been formulated and is carried out in accordance with the recommendations of INDC which meets annually and the recommendations made by panels and other groups which the Nuclear Data Section sponsors. The Nuclear Data Section also functions in close co-

operation with the centres at Brookhaven, Obninsk and Saclay and provides services for that part of the world not covered by the other centres.

V.6.44. The current activities are as follows:

(a) The collection and dissemination of experimental data;

(b) Co-ordination of work with other centres and development of the international exchange format;

(c) Publicizing of data centre activities within the area served;

(d) Initiation of a world-wide neutron data request list;

(e) Determination of the needs for accelerator targets and samples for nuclear data measurements in developing countries;

(f) Preparation of data reviews on a limited scale (e.g. the 2200 m/sec nuclear constants review for fissile nuclides); and

(g) Promotion of international co-operation in work on neutron physics data through panels and conferences.

The programme for 1971-72

V.6.45. The current work will be consolidated and expanded and the main activities will be as follows:

Development and operation of data centre activities

(a) The increased provision of services by the data centre in which emphasis will continue to be placed on advisory missions;

(b) The development of data retrieval systems in co-operation with other centres through meetings of the four data centres;

(c) The implementation of the inter-centre data exchange format;

(d) The development of an international nuclear data index;

(e) The preparation of input and publication of CINDA, starting in 1971;

(f) An increase in evaluated data exchange; and

(g) The provision of consultants' services to about the same extent as in the previous two-year period to foster the continued development and use of the International Neutron Data System.

Assessment of world-wide data needs

(a) The preparation of detailed reviews of specific data which are important for the development of peaceful nuclear energy programmes, particularly in developing countries (e.g. standard and heavy element cross-sections);

(b) Technical contracts on nuclear data evaluation;

(c) The assessment of cross-section needs in specific fields, e.g. safeguards, fusion and dosimetry;

(d) The preparation and continuous critical review of a world-wide request list for neutron data measurements; and

(e) Participation in co-ordinating the compilation and evaluation of certain types of non-neutron data.

Co-ordination of experimental nuclear data activities

(a) Surveys of experimental capabilities and facilities in developing countries;

(b) The promotion and co-ordination of neutron physics experimental programmes in developing countries; and

(c) The collection of requests for and provision of assistance in the supply of accelerator targets and samples for nuclear data measurements particularly in developing countries. INDC will be responsible for evaluating requests.

Panels and committees

The convening of the following meetings is planned, subject to the availability of funds:

(a) For 1971, a panel meeting on methods of evaluation, a panel meeting on the status of fission neutron spectrum data and the annual meeting of INDC; and

(b) For 1972, a second panel meeting on standards for nuclear data measurements, a panel meeting on the status of heavy element nuclear data and the annual meeting of INDC.

The programme for 1973-76

V.6.46. The workload of the Nuclear Data Section will be greater than in the previous two-year period as the compilation and review of data will be extended to other types of nuclear data. Concurrently the provision of services will become increasingly important.

V.6.47. The assessment of world-wide nuclear data needs by data reviews, the subsequent awarding of technical contracts for nuclear data evaluation and the continuous up-dating of the world-wide request list for nuclear data measurements will be important activities. This list will serve as a guide for the continued stimulation and co-ordination of experimental nuclear data programmes, particularly in developing countries. In this context increasing assistance will be given to developing countries by awarding research contracts and helping them to acquire experimental equipment like accelerator targets and samples for nuclear data measurements.

V.6.48. Appropriate panels and consultants' meetings will continue to be held in accordance with the recommendations of INDC. Thus the Agency plans to convene not later than in 1973 a small symposium on the collection, compilation, indexing, evaluation and distribution of nuclear data, including neutron data. A third international conference on nuclear data is planned for 1974.

Budget estimates

Explanation of major cost changes in 1971

V.6.49. The various price and programme increases in 1971 as compared with 1970 are given in Table 20, which shows that the total cost of this programme will increase by $12 600 or 1.80%. Of this amount, $16 600 is due to salary and price increases, partially offset by a net reduction in programme costs of $4000 or 0.57%.

FIGURE 13

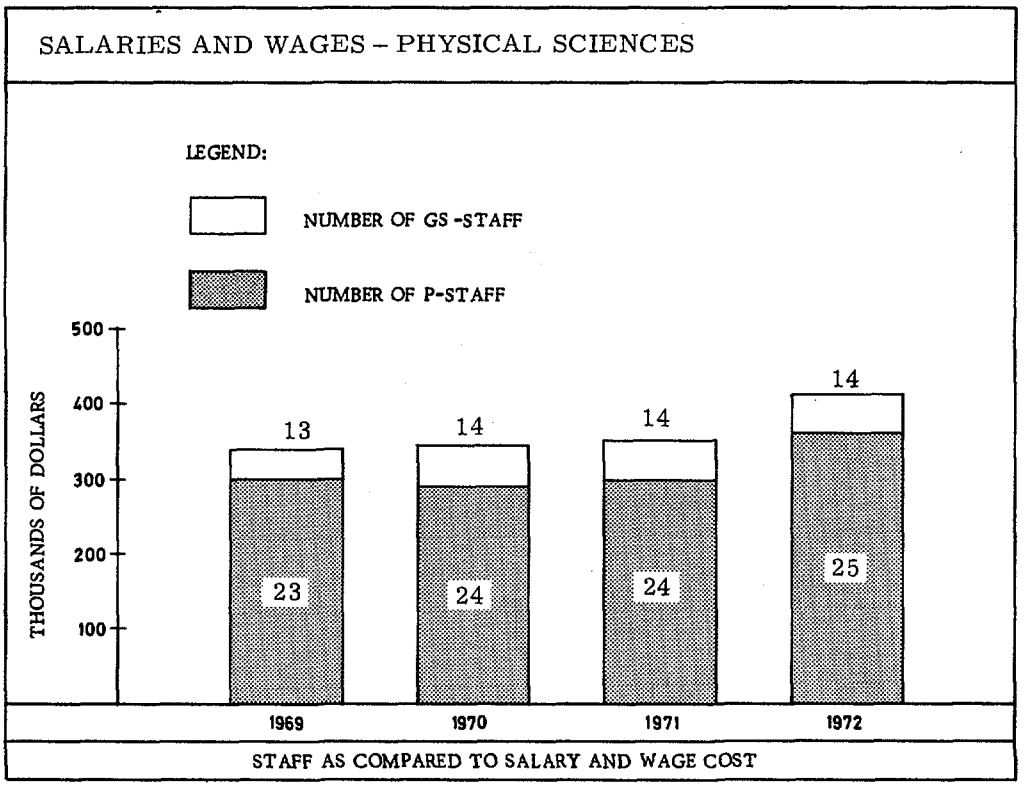
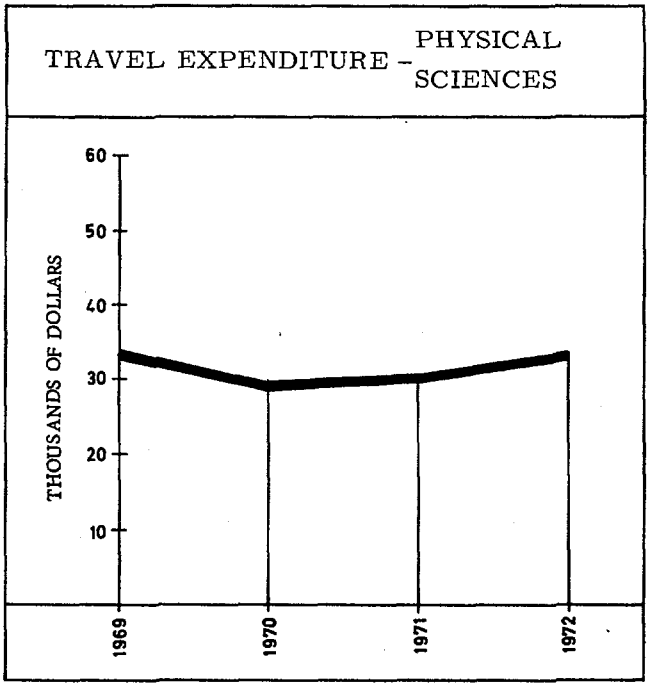
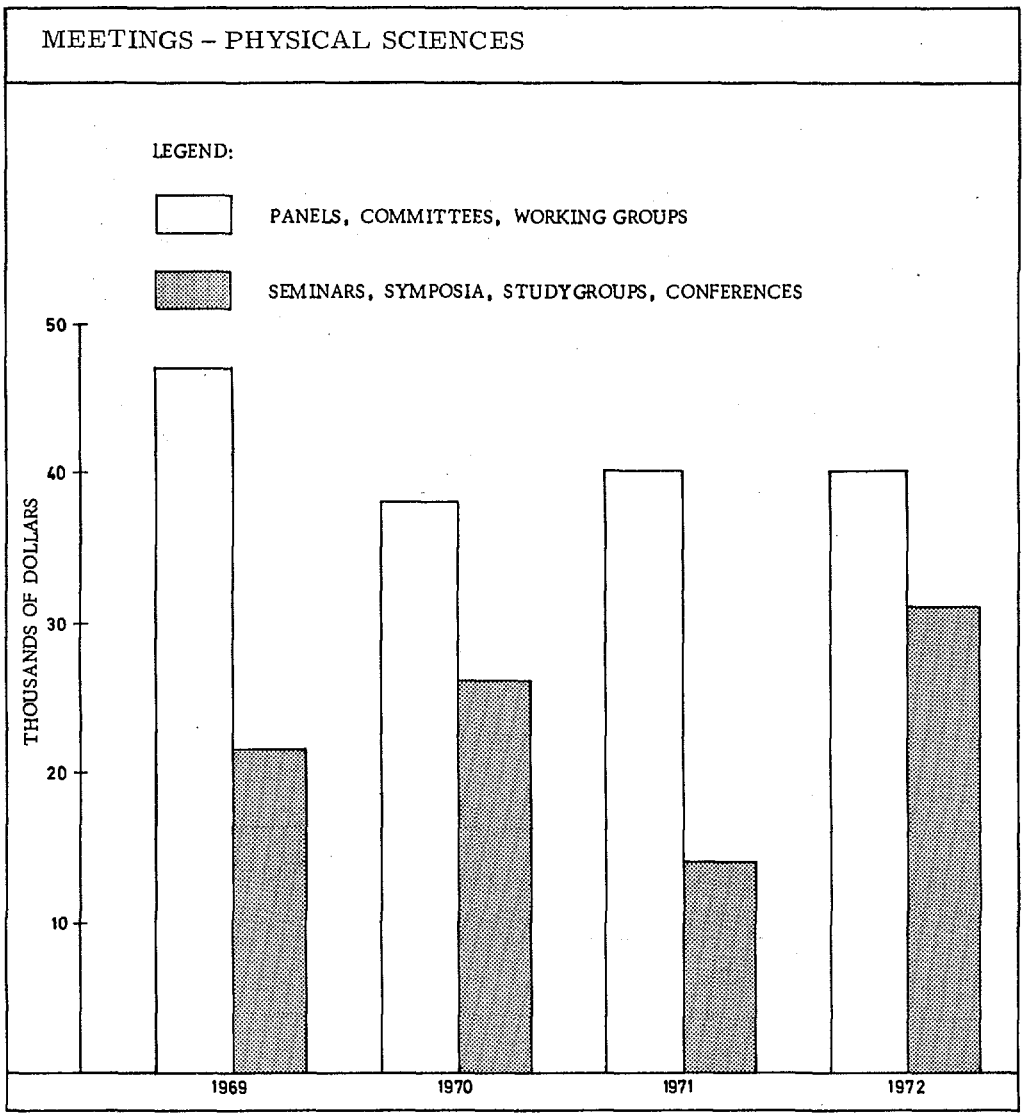


FIGURE 14



V.6.50. The only programme increase proposed for 1971 is the production of an $8000 training film on the industrial applications of radioisotopes. The use of large radiation sources to process a wide range of materials is now well established. It is therefore necessary to inform developing countries of the full potential of this technique. This programme increase largely offsets the programme reduction of $12 000 resulting from the curtailment of the number of scientific meetings in order to lend support to the Fourth Geneva Conference.

FIGURE 15



Preliminary budget estimates for 1972

V.6.51. The preliminary estimates for 1972 provide for salary and wage increases of $62 300 and associated common staff cost increases of $24 700. These increases are primarily due to the proposal to establish a new P-4 post in the Industrial Applications Section to cope with the increased workload relating to environmental control, with particular reference to the use of radioisotopes and radiation in pollution studies, the reclassification of a P-3 post to the P-4 level in the Physics Section because of the increased workload in connection with the planning and organization of meetings, evaluation of technical assistance projects and evaluation of research contracts, the reclassification of a P-4 post to the P-5

level in the Nuclear Data Section in view of the broadening scope of the operation and the need of the Section Head for greater assistance in the scientific planning and co-ordination of the work programme and the reclassification of two P-3 posts to the P-4 level in the same Section to bring their professional grade up to the level of that of staff in other nuclear data centres performing comparable duties. The remainder of the increase in respect of salaries and wages is attributable to normal increases for existing staff plus minor increases for consultants' services and temporary assistance staff.

V.6.52. An increase of $3000 is foreseen for travel. In addition, a training film on the use of isotopes in water studies, which would show how isotope applications can help to supply arid countries with water, is planned in 1972 at a cost of $10 000 which is an increase of $2000 over the cost of the 1971 film on industrial applications of radioisotopes. There will be an increase for seminars and symposia of $17 000, mainly for the purpose of restoring their number to the normal level.

V.6.53. It is also proposed to provide neutron targets to developing countries in 1972, as required, to expedite the measurement and exchange of neutron data. It is estimated that these targets will cost $25 000, which will represent a programme increase over 1971.

V.6.54. Funds for research and technical contracts are expected to be required in 1971 and 1972, amounting to $111 000 for each year. This amount is only $600 above the level in 1970, which is required to meet price increases from $15 400 to $16 000 under one technical contract.

7. The Laboratory

Summary of costs

Table 22

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	595 106	579 000	50 200	5 600	55 800	634 800	722 800
Common staff costs	212 068	189 000	20 300	700	21 000	210 000	218 000
Duty travel and missions	1 550	4 000	-	-	-	4 000	4 000
Meetings: Panels and committees	-	-	-	-	-	-	5 000
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	-	-	-	-	-	-	-
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	127 955	147 000	7 000	-	7 000	154 000	162 000
Common services, supplies and equipment	99 598	95 000	11 200	-	11 200	106 200	108 200
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	1 036 277	1 014 000	88 700 8.75%	6 300 0.62%	95 000 9.37%	1 109 000	1 220 000
Source of funds:							
Operating Fund I	280 967	195 000	4 000 2.05%	(60 000)[a] (30.77)%	(56 000) (28.72)%	139 000	-
Regular Budget	755 310	819 000	84 700 10.34%	66 300 8.09%	151 000 18.43%	970 000	1 220 000
TOTAL	1 036 277	1 014 000	88 700 8.75%	6 300 0.62%	95 000 9.37%	1 109 000	1 220 000

(a) Transfer of $ 60 000 to the Regular Budget.

Summary of manpower

Table 23

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	-	-	-	-	-
P-5	5	5	-	5	7
P-4	10	11	-	11	9
P-3	7	7	-	7	7
P-2	6	6	-	6	6
P-1	1	1	-	1	2
Sub-total	29	30	-	30	31
GS	53	53	-	53	55
M&O	19	19	2	21	23
TOTAL	101	102	2	104	109

Highlight summary

V.7.1. This part of the programme covers the work of the Agency's Laboratory at Seibersdorf, which includes the Sections of Metrology, Chemistry, Agriculture and Electronics, and of those parts of the Laboratory installed at the Agency's Headquarters which deal with medical applications, hydrology and dosimetry. The work done by the various Laboratory sections is largely aimed at supporting other programmes of the Agency. A thorough review of Laboratory activities was carried out in October 1968 by a group of scientific and administrative experts and their recommendations have been borne in mind in developing the programme proposals.

V.7.2. It is expected that by 1973 the Agency's safeguards programme will have reached a high level of activity and that the Laboratory will be required to carry out reference analyses of fissile materials consisting of uranium, plutonium and, perhaps, small samples of irradiated fuel; to look after the maintenance and calibration of electronic equipment used in safeguards work; and to perform some development work on such equipment.

V.7.3. With the existing plutonium facility at Seibersdorf, which is not equipped with beta-gamma shielding, not more than double the present workload can be handled. It is estimated that for safeguards work it will be necessary to extend the area of the Laboratory by about 500 m^2, of which 300 m^2 – with the necessary ventilation and shielding – will be required for chemical and physico-chemical analyses and 200 m^2 for physics and electronics. It is

estimated that the cost of the extension, excluding the cost of equipment, will be approximately $500 000.

V.7.4. The costs of operation of the Laboratory are expected to increase by $95 000 in 1971, which represents an increase of 9.37% over the 1970 approved level. Of this amount, $88 700 or 8.75%, results from general price and salary increases. In addition to the normal increases for emoluments of staff, there are fairly substantial increases in the costs of supplies, materials, utilities, etc., which are required for execution of the programme.

V.7.5. Programme increases in 1971 are expected to amount to only $6300, to cover the addition of two M & O staff members for building maintenance, plus some increase in overtime pay in respect of experiments which require attention during other than normal working hours. The preliminary estimates for 1972 foresee the employment of three additional GS and two M & O staff members, and the upgrading of two P-4 staff members to the P-5 level and one GS staff member to the Professionl level.

V.7.6. In accordance with the plan initiated in 1970 it is proposed to complete the transfer of Laboratory costs from Operating Fund I to the Regular Budget by the end of 1972. A second transfer of $60 000 is proposed for 1971, which is comparable with the initial transfer made in 1970. This will leave a final transfer of approximately $63 000 for 1972.

Programme

V.7.7. The main activities to be carried out at the Laboratory during 1971-76, namely, metrology, chemistry, agriculture, medical applications, radiation dosimetry, hydrology and electronics, are outlined below, emphasis being placed on the programme for the biennial period 1971-72.

Metrology

The programme for 1971-72

V.7.8. The Laboratory's work in metrology consists of providing services to Member States and to other units of the Agency in the accurate assay of radionuclides, nuclear spectroscopy and the preparation of radioactive sources. These services include:

(a) Distribution of standardized radioactive sources. These sources are needed in gamma spectrometry, preferably with Ge(Li) detectors, a technique now used in many branches of science. Because of the demand for calibrated gamma sources for gamma spectrometry, this service will continue for some time, although most of these sources are now commercially available. However, a shift to other gamma emitters is expected. A calibration method for ^{3}H and ^{14}C standards is being developed which may provide greater precision than is possible with the methods now used;

(b) Distribution of materials for reactor neutron fluence measurements. The ^{32}P production by the (n, p) reaction makes the evaluation of the fast neutron fluence possible. The supply of monitors and standards for monitoring the flux of thermal and fast neutrons will continue in 1971 and 1972. Routine methods of measuring neutron flux densities in reactors are normally carried out with reactions yielding radionuclides with half-lives of a few days or less (e.g. ^{198}Au, ^{116}In, ^{56}Mn, ^{31}Si). It is not possible to supply calibrated standard sources of these nuclides and consequently standards with gamma energies near to those of the nuclide produced by the reaction will be prepared and offered (e.g.: ^{113}Sn : E = 393 keV for ^{198}Au : E = 410 keV and/or for ^{119m}In : E = 335 keV). It is planned to supply targets with fissionable material together with appropriate recording foils and to count automatically the number of fission fragment tracks on request. For flux density and flux spectra measurements of thermal, intermediate and fast neutrons, small quantities of high

quality materials are necessary. It is planned to have a stock of very pure materials at the Laboratory which will be available to reactor institutes in Member States;

(c) Comparison and preservation of radionuclides calibration standards. At present, standards of the many different radionuclides, produced at different times and places, are rarely compared. The Agency Laboratory can help by setting up instrumentation for relative measurements with excellent long-term stability, giving considerably greater precision than instruments for the absolute calibration in terms of disintegrations. Standardizing laboratories can then send samples for comparison with long-lived Agency standards. A high-reproducibility electronic system has been developed for a high-pressure 4π gamma-ionization chamber, and is being tested for long-term stability. A 2π beta proportional counter for liquids has been developed and will be tested extensively. The following specialized laboratories have agreed to co-operate with the Laboratory: National Physical Laboratory, Teddington; National Bureau of Standards, Washington; National Research Council, Ottawa; Central Bureau of Nuclear Measurements of EURATOM, Geel (Belgium); Laboratoire de Métrologie de la Radioactivité, Saclay. Calibrated samples of gamma-emitting radionuclides should begin to arrive early in 1971; by 1972 many different calibrations will be registered. Somewhat later, the instrumentation for the assay of medium- and high-energy beta emitters will be ready. Spectrometric methods for determining small alpha-, beta- and gamma-emitting impurities in the solution samples must be developed; and

(d) Work for the Department of Safeguards and Inspection. To date, some calibrated sources of alpha and gamma emitters have been prepared for calibrating and checking instruments. The ^{3}H content of heavy-water samples from Japan and Norway has been determined; it seems, however, that the ^{3}H build-up in the heavy-water moderator is not a suitable measure for the integrated power. A portable gamma spectrometer to determine the ^{235}U and ^{238}U content of fuel elements has been tested. The demand for calibration sources is expected to increase, and participation in the training of future inspectors is foreseen. Instrument testing and development of new assay methods will be required.

The programme for 1973-76

V.7.9. The programme carried out during the period 1971-72 will, in general, be continued.

Chemistry

V.7.10. Pending a decision on the extent of the effort that the Laboratory should devote to safeguards analysis, work will continue in 1971 and 1972 at the same level as in 1970, the tasks being similar to those performed in 1969-70, i.e. preparation of standard samples for submission during inspections; familiarization with suitable methods of analysis for uranium and plutonium in various forms, and analysis of some of the samples obtained from inspections for control purposes. The effort which can be devoted to plutonium analysis is limited by the space available.

The programme for 1971-72

V.7.11. It is expected that laboratory staff will participate in panels and meetings on safeguards subjects and, on some occasions, in inspections and that they will continue to perform bioassay for plutonium for the Agency's inspectors.

V.7.12. The work begun in 1970 on the atomic absorption method for determining the isotopic composition of uranium for safeguards purposes should show by 1971 whether it is feasible to develop a small-sized instrument for this purpose. If this proves practicable, its further development for field use will follow in 1972 and 1973.

V.7.13. The analytical quality control programme will be continued; analytical intercomparison will be organized for laboratories in Member States and analysed samples issued to them. The following activities will be covered:

(a) Low-level radionuclides determinations in environmental and biological materials;

(b) Trace element determinations by activation analysis and other nuclear techniques in materials of economic, medical or forensic interest;

(c) Analysis by isotopic methods of agricultural and food material containing toxic compounds such as mercurials and pesticides;

(d) Analysis of raw materials for nuclear fuel and reactor technology; and

(e) The use of radionuclide dating techniques.

V.7.14. This programme will be carried out in close co-operation with other international organizations. In 1972, it is planned to convene a panel of experts to advise on the direction the programme should take in the following years.

V.7.15. As in past years, the Laboratory will assist WHO and FAO by providing advisory and analytical services in dealing with problems relating to the contamination of man's environment. Shifts of emphasis in the work will necessitate the provision of assistance in tracer experiments on the fate of pesticides, herbicides, etc. in field crops. Subject to the availability of funds, a training course on the use of isotopes in pesticide investigations may be held at the Laboratory in 1972 in co-operation with the Joint FAO/IAEA Division.

V.7.16. The provision of analytical services for the determination of ^{15}N by mass spectrometry and by emission spectroscopy will continue; however, the increasing emphasis on protein quality in crop production will mean that the emission spectroscopic method will play a more important role.

V.7.17. Investigations have been made for the co-ordinated research programme on geochemical and geobotanical prospecting, which is based on activation analysis and is designed to assist in the utilization of reactors. The object is to allow research contractors to start work immediately on local problems without spending undue time on investigations of methods; this programme is expected to be extended into 1972.

V.7.18. The demand for the analysis of samples from uranium and thorium prospecting in 1969-1970 has led to the provision of a semi-routine service to both Agency and United Nations experts. Services will continue to be offered to Member States and United Nations organizations in addition to other departments of the Agency.

V.7.19. Training, particularly "in-service" training, will continue to be provided in subjects for which the Laboratory is suitably staffed and equipped.

V.7.20. It is hoped to hold a course on forensic activation analysis in 1971, subject to the availability of funds.

V.7.21. A training course on the bioassay of radionuclides, originally planned to be held at the Laboratory in 1970, could not be financed in that year; it is now proposed to hold this course in 1972, subject to the availability of funds.

The programme for 1973-76

V.7.22. It is evident that the safeguards work will have a considerable influence on the work-load if the Laboratory is to be used extensively for the preparation, analysis and control of plutonium samples.

V.7.23. Changes in the analytical quality control programme will depend on the prevailing situation and on the needs of Member States. It is expected that new reference materials will be required for neutron activation analysis, particularly for forensic purposes and for the determination of pesticide residues. The number of requests for ore analyses is expected to increase.

V.7.24. Subject to the availability of funds, a training course on uranium analysis in ores might be held in 1973.

Agriculture

Crop nutrition

V.7.25. The Laboratory will continue to support co-ordinated programmes by preparing labelled fertilizers, by carrying out isotope analyses of plant and soil samples from field experiments, by carrying out preliminary field and greenhouse studies relevant to co-ordinated field programmes, and by providing guidance and training in the application of nuclear techniques in soil and plant nutrition studies.

The programme for 1971-72

V.7.26. Activities will include:

(a) Preparation and distribution of ^{15}N- and ^{32}P-labelled fertilizers to contractors in the co-ordinated wheat programme; analyses of ^{15}N and ^{32}P in plant samples from contractors' experiments, involving the study of effective methods of fertilizer placement, time of application and type of fertilizer; and field and greenhouse experiments with wheat for future field programmes;

(b) Preparation of labelled fertilizers and analysis of ^{15}N and ^{32}P in plant samples for contractors in the co-ordinated rice production programme, which involves studies of water management and nitrogen fertilizer practices in relation to the efficiency of fertilizer nitrogen utilization by rice;

(c) Preparation of glass ampoules labelled with ^{32}P for injection experiments in the programme on tree-crop fertilization which will terminate in 1971. In addition, ^{32}P-labelled fertilizer will be prepared and distributed to the contractors and ^{32}P analysis of leaf samples from co-ordinated field experiments will be carried out; and

(d) Continuation of studies on specific aspects of the nitrogen cycle in soils within the framework of the co-ordinated research contract programme on nutrient movement and supply in soil systems, and ^{15}N analysis of samples by means of mass spectrometry and emission spectrometry.

V.7.27. A co-ordinated programme on the efficiency of conversion of fertilizer nitrogen into grain protein will be initiated in 1971, with emphasis on the environmental, soil and plant physiological control of protein production. The Laboratory will service this programme with regard to ^{15}N analyses and methodology studies for the determination of microgram quantities of nitrogen in organic plant fractions; comparative greenhouse, growth chamber and field studies will be carried out.

V.7.28. In 1971 a co-ordinated research contract programme on the effect of irrigation régimes on fertilizer management practices will be initiated. Fertilizer labelled with ^{15}N and ^{32}P will be prepared and distributed, and analysis of ^{15}N and ^{32}P in soil and plant samples will be carried out for contractors.

V.7.29. The Laboratory will also continue to carry out routine analyses of radioactive and stable isotopes in soil and plant material at the request of institutes in Member States for technical assistance programmes and for UNDP(SF) projects.

The programme for 1973-76

V.7.30. The wheat fertilization programme will terminate in 1972 and will be replaced by a new programme, involving the use of labelled fertilizers in a number of other important agricultural crops. Studies involving the use of ^{14}C will be initiated to investigate photosynthesis in relation to productivity. Preliminary laboratory, greenhouse and field trials will be carried out prior to the initiation of new co-ordinated programmes.

V.7.31. The co-ordinated programmes on rice, protein and fertilizer-irrigation interactions will continue to be serviced through distribution of labelled fertilizers, analysis of isotopes in soil and plant material and laboratory greenhouse and field experiments.

V.7.32. The rice programme will terminate in 1974 and will probably be replaced by a closely related project on rice cultivation. The fertilizer-moisture interaction programme will terminate in 1976 and will be replaced by a related programme after a review by a panel of experts. A co-ordinated programme on forestry is likely to involve the provision of laboratory services for ampoule production, fertilizer distribution and analysis of isotopes in leaf samples.

V.7.33. It is expected that a new co-ordinated programme on the use of isotopes in oligo-element nutrition will be initiated. Preliminary investigations, including activation analysis procedures for this programme, will be carried out and the Laboratory will service fertilizer distribution and routine analysis of samples for contractors.

V.7.34. A reorientation of the programme on protein production is expected in 1975, with increased emphasis on the study of the effects of soil and environmental factors on protein production of crops. The Laboratory will continue to service this programme.

Plant breeding

V.7.35. The major emphasis in the plant breeding work will be placed on the use of mutation breeding techniques for major cereal and legume crops. Protein and essential amino-acid content and pest and disease resistance will be the main subjects of the mutation breeding programme, carried out in co-operation with the Joint FAO/IAEA Division.

The programme for 1971-72

V.7.36. The work on the development and testing of efficient methods for mutation induction in crop plants will be continued. As satisfactory methods have now been established for cereals, emphasis in 1971-72 will be placed on protein crops, forage crops and vegetable crops. Special attention will be paid to the development of methods for vegetatively-propagated plant species.

V.7.37. The Laboratory will provide special services for the FAO regional programme and other co-ordinated projects in the Near East on barley improvement by breeding. The main objective of the laboratory work will be to develop mutant screening techniques for the improvement of agronomic plant characters. The Laboratory will also continue to provide the necessary services for the co-ordinated wheat programmes in the Near East and Latin America. The development of efficient mutant screening techniques for resistance to stem rust (Puccinia spp.) and blotch (Septoria spp.) will be one of the most important objectives in the wheat project.

V.7.38. Laboratory services for mutagen treatments and mutant screening techniques will be increasingly needed for the co-ordinated programme on rice improvement by induced mutations.

V.7.39. The co-ordinated neutron seed irradiation programme will be carried on in 1971-72 and the continuation of related laboratory services is essential. In the past these have related mainly to neutron dosimetry and neutron radiosensitivity; the main emphasis

in the future will be on genetic effects and the efficiency of neutrons in producing useful mutations in crop plants.

V.7.40. A co-ordinated programme of research on the use of isotopes and radiation in breeding for disease and pest resistance will be initiated in 1971, and laboratory services will be required; the induction of mutations with improved resistance is a valuable approach to the production of disease-resistant varieties.

V.7.41. Radiation treatment of seeds will be continued in order to provide services for research contractors under the low-radiation-dose programme, the co-ordinated mutation research projects, technical assistance and UNDP projects, and national institutes in Member States.

The programme for 1973-76

V.7.42. During this period certain activities will be reduced, in particular the neutron seed irradiation programme and several crop-oriented co-operative programmes financed from non-Agency sources. These programmes will be replaced by others in which emphasis will be placed on the use of mutant screening methods for biochemical factors which determine pest and disease resistance, levels of enzymes which limit photosynthetic efficiency in plants and genetic factors that regulate biosynthetic mechanisms of crop plants.

V.7.43. The Laboratory will continue to support co-ordinated mutation breeding programmes in developing quantitative screening methods for genetic and physiological factors, in particular the use of automated analytical equipment.

Entomology

V.7.44. The programme aims at providing data relevant to the sterile insect release method of controlling or eradicating pest species of insects and Acarina. Depending on the stage of development of the method for a particular pest species, the Laboratory research work may be concentrated on any of the following: mass rearing; radiation sterilization; methods of marking released insects; and methods of releasing sterilized insects.

The programme for 1971-72

V.7.45. During this period work on the Mediteranean fruit fly will be phased out, since all necessary mass-production, sterilization and marking problems are expected to be clarified, but some services will continue to be provided in support of a proposed large-scale eradication programme in Central America.

V.7.46. Work will be intensified in 1971-72 on methods of mass production of olive flies for field programmes; sterilization studies should be completed during this period.

V.7.47. The techniques involved in mass rearing of the tsetse fly, in which artificial membranes and artificial diets are used, will be developed, and sterilization and release studies with Glossina morsitans and other economically important species will be undertaken.

V.7.48. Research into techniques for mass rearing of the codling moth suitable for developing countries will be continued and intensified, especially in regard to the use of sub-sterilizing radiation dosages to assess the effect of inherited partial sterility for the control of this pest.

The programme for 1973-76

V.7.49. Since experimental work with the Mediterranean fruit fly will be terminated in 1971-72, the period 1973-74 will be mainly devoted to training of fellows and rendering assistance to developing countries engaged in projects related to the control of this insect.

V.7.50. Work on techniques for mass production of species of tsetse flies other than Glossina morsitans will continue, as will sterilization studies of economically important species. Sterilization studies on the olive fly should be completed in 1971-72. Further work on mass-production techniques will, however, be required. With regard to the codling moth, studies with partially sterile insects will probably be initiated to test this method of control in the field; research on mass production will continue.

V.7.51. New projects involving other potential candidates for the sterile insect release method may be initiated during this period, and training of fellows from developing countries will continue.

Medical applications

V.7.52. This programme supports the work of the Medical Applications Section of the Division of Life Sciences, including the development or adaptation of new techniques for measurement of radionuclides as required in the research contract programme, the preparation of reference materials or procedures for use in interlaboratory comparisons, the analysis of samples arising from the research contract or technical assistance programmes, the provision of training, and collaboration in the organization of meetings. In addition, selected services are provided for other units of the Agency's Laboratory.

The programme for 1971-72

V.7.53. Support will continue to be provided for the joint IAEA/WHO co-ordinated research programme on iron nutrition. Activities will include:

(a) The development of whole-body counting techniques and the provision of simple whole-body counters required by laboratories studying absorption of food iron with the aid of ^{59}Fe;

(b) The testing and adaptation of alternative methods for assay of ^{55}Fe required by laboratories studying iron absorption with this isotope;

(c) The assay of ^{55}Fe in blood or other samples, as part of a service for other laboratories or of inter-laboratory comparison of techniques; and

(d) The testing of the purity of iron radioisotope preparations, and of the homogeneity of labelled foodstuffs.

V.7.54. Support will also continue to be provided for the co-ordinated research programmes on medical applications of activation analysis. It is foreseen that these programmes will be expanded and diversified as chemical and physical analytical techniques continue to be refined and more research reactors come into operation. Specific laboratory activities are expected to include:

(a) Provision and testing of analytical reference materials, such as blood plasma, liver and bone, for comparison of assay techniques among collaborating laboratories;

(b) Development or adaptation of instruments and techniques required for special elements or samples, or by particular laboratories;

(c) Analysis of samples collected in the collaborative WHO/IAEA study of the role of trace elements in cardiovascular diseases; and

(d) Analysis of samples in other collaborative programmes with WHO, the International Agency for Research on Cancer, and laboratories in Member States, including the role of trace elements in malnutrition, cancer, and other conditions.

V.7.55. The whole-body counter will continue to be used in various applications. As a service to the Agency's Laboratory and other programmes, such as safeguards inspections, analysis of personnel for possible contamination will be made. The use of techniques and instruments for the assay of ^{239}Pu in the lungs may be introduced in collaboration with the Division of Health, Safety and Waste Management. Improved techniques for assay of ^{59}Fe will continue to be examined for the co-ordinated research programme on iron nutrition.

V.7.56. Support will be provided for collaborative studies of scintigraphic techniques, particularly the application of computers to data processing and the preparation and distribution of phantoms required for such studies.

V.7.57. It is probable that laboratory work will be required in conjunction with and support of in vitro assay methods. In particular, reference materials for inter-laboratory comparisons and standardization may need to be distributed, and service analyses may be requested.

V.7.58. Training will be provided as facilities permit; there may be numerous opportunities for training in conjunction with the co-ordinated programmes on medical applications of activation analysis.

The programme for 1973-76

V.7.59. Most of the programmes under way in 1971-72 will be continued well into the period 1973-76, with varying emphasis in line with the progress made. The co-ordinated research programme on iron nutrition is likely to focus attention on iron supplementation of the diet and on tests necessary to evaluate its effectiveness; new radioisotope procedures may have to be developed or adapted. The co-ordinated research programmes on medical applications of activation analysis will continue, and there will be many opportunities to diversify the technique or application.

Radiation dosimetry

V.7.60. This programme is organized to complement the activity of the Dosimetry Section in the Division of Life Sciences. The main objectives are to provide support for the work of the dosimetry laboratories in Member States and selected services for other units of the Agency. Moreover, the Laboratory will serve as an international training and reference laboratory for dose calibration, in particular for the secondary regional reference centres to be established in co-operation with WHO. The Laboratory now possesses the facilities necessary to give the required support to the dosimetry programme.

The programme for 1971-72

V.7.61. The 3000-curie ^{60}Co source will serve for calibration of dosimeters used by Agency experts in the field in terms of exposure or absorbed dose. This service will also be offered to consultants or scientists participating in panels and symposia. Such measurements will be made at short notice so that they can be completed during the scientist's stay in Vienna.

V.7.62. The ^{60}Co source is available for calibration and comparison required for radiation protection purposes.

V.7.63. The Fricke dosimeter system for postal intercomparison will be made available, on request, for comparison or calibration of other dosimeters in high energy electron beams.

V.7.64. The ionization chambers will be used extensively for comparison measurements in the Laboratory itself and between laboratories of Member States. Upon request, one parallel electrode chamber together with a Townsend compensation system will be put at the disposal of the interested institute for comparison measurements.

V.7.65. The graphite calorimeter constructed in the Laboratory serves as an internal primary standard; all other dosimeters in the Agency can be easily calibrated in terms of absorbed dose.

V.7.66. All the dosimeters mentioned above can be used for high precision comparison measurements between national standard laboratories. As outlined in the dosimetry programme, the thermoluminescence and chemical dosimetry projects will be supported by the Laboratory.

V.7.67. The Laboratory will also participate with the Dosimetry Section in training scientists from Member States. The training programme includes experimental measurement with the dosimeters mentioned above in the ^{60}Co beam and the evaluation of such experiments.

V.7.68. The Laboratory also provides institutes in Member States with advisory services concerning, for example, proper construction of ionization chambers, Fricke dosimeters, and evaluation of readings.

The programme for 1973-76

V.7.69. The projects mentioned above for 1971-72 are of a long-range nature, and it is expected that they will continue beyond that period. With the increasing number of secondary reference laboratories and the growing demand for the provision of services to Member States, no decrease in the workload can be expected.

Hydrology

V.7.70. The work done by the Hydrology Laboratory forms an integral part of the Agency's work on the use of isotopes in hydrology and permits advice and services to be rendered to Member States. Its main objectives are:

(a) To provide analytical services for measuring tritium, carbon-14, deuterium and oxygen-18 in natural waters;

(b) To develop improved analytical methods, including the intercomparison of environmental isotopes; and

(c) To carry out field demonstrations and provide experimental services.

V.7.71. In 1969 an international inter-laboratory comparison of tritium measurements was completed and a similar inter-laboratory comparison for oxygen-18 and deuterium mass spectrometer results was initiated. An intercomparison of carbon-13 laboratory measurements in continuing.

V.7.72. Because of the Agency's leading role in the application of isotope techniques in hydrology and because Member States use the Laboratory as a model for isotope laboratory facilities of their own, it is essential to maintain high standards in both equipment and performance. This necessitates the replacement of obsolete equipment as appropriate, as well as the training of laboratory personnel in new methods from time to time.

V.7.73. In 1969, despite the fact that some analytical work for the Agency and WMO was transferred to other laboratories, the demand for tritium and carbon-14 analyses increased. Samples for at least 12 projects in Member States were analysed. Improvements were made in the Laboratory's gas counting systems and an additional proportional counter was installed. The gas preparation line was also improved. Training in laboratory techniques is a continuing function.

The programme for 1971-72

V.7.74. In addition to continuing the Laboratory's analytical work, the programme will provide for an expansion of demonstration and experimental services; this will require ad-

ditional portable isotope measuring equipment. The need for the provision of advisory services to newly established national laboratories is expected to increase.

The programme for 1973-76

V.7.75. The programme for 1973-76 will probably require continued expansion of advisory services for other national laboratories. Otherwise it is expected to continue with little modification. It is hoped that some developing countries will develop their own capability to perform analytical services.

Electronics

The programme for 1971-72

V.7.76. The Electronics Section's work will include the development and installation of automated measuring equipment, control and programme units, and interface and peripheral equipment for small laboratory computers and multi-channel analysers. In addition, sub-units for commercial counting equipment to increase high count rate performance and reduce the need for corrections will be introduced, and an effort will be made to increase the stability and performance of various types of equipment by using micro-electronic circuits.

The programme for 1973-76

V.7.77. The activities carried out will probably be the same as in 1971-72 except that greater emphasis will be placed on automation. The techniques employed will be influenced by micro-electronics.

V.7.78. Several small computers may be used. To use these instruments on-line, much interface and peripheral equipment will be necessary. All equipment will be transistorized, so that service time may be reduced and technicians can service the computers if they are specially trained for this purpose.

V.7.79. Budgetary requirements should remain more or less constant. A slight increase in expenditure on scientific supplies will be necessary for work relating to safeguards.

Budget estimates

Explanation of major cost changes in 1971

V.7.80. As shown in Table 22, the cost of the Laboratory programme is expected to increase by $95 000 in 1971 over the approved level for 1970. Of this increase, $88 700 is due to increased emoluments of existing staff and increased price levels for supplies, materials, services and utilities. A minor increase of $6300, or 0.62%, is also requested for programme increases.

V.7.81. The programme increase is made up of $1500 for increased overtime for GS and M & O staff required to work at night or on holidays and week-ends to service experiments carried out in support of the entomological and crop nutrition programmes.

V.7.82. In addition, it is proposed to employ two additional M & O staff members for the purpose of building maintenance. The expansion of the facilities at the Laboratory at Seibersdorf since 1961 has created serious difficulties for the supporting and maintenance staff, and these two additional unskilled workers will be urgently needed in 1971 because of the increase in the maintenance work. Unskilled workers are responsible for routine cleaning, stores handling, small repairs, etc., and in addition, they assist in maintenance and in much of the routine work of the scientific staff, thus allowing the latter to concentrate on more important duties.

FIGURE 16

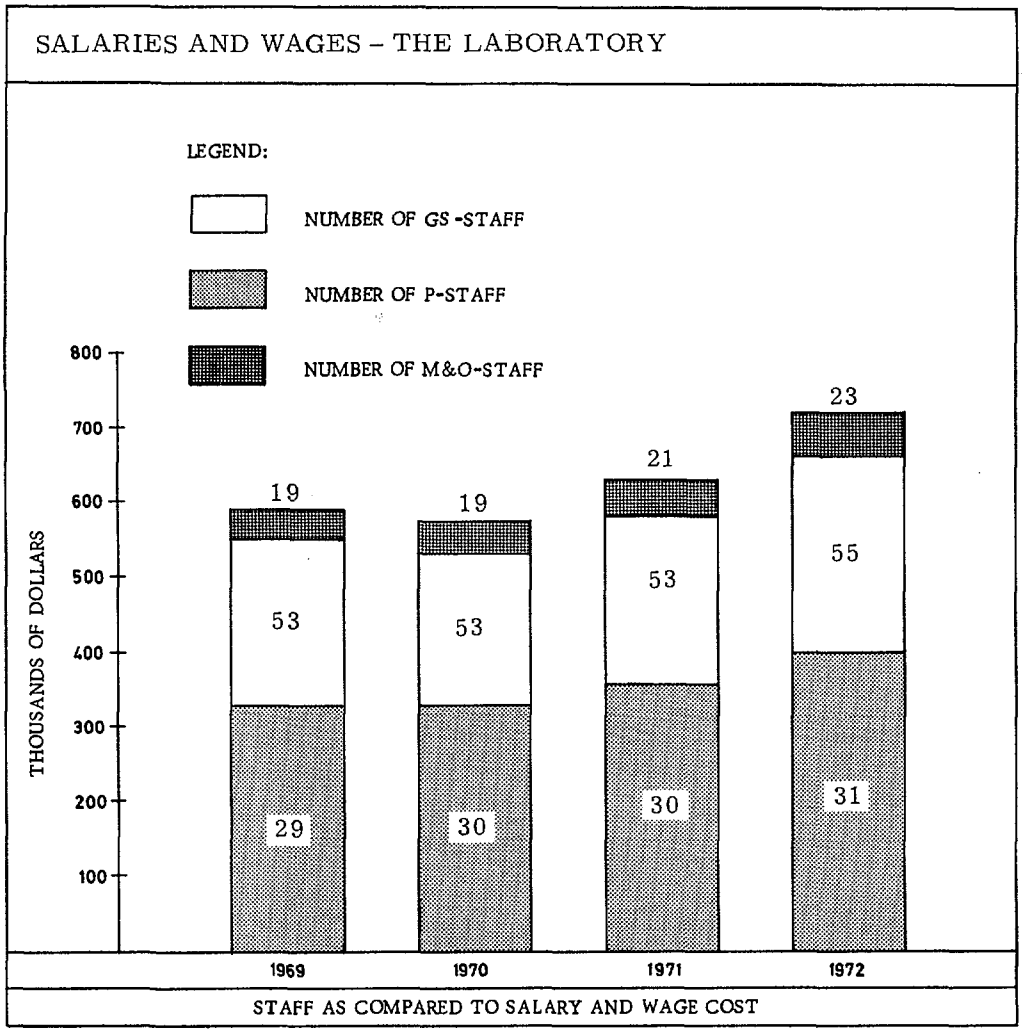
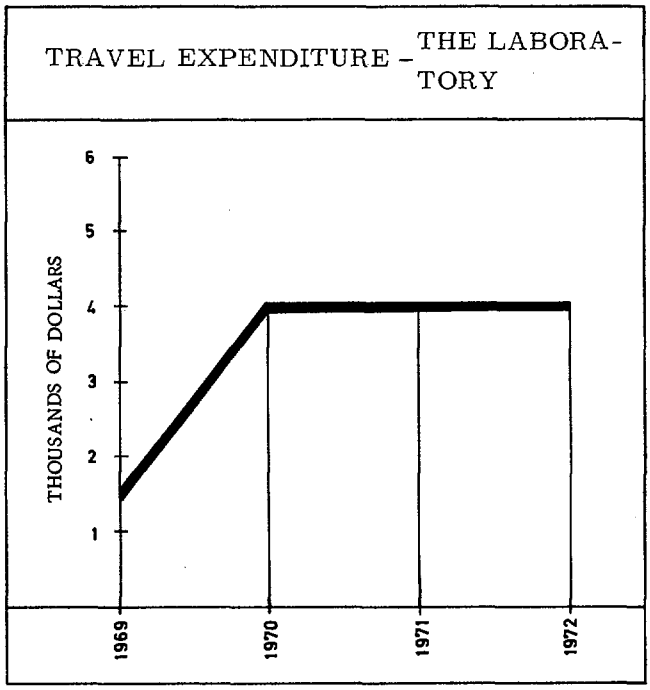


FIGURE 17



V.7.83. Regular Budget. Following the transfer of more of the costs of the Laboratory from Operating Fund I to the Regular Budget in 1971, the net increase in Regular Budget support of this programme will be $151 000, of which $84 700 represents salary and price increases, $6300 programme increases, and $60 000 the amount of programme costs transferred from Operating Fund I.

V.7.84. Operating Fund I. The cost increases will amount to $4000 in respect of the Operating Fund I portion of this programme, and consequently the $60 000 transfer to the Regular Budget will result in a net reduction of $56 000 in the charge to Operating Fund I in support of the Laboratory programme in 1971.

Preliminary budget estimates for 1972

V.7.85. For 1972 it is anticipated that the Laboratory programme will require total cost increases of about $111 000. Of this amount, $96 000 pertains to salaries and wages and common staff costs to cover normal increases, reclassifications of posts, and the employment of five additional GS and M & O staff members.

V.7.86. It is proposed to regrade two P-4 posts to the P-5 level in the Entomology and Plant Breeding Sections respectively. It is also proposed to regrade one GS post to the P-1 level in the Plant Breeding Section because of the qualifications required, and to establish three additional GS posts and two additional M & O posts in 1972. Two of the additional GS staff members are needed to cope with the increased work-load in the Agricultural Section and the third is needed for work relating to the cobalt source. The additional M & O staff members will consists of a plumber and an electrician needed to cope with increasing maintenance work-load.

V.7.87. The increases in 1972 include $5000 for a panel $8000 for additional scientific supplies and equipment and $2000 for common services, supplies and equipment.

V.7.88. The complete transfer of Laboratory costs to the Regular Budget in 1972 will result in total increases in expenditure under the Regular Budget amounting to about $250 000, partially offset by about $76 000 in income which is normally obtained as a result of reimbursable services provided by the Laboratory.

8. International Centre for Theoretical Physics

Summary of costs

Table 24

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	123 224	122 000	8 000	8 500	16 500	138 500	140 000
Common staff costs	21 073	27 000	1 000	1 000	2 000	29 000	29 500
Duty travel and missions	1 870	10 000	-	(5 000)	(5 000)	5 000	5 000
Meetings:							
Panels and committees	1 746	5 000	-	-	-	5 000	5 000
Seminars, symposia and conferences	53 190	60 000	-	-	-	60 000	60 000
Representation and hospitality	3 329	2 500	-	-	-	2 500	2 500
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	11 621	12 000	-	-	-	12 000	12 000
Common services, supplies and equipment	83 927	65 000	2 000	17 000	19 000	84 000	85 000
Publications and other information media	19 835	23 500	-	-	-	23 500	23 500
Other: Fellowships	32 589	47 500	-	(8 500)	(8 500)	39 000	40 000
Visiting scientists and lecturers	128 125	140 500	4 000	5 000	9 000	149 500	150 500
Associate members	40 909	25 000	-	50 000	50 000	75 000	75 000
Federated institutions	11 122	20 000	-	(8 000)	(8 000)	12 000	12 000
TOTAL	532 560	560 000	15 000 2.68%	60 000 10.71%	75 000 13.39%	635 000	640 000
Source of funds:							
Operating Fund I	412 715	410 000	15 000 3.66%	60 000 14.63%	75 000 18.29%	485 000	490 000
Regular Budget	119 845	150 000	-	-	-	150 000	150 000
TOTAL	532 560	560 000	15 000 2.68%	60 000 10.71%	75 000 13.39%	635 000	640 000

Summary of manpower

Table 25

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	-	-	-	-	-
P-5	1	1	-	1	1
P-4	1	1	-	1	1
P-3	1	1	-	1	1
P-2	1	1	-	1	1
P-1	-	-	-	-	-
Sub-total	4	4	-	4	4
GS	12	12	3	15	15
MO	5	5	(3)	2	2
TOTAL	21	21	-	21	21

Highlight summary

V.8.1. The International Centre for Theoretical Physics was established by the Agency in 1964 as a co-operative venture with the Italian Government to serve as a research and training centre for young theoretical physicists, especially those from developing nations. In 1967 the Board decided to continue this arrangement for an additional six years. With effect from 1 January 1970 a new arrangement was made whereby UNESCO and the Agency both contribute $150 000 annually to the Centre and the Centre is jointly operated by the Agency and UNESCO in collaboration with the Italian Government.

V.8.2. Under the present financial arrangements the Government of Italy contributes $250 000 annually and, as already mentioned, the Agency and UNESCO each contribute $150 000. Other contributions are all considered as special contributions to Operating Fund I for operation of the Centre, leaving only the $150 000 basic contribution of the Agency as a charge to the Regular Budget. No change in this amount is forecast for 1971 and 1972 because the agreement with UNESCO calls for a continuing contribution of this amount by each organization.

V.8.3. In addition to the three major contributions in support of the Centre, a special grant of $200 000 has been received during the period 1967-1970 from the Ford Foundation and it is anticipated that an additional three-year grant of $150 000 may be approved. Special contributions have also been received from several Member States and from other sources. An agreement with the Government of Sweden in 1969 resulted in a grant amounting in 1969 to $55 000 from SIDA in support of Associate Members and participants in the international training course in solid state physics. Because of these special grants it is foreseen that the total budget of the Centre will reach $635 000 in 1971 and $640 000 in 1972.

Programme

General

V.8.4. The programme of the Centre, in the financing of which UNESCO also participates, covers research and training for research in the main branches of theoretical physics: high- and low-energy physics, plasma physics, solid state physics and related disciplines. The Centre's functions are:

(a) To train young physicists for research, especially those from developing countries;

(b) To help in fostering the growth of advanced studies of theoretical physics, especially in developing countries;

(c) To conduct original research; and

(d) To provide an international forum for personal contacts between theoretical physicists from countries at all stages of development.

V.8.5. Since its establishment, the Centre has increased the work done for the benefit of developing countries. The experience gained in the first years has shown that it can do so, provided the necessary financial resources are available. With that end in view, the Centre will consolidate the work done during the first five years in providing training and opportunities to conduct research for scientists from both developing and developed countries, emphasis being placed on the needs of those from the developing countries.

V.8.6. The Centre's academic year is normally divided into two main sessions, one devoted to research and the other to an extended seminar leading to research.

The programme for 1971-72

V.8.7. The Centre plans to hold two extended seminars: one on theoretical nuclear physics at the beginning of 1971 and one on solid state physics at the beginning of 1972. At each of these, an international faculty of 20-25 lecturers will gather with 80-100 participants for a period of 10-12 weeks. Several Member States have already offered to act as host to such an extended seminar. The Centre proposes to hold one seminar in a developing country either in 1971 or 1972. In 1972 another seminar is proposed on mathematics and computer sciences.

V.8.8. The session devoted to research seeks to bring together a group of senior visiting scientists from developing as well as developed countries and a number of research fellows from developing countries for a period of six months or more.

V.8.9. The Centre proposes to concentrate its research session in 1971 on elementary particle physics and on nuclear physics. Mathematics and computer sciences, astrophysics and space physics are also proposed as subjects of research.

V.8.10. In view of the interest of developing countries in condensed matter physics, the Centre is planning to have a permanent group working on this subject from 1972 onwards. Other major areas of interest for the 1972 research session will be elementary particle physics, mathematics and computer sciences and nuclear physics.

V.8.11. The achievements of the Centre in providing facilities to scientists from developing countries to enable them to keep abreast of modern thought and developments, without leaving their home countries for the larger part of the year, has encouraged it to enlarge its "Associate Members" scheme. This effort of the Centre will be strengthened with the appointment of new Associate Members, who at the end of 1969 numbered 32.

V.8.12. Associate Members are entitled to spend from one to three months every year at the Centre at times of their own choosing, their fares and living expenses being paid by the Centre. Appointments are made normally for a three-year period.

V.8.13. A new scheme of "Junior Associates" was started in 1969. Under this scheme an annual sum of $200 is made available to young physicists (under 30 years of age) selected from participants in annual courses, to be spent on books, other scientific literature and copies of preprints or papers. Their appointment as Junior Associates is made for a four-year period, after which they become candidates for a full associateship.

V.8.14. Under the federated institutes scheme, an agreement is made whereby an institute may send physicists for a given number of days per year. Travel expenses are usually borne by the federated institutes, while the Centre pays a per diem allowance to scientists while in Trieste. There are now 20 federated institutes and their number is expected to remain at about this level in 1971-72.

V.8.15. Some of the scientifically advanced federated institutes have offered fellowships for short periods to physicists from developing countries. A similar offer has been made by the University of Heidelberg. It is foreseen that the junior physicists of the Centre will continue to take advantage of this opportunity in 1971-72.

V.8.16. An additional function of the Centre is gathering information about scientific development around the world and encouraging contacts and collaboration between groups and individual scientists to accelerate the development of scientific communities in developing areas, especially in Africa, Asia and Latin America. To this end a card index of physicists from, and working in, developing countries is maintained, from which it is proposed to compile an annually revised directory of such physicists, beginning in 1970-71.

The programme for 1973-76

V.8.17. The existing financial agreements with the Italian Government and with UNESCO in respect of operation of the International Centre for Theoretical Physics both expire in 1974. It is foreseen that a review of the activities of the Centre will be undertaken in 1973 and it appears probable that suitable arrangements will be made for its continuation along the same general lines as outlined above for the biennial period 1971-72. Based on the recommendations of a consultative panel which reviewed the programme and future of the Centre late in 1969, attempts will be made to make proper financial provision to cover the increases in costs that have been experienced by the Centre during the past few years.

Budget estimates

Explanation of major cost changes in 1971

V.8.18. The various price and programme increases as compared with 1970 which are anticipated for 1971 are shown in Table 24. The total increase amounts to $75 000, or 13.39%, above the 1970 level. Of this amount, $15 000, or 2.68%, represents price or salary increases and the balance of $60 000, or 10.71%, represents programme increases, most of which can be financed because of special grants from the Ford Foundation and SIDA.

V.8.19. As shown in Table 24, the total increases for salaries and wages and common staff costs amount to $18 500. Of this amount, $9000 is due to salary increases of existing staff, and the balance of $9500 represents programme increases, principally due to reclassification of three M & O posts to the GS level and the increased use of temporary assistance and consultants' services.

V.8.20. The emoluments of visiting lecturers and scientists are largely made up of daily subsistence allowances paid while they are in Trieste. Since these allowances have been increased in the past two years, namely from $12 to $16 per day, increased resources will be required to maintain the same level of scientific competence for the Centre's programme.

FIGURE 18

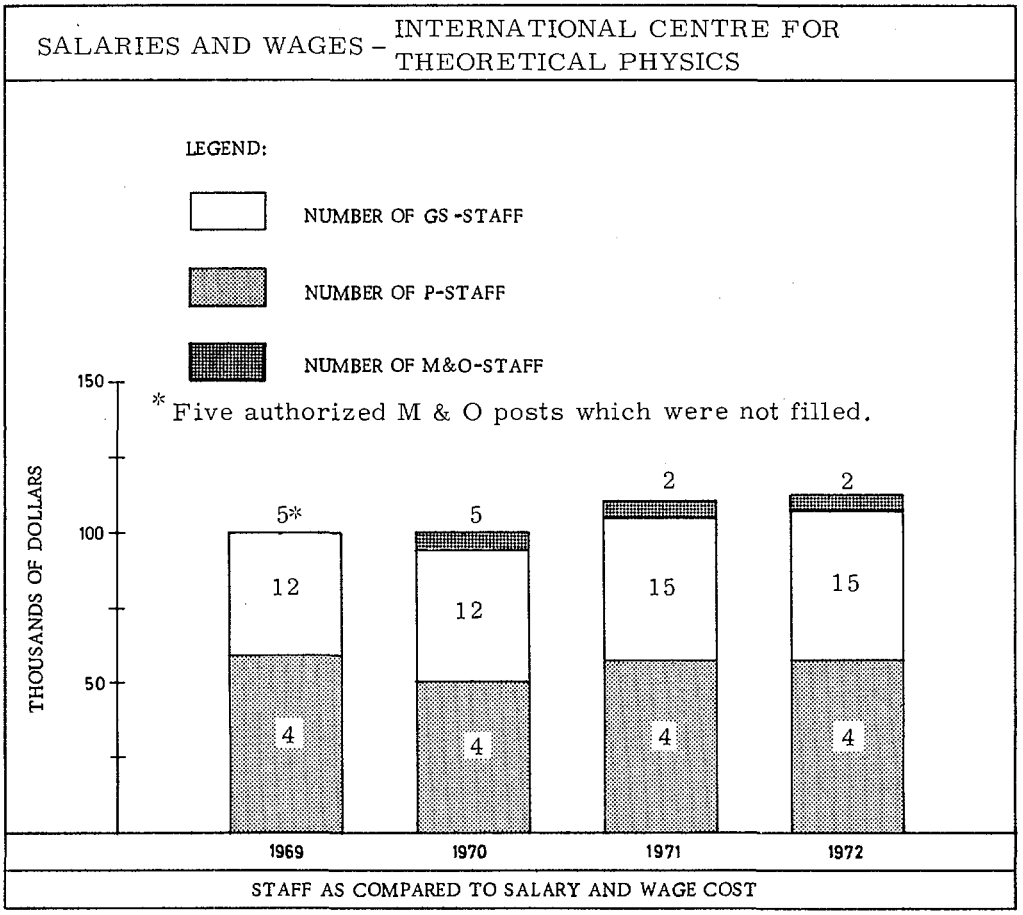


FIGURE 19

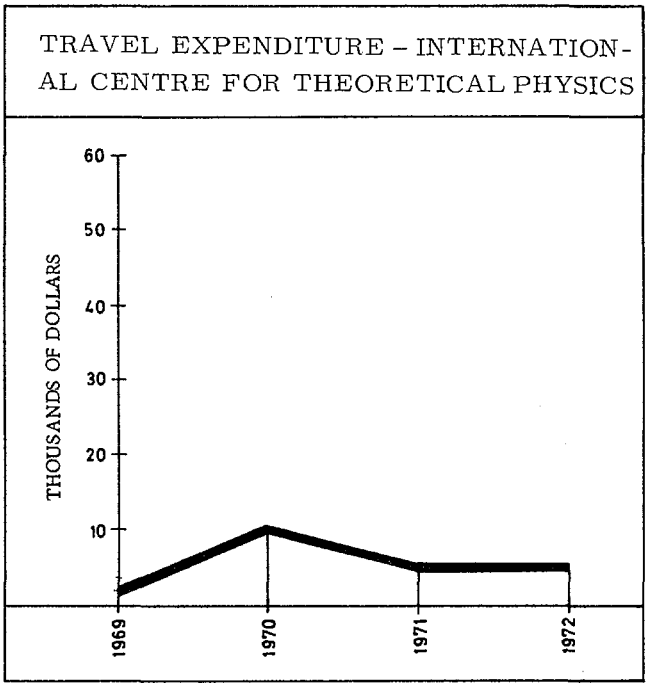
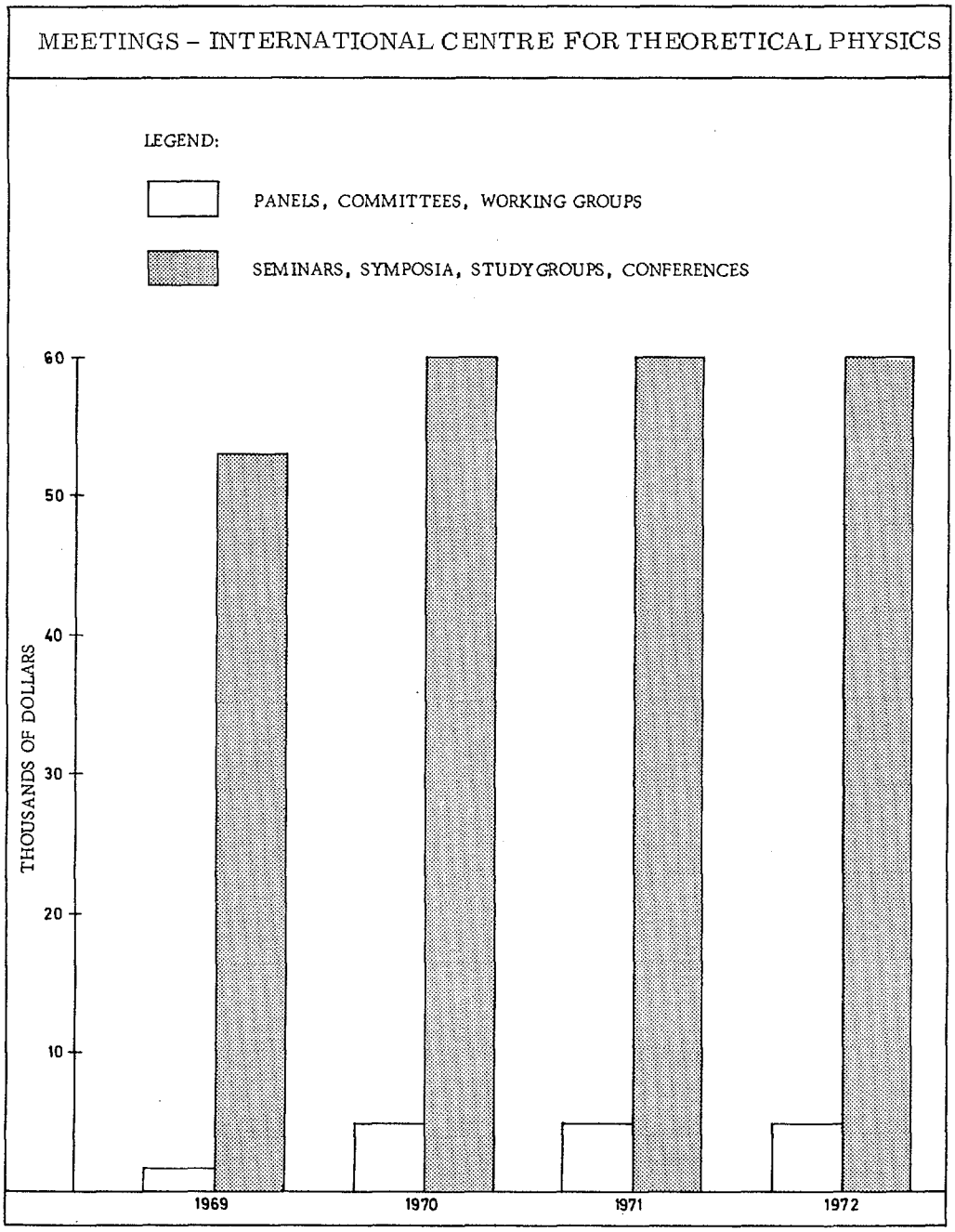


FIGURE 20



V.8.21. The increase in estimated costs for common services reflects actual experience during 1969, which was the first year of full operation of the Centre at the Miramare site. Experience has shown that the costs for utilities, building maintenance, cleaning, postage and transportation will be much higher than originally anticipated. Reductions have been proposed in the expenditures for fellowships and federated institutions to compensate for these higher costs.

V.8.22. Regular Budget. The Trieste Centre charges to the Regular Budget are expected to remain at the $150 000 level during both 1971 and 1972, unless arrangements are made with UNESCO to provide a special 3-5% increase to compensate for some of the increased costs of operation, as recommended by the consultative panel in November 1969.

V.8.23. Operating Fund I. The budget estimates for 1971 assume that income for the Centre under Operating Fund I will be as follows: $250 000 from the Italian Government; $150 000 from UNESCO; $50 000 from the Ford Foundation; $25 000 from SIDA; and $10 000 from other miscellaneous sources.

Preliminary budget estimates for 1972

V.8.24. The preliminary budget estimates for 1972 assume that the revenues from special contributions to Operating Fund I will be the same as in 1971 except for an increase of $5000 in the estimated miscellaneous income. No change in staffing or the general level of operation of the Centre is anticipated.

9. Nuclear power and reactors

Summary of costs

Table 26

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	343 349	367 900	7 400	(2 500)	4 900	372 800	411 100
Common staff costs	132 835	136 500	4 600	(1 000)	3 600	140 100	156 800
Duty travel and missions	16 887	20 000	800	-	800	20 800	22 500
Meetings:							
Panels and committees	32 674	40 000	-	-	-	40 000	40 000
Seminars, symposia and conferences	24 574	40 000	-	(26 000)	(26 000)	14 000	40 000
Representation and hospitality	1 018	1 600	-	-	-	1 600	1 600
Scientific and technical contracts	52 300	100 000	-	(5 000)	(5 000)	95 000	100 000
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	9 700	9 700	9 700	-
Publications and other information media	-	-	-	-	-	-	10 000
Other	-	-	-	-	-	-	-
TOTAL	603 637	706 000	12 800 1.81%	(24 800) (3.51%)	(12 000) (1.70%)	694 000	782 000

Summary of manpower

Table 27

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	1	-	1	1
P-5	10	11	-	11	11
P-4	7	6	-	6	6
P-3	3	3	-	3	3
P-2	2	2	-	2	2
P-1	1	1	(1)	-	-
Sub-total	24	24	(1)	23	23
GS	12	12	1	13	13
M&O	-	-	-	-	-
TOTAL	36	36	-	36	36

Highlight summary

V.9.1. This part of the programme covers the work of the Division of Nuclear Power and Reactors in the Department of Technical Operations. The Division's four sections are responsible for reactor engineering, economic studies, nuclear materials and fuel cycles, and reactor physics and research reactors. The Division provides Member States with advice and assistance in their reactor programmes or projects; evaluates the technical feasibility, design, technology and economics of various power reactor systems, as well as operational experience and its application to meet given needs; forecasts world energy needs and estimates the extent to which nuclear power is likely to meet these requirements; encourages the study of new applications of nuclear power, such as desalting, agro-industrial nuclear energy complexes, nuclear ship propulsion and space exploration; studies the production and processing of nuclear fuels; and assists Member States in the utilization of their research reactors. In addition, work on MHD nuclear fuel supply problems and the technology of peaceful nuclear explosions is carried out.

V.9.2. No increase in the number of staff is requested for this programme for 1971 and 1972; in fact, one P-1 post will be surrendered in 1971 and replaced by a GS post, resulting in some savings in salary costs. Total net costs of the programme are expected to decrease by $12 000 in 1971 because price and salary increases of $12 800 are more than offset by the replacement of the post referred to above, postponement of symposia in order to provide support for the Fourth Geneva Conference, and a minor reduction for research contracts. The only programme increase proposed for 1971 is for the acquisition of a calculating machine at an estimated cost of $9700. The preliminary estimates for 1972 provide for an increase of $88 000 over the 1971 level, primarily to cover additional salary and price increases, a minor increase in duty travel, restoration of the number of symposia programmes to the normal level, a minor increase in research contracts, and production of a training film.

Programme

General

V.9.3. Previously activities relating to power and research reactors have been largely concerned with the development of systems. It has now become more important to make use of the considerable amount of experimental and operational experience which has been acquired with several types of power and research reactors. In the future, activities which relate to reactor technology as a whole are expected to make way for programmes on specific problems of operation and on the relatively advanced systems and applications. Similarly, economic studies will concentrate on such specific tasks as forecasting the needs of developing countries and studying the availability of financing and impact of financing problems on nuclear power programmes. The work of forecasting will also be of importance in guiding activities relating to nuclear fuels and materials. In this connection it is clear, however, that world supplies of special ores must be increased and more prospecting in developing countries should be carried out. It is further expected that ores which are of such poor quality that the uranium can only be extracted as a by-product will become increasingly important, and that work on the technology of these processes will be a continuing part of the fuel programme.

V.9.4. By 1971, the preparation of the Reactor Directory and its associated Reactor Lists will be the responsibility of the Division of Scientific and Technical Information. To accommodate their workloads the full-time assignment of staff for the appraisal of fossil fuel costs will also be discontinued and replaced by consultants' services.

V.9.5. With regard to those parts of the reactor programme that are of primary interest to advanced countries, the permanent working groups that the Division has formed have been very successful in extending the Agency's role in co-ordinating research and development activities and encouraging the exchange of information at very little cost to the Agency. International working groups of this type are now studying the following subjects:

(a) Fast reactors;

(b) Reactor pressure vessel technology;

(c) Reactor radiation measurements; and

(d) Thorium utilization.

Similar working groups, co-sponsored by ENEA, are studying:

(a) Magnetohydrodynamics (MHD); and

(b) Uranium reserves and resources.

It is planned to form additional Agency working groups on:

(a) Heat and mass transfer; and

(b) Nuclear power plant control and instrumentation.

Other working groups may also be formed depending on the requirements of Member States and further co-operation with EACRP (ENEA) is expected.

V.9.6. Over the years the setting up of regional study groups has proved to be one of the most successful ways of stimulating reactor science and technology in developing countries.

V.9.7. It is proposed to convene a panel on mobile reactors, a panel on the financing of reactors, a consultants' meeting on prospecting instrumentation, and a training course on advanced prospecting techniques.

V.9.8. It is impossible to present in detail what the impact of increased safeguards activities upon the Division will be. In view of the paramount importance of the Division's technical activities with regard to reactors, the supply of fissionable materials and fuel fabrication, processing and reprocessing, it is to be expected that it will frequently be called upon to advise the Department of Safeguards and Inspection.

Reactor engineering

V.9.9. With regard to most of the advanced reactor systems and engineering, the Agency concentrates on compiling and correlating the results of the work performed in the countries most advanced in the use of nuclear energy, and disseminating the information throughout the world. Within the past few years the use of certain types of reactor systems, such as light-water reactors, graphite-CO_2 reactors and heavy-water reactors, has been commercially introduced on a large scale and the previous work of collecting information on design and development is no longer as urgent.

V.9.10. In reactor engineering the emphasis has shifted from exploratory, developmental and theoretical problems to questions of reliability, serviceability, and endurance and to the extension of the application of engineering experience into such media as liquid sodium and high-temperature helium. The work on such applications as desalting is continuing, nuclear ship propulsion is gradually receiving more attention, and it can be foreseen that the application of reactors in space will be a matter of international importance. In all these areas, the activities of the Division of Nuclear Power and Reactors with regard to technology and economics are complemented by the activities of the Division of Health, Safety and Waste Management with regard to safety.

Reactor systems

V.9.11. Emphasis will be placed on gathering and evaluating operating experience on established power reactor systems. With reference to advanced converters, emphasis will be placed on the development of heavy-water reactors, high-temperature gas-cooled systems, molten-salt reactors and other promising concepts.

V.9.12. Fast-breeder reactors will be the focus of attention in the early 1970s. Because of their potential for generating power at a very low cost, they are being allocated the major share of research and development funds in advanced countries, and even beginning to receive attention in the programmes of certain less industrialized countries.

V.9.13. Nuclear power has not yet had any appreciable impact on developing countries, where the need for low-cost energy is urgent. There are several reasons for this, the most important being that the cost of generating electricity increases more rapidly with decreasing unit size in the case of a nuclear plant than for a fossil-fuelled plant. Thus, one of the ways to speed up the introduction of nuclear power in developing countries is to promote the development of suitable medium-sized reactors.

The programme for 1971-72

V.9.14. The programme for fast reactors will again be drawn up in consultation with the International Working Group on Fast Reactors. A pattern of one working group meeting and two specialists' meetings per year will be established.

V.9.15. The annual review of operating experience with power reactors, initiated in 1969, will be a continuing task. In view of the large number of reactors to be commissioned soon, a major effort to improve the cataloguing of the information received will be necessary in 1971.

V.9.16. It is expected that an average of two missions per year will be required to advise Member States on nuclear power programmes and two more to advise on the specification and evaluation of bids for reactor systems. Training courses have been proposed to train

some of the people required to carry out the nuclear power programmes of developing countries. It is proposed to hold a course in the area of Asia and the Far East on the specification and evaluation of nuclear power plant bids in 1971, since several countries in that area will be establishing their first or second nuclear power station. For 1972 an interregional course on the evaluation and management of nuclear power projects is proposed. With the assistance of the Regional Economic Commissions of the United Nations, it is planned to hold one briefing per year for electrical experts in a developing region.

V.9.17. A panel on plutonium recycling in thermal reactors is scheduled for 1971. Although the panel will also deal with problems relating to reactor physics, nuclear materials and reactor economics, it will be primarily concerned with the technological consequences of plutonium recycling.

The programme for 1973-76

V.9.18. The convening of a symposium on fast-breeder reactors has been recommended for this period, and one of the subjects for discussion might be early operational experience with some of the prototype and test reactors now under construction.

V.9.19. It is also planned to hold a symposium on operating experience with standard types of light-water, heavy-water and gas-graphite reactors. Reporting of operating experience by the Secretariat will continue.

V.9.20. A symposium on gas-cooled reactors foreseen for 1972 in the 1969-74 programme [1] has been postponed until this period and a symposium on heavy-water reactors has also been planned [2]. These symposia are expected to deal with versions of reactor types that are still at the development stage. It is possible that the subjects proposed for the two symposia might be considered by a symposium on advanced power reactor types.

V.9.21. It is hoped that the work already carried out on small- and medium-power reactors will encourage supplier countries to demonstrate their ability to supply such plants. Efforts by the Agency to exchange information between potential suppliers and users should make it unnecessary to continue a separate small- and medium-power reactor programme.

V.9.22. The provision of consultant and advisory services to Member States is expected to include roughly the same amount of work as in 1971-72. At least one practical training course per year on planning and procuring power reactors should also be held.

V.9.23. In 1975-76 both suppliers and operators will be deciding whether they should use established thermal reactors or fast reactors, or whether they should choose an intermediate course and use other advanced reactors, or a combination of different types.

V.9.24. It will be necessary to evaluate the training courses held in reactor procurement in order to determine which of their features could be most usefully incorporated into regular nuclear engineering programmes at established educational institutions, and which must continue to be presented in a specialized fashion.

V.9.25. The provision of advisory services to Member States will continue. By 1975-76 there should be a greater demand for detailed technical assignments, as compared with the somewhat broader scope of most of the advisory missions which are expected to be requested in the first half of the decade.

Engineering studies

V.9.26. The proper design of reactors and understanding of their behaviour requires a basic knowledge of the engineering sciences. The most important aspects requiring atten-

---

[1] GC(XII)/385, para.341.

[2] Ibid., para. 341(a).

tion are heat and mass transfer, components technology, fuel-element technology, and reactor instrumentation.

V.9.27. The development of non-destructive testing techniques, such as ultrasonic and radiographic testing, has progressed considerably in recent years, particularly in the the nuclear field. These methods, which are used, for example, to detect flaws, check dimensions such as tube-wall thickness, and to determine the location and distribution of uranium fuel in a fuel element, deserve periodic review.

V.9.28. Of particular importance is the need to encourage the improvement of control equipment, nuclear process instrumentation, monitoring and in-core instruments and failed-fuel-element detection. For some time to come, however, it will be important to support research and hold reviews and meetings on such subjects as reliability and endurance of control mechanisms and instrumentation channels under the environmental stresses of reactor systems.

The programme for 1971-72

V.9.29. It is expected that the following meetings will take place: an international working group on reactor heat and mass transfer in 1971; an international working group on pressure vessel steels in 1971 and 1972 to formulate a programme and sponsor meetings on other structural components of reactor systems; co-ordinated research on the irradiation embrittlement of pressure vessel steels in 1971 and final review in 1972; a panel on in-service inspection of reactor components in 1972; a panel on power reactor shielding in 1971 for a general review; a symposium on power reactor control and fuelling experience in 1972.

The programme for 1973-76

V.9.30. Work relating to heat and mass transfer and components should concentrate on research topics. Specific problems relating to components of fast reactors are likely to require particular attention. It is expected that a high level of research in theory and analysis, superheating and boiling and condensation will be carried out in Member States.

V.9.31. The working group on pressure vessel steels should continue its work on such matters as standardization and inspection. It is expected that further co-ordinated research on irradiation effects in structural materials would be carried out and that research into the basic technical problems of other reactor components would be supported. The convening of panels on containment, direct-cycle gas turbines for reactor systems, and reactor heat-exchangers are proposed with a view to preparing the ground for further work on these sub-systems.

V.9.32. It is proposed to convene a panel on non-destructive testing of reactor fuels and components, should the subject not be adequately covered by other meetings.

Advanced applications

V.9.33. The world's total installed desalting capacity is growing by more than 20% per year, and this rate of increase should continue into the 1970s. Larger-sized units are being built each year. Data on which cost estimates for large-capacity desalting plants could be based should be available in the early 1970s. It seems likely that in the mid-1970s nuclear desalinating will become attractive for selected municipal and industrial water projects.

V.9.34. Over the period 1971-76, the Agency will collect and make available to Member States recent scientific and technical information on problems connected with nuclear desalting engineering, and will assist the States which so request in:

(a) Assessing the role which nuclear energy can play in meeting water and chemical requirements;

(b) Finding methods for the optimum development of nuclear desalting in the existing circumstances;

(c) Organizing and extending training in nuclear desalting engineering; and

(d) Implementing their plans for the design and construction of nuclear desalting facilities and for the associated nuclear power and industrial applications.

V.9.35. The establishment of energy centres is a logical extension of the use of nuclear energy for electricity production and water desalting and is intended to ensure that the maximum use is made of this type of energy. It aims at the production of cheap energy by large nuclear reactor centres around which numerous industries are clustered. Energy centres would require very large investments but the concept is technologically sound.

V.9.36. Other advanced applications of reactors would be for nuclear ship propulsion, for space vehicle propulsion or as mobile power plants carries by land vehicles or special ships. Work on MHD will also be continued.

The programme for 1971-72

V.9.37. The following meetings are expected to be held: a panel on the technical and economic aspects of the storage, conveyance and distribution of desalted water from large-scale nuclear desalting plants in 1971; a study group in Latin America in 1971 for senior officials and young engineers of Member States interested in nuclear water desalting and power programmes; a study group on nuclear power and desalting for interested countries in the Mediterranean in 1971. It is expected that desalination will be one of the major topics of the Fourth Geneva Conference.

V.9.38. It is expected that at least one of several co-operative desalting study programmes will be under way in 1971-72 and one advisory mission per year to help Member States in planning is therefore foreseen.

V.9.39. Attempts will be made to induce other international organizations to take part in the industrial and agricultural planning which is required in proposing, evaluating and implementing projects to be carried out by nuclear energy centres. At least one, and possibly two, co-operative studies will probably be under way in 1971-72, with the Agency acting as co-ordinator. Because of the close relationship between nuclear desalting and nuclear energy centres many of the studies in these two fields will be combined and an international seminar on the review of nuclear energy centre studies is proposed for 1972.

V.9.40. In 1972 it would be appropriate to follow up the 1970 IMCO/IAEA symposium with a panel on mobile, particularly maritime, reactors; this panel would bring information on nuclear shipping propulsion up to date and provide advice on other types of mobile reactors to the extent desirable.

V.9.41. The Joint ENEA/IAEA International Liaison Group on MHD Electrical Power Generation will prepare for its fifth international conference on MHD, to be held in 1971; this topic is unlikely to be covered at the Fourth Geneva Conference. The Group will meet in 1972, and may prepare status reports and sponsor specialists' meetings, as appropriate.

The programme for 1973-76

V.9.42. Co-operative programmes, advisory services, research contracts, regional study groups and training courses on nuclear desalting and energy centres are envisaged for this period. As by 1974 much of the information which is now speculative will be more reliable a symposium is envisaged to cover nuclear costs and operating experience as well as advances in technology. By 1975-76 some major projects should be under way and the Agency's programme should therefore concentrate on solving specific problems regarding costs, performance, financing and the international sharing of benefits.

V.9.43. A continuing modest amount of work relating to maritime, undersea and space reactor systems is envisaged.

V.9.44. The convening of a sixth international conference on MHD will probably be appropriate, after which a realistic world assessment of the potential offered by this technology should be possible. The Agency's work relating to MHD will be developed within the framework of the Joint ENEA/IAEA International Liaison Group on MHD Electrical Power Generation. At its regular annual meetings this Group will discuss specific aspects of the problems that may arise in the future and continue to act as co-ordinator of the relevant international activities.

V.9.45. Other activities should include at least one energy centre study of a specific site per year and the publication of information concerning methods of assessing costs and economic benefits.

Economics

V.9.46. Activities related to power reactors, nuclear fuels, desalting and energy centres involve major economic considerations; waste disposal, safeguards and the industrial applications of isotopes also have cost implications for the assessment and analysis of which reasonably uniform procedures would be useful. Economic activities can be divided into four main categories:

(a) Collection of data, evaluation and forecasting;

(b) Economic methods and analyses;

(c) Financing studies; and

(d) Advisory functions.

V.9.47. The maintenance of an up-to-date world-wide picture of economic prospects for nuclear energy requires a continuous analysis of factors determining present and future supply and demand. The following activities will therefore remain essential:

(a) Continuous analysis of energy and power developments in Member States and main geographical regions of the world;

(b) Evaluation of nuclear energy costs as predicted and confirmed in practice;

(c) Forecasts of nuclear energy costs and market penetration; and

(d) Continuous survey of conventional energy costs and the increasing costs of environmental pollution control associated with conventional plants.

V.9.48. To establish continuous coverage of present and future energy demands, to estimate the share of nuclear power in meeting them, and to help Member States to plan for the introduction of nuclear power, national and regional energy requirements must be assessed.

V.9.49. The evaluation of nuclear energy costs involves analysis of published capital cost data and forecasts of possible costs for advanced nuclear power plants and multi-purpose installations. It also requires a continuous survey of resources of nuclear fuel. The Agency maintains a continuous survey of cost developments and makes summary surveys available to Member States.

V.9.50. The Secretariat carries out interpretative studies of the costing methods used at present in different countries and tries to achieve some degree of unification in its own cost appraisal.

V.9.51. In accordance with the resolutions adopted by the Conference of Non-Nuclear-Weapon States [3], the General Assembly [4] and the General Conference [5], the Secretariat is studying possible ways of financing nuclear projects in developing countries and carrying out a comprehensive and up-to-date study on the subject.

V.9.52. The advisory services which the Agency may be requested to provide for Member States are likely to expand in scope and change in nature. The general power missions required in the past will be gradually replaced by one or two experts who will be sent to Member States to assist in the preparation and evaluation of bids and in assessing financing terms.

V.9.53. The work relating to the supply of nuclear fuel also involves economic considerations. This work includes making arrangements with supplying and recipient countries for nuclear fuel to be furnished through the Agency for reactors and for experimental use. It also has a bearing on the reactor engineering and the nuclear materials and fuel cycle programmes. In carrying out this work, however, the question of financing is particularly important and will receive special attention as more power reactors are installed in developing countries. The volume of international fuel transfers will certainly increase markedly in the next few years.

The programme for 1971-72

V.9.54. In early 1971 a panel will review the studies on the financing of nuclear projects for presentation at the Fourth Geneva Conference. In 1972 another panel will study the economics of nuclear power programmes.

V.9.55. It is proposed to collect information on computer programmes in order to be able to advise Member States on the possibilities of using them to make more detailed and sophisticated studies.

The programme for 1973-76

V.9.56. Work on data, evaluation and forecasting and the collection of information will be continued.

V.9.57. By 1973 many major nuclear power plants will have become operational and revised cost estimates for new stations will be available; the holding of a symposium on capital cost experience for established thermal reactor types will therefore be timely. Another symposium in 1974 will review the economic prospects of breeder reactors.

V.9.58. The provision of the various advisory services for reactor and other nuclear projects will continue. Regional study groups and panels on reactor economics and financing are also proposed.

Nuclear materials and fuel cycle

V.9.59. In geology, mining and engineering the following activities will be carried out:

(a) The collection of data on world reserves and resources, which could be made more accurate by encouraging the development of a uniform estimating and reporting system;

(b) The cataloguing of information according to location of ores, their characteristics, etc.;

---

[3] Resolutions H.II and I reproduced in United Nations document A/7277.

[4] General Assembly Resolution 2605 A (XXIV).

[5] General Conference Resolution GC(XIII)/RES/256.

(c) The evaluation of world reserves and resources;

(d) The provision of a clearing house for information on the above topics;

(e) The sponsoring of research and other national activities to develop methods for prospecting for and evaluating uranium and thorium ores; and

(f) The encouragement of research on certain aspects of radiometric field surveys;

(g) The encouragement of research and development in the extraction of uranium from low-grade deposits and as a by-product from other processed materials.

The programme for 1971-72

V.9.60. The performance of a reactor system is determined largely by the behaviour of the fuel element. The establishment of design criteria based on thermal, hydraulic, structural, materials and engineering considerations represents a large part of the total effort required to develop a reactor system, and standardization of the basic parts of a fuel assembly and structure could lead to significant savings. Developments in fuel element design and possible ways of improving performance and reducing costs will be subjects of continuing study.

V.9.61. With regard to reactor fuel elements the following subjects need to be studied:

(a) Improved and advanced techniques for fabrication and the testing of their experimental irradiation;

(b) Handling of non-metallic fuels throughout the fuel cycle;

(c) Fabrication equipment;

(d) Simplified fuel elements which might be locally manufactured in developing countries;

(e) Thermal, hydraulic and mechanical aspects of fuel element design; and

(f) Actual fuel element experience gained in power reactors.

V.9.62. With the increased demands for nuclear fuels expected in the 1970s it is becoming more important to adapt fuel refining, processing and reprocessing techniques for continuous and automatic use to replace the batch processes used in the past. Research contracts should be awarded wherever possible. Automation will probably be required to handle the increasing quantities of irradiated materials available.

V.9.63. The Agency's programme will cover aqueous and non-aqueous methods of reprocessing. The main emphasis in the reprocessing of highly irradiated fuel in the near future should be placed on the reprocessing of fuel elements with a very high burn-up level.

V.9.64. In the near future, when fast reactors are few in number and plutonium is abundant enough for long cooling to be possible it is likely that reprocessing could be largely carried out in existing plants with only limited modifications.

V.9.65. Matters which deserve priority and could be the subject of Agency-sponsored research activities include:

(a) Basic aspects of head-end processes such as the control during head-end operations of gaseous fission products;

(b) Plutonium process chemistry and, in particular, problems associated with the high concentration of plutonium in fast reactor fuels;

(c) Chemistry of fission products in macro amounts under process conditions.

V.9.66. The Agency has a continuing programme dealing with various aspects of thorium utilization. Periodic meetings at intervals of about three years of the Working Group on Thorium Utilization are envisaged.

V.9.67. The accumulation of large quantities of plutonium resulting from the operation of thermal power reactors is a matter of great economic concern to power utilities. The question is whether to recycle this plutonium in the next generation of thermal reactors, or whether to keep it for use in industrial fast-breeder reactors. Since technologies are progressing rapidly it is necessary to keep the situation under review.

V.9.68. A symposium on heavy-water production, either alone, or dealing also with other non-fissile nuclear materials, is under consideration.

V.9.69. The programme on the peaceful uses of nuclear explosives calls first for an exchange of information between all Member States. It is generally believed that this will stimulate interest in specific international projects for excavation, mineral recovery and mining and fluid storage. However, it is still too early to make long-range plans and it has been considered more advisable to set up the machinery for planning and implementing programmes on a sound basis. The Division of Nuclear Power and Reactors and the Division of Health, Safety and Waste Management have made provision for a number of meetings during 1971-76 to meet the demands of the programme. The Agency's programme on the peaceful uses of nuclear explosives will follow the recommendations of the General Assembly [6] and the General Conference [7].

V.9.70. The Joint IAEA/ENEA Uranium Resources Group will hold annual meetings, and in 1971 or 1972 a new edition of the pamphlet listing world reserves and needs will probably be issued.

V.9.71. A consultants' meeting on prospecting instrumentation and a training course on advanced prospecting techniques are planned for 1971. A similar training course for Asia and the Far East has been proposed for 1972. The number of requests for the provision of advisory services and the use of staff members as technical assistance experts for short assignments is very large and there will probably be an increase of up to six in the number of missions, with one man-month per mission, by 1971-72.

V.9.72. The co-ordinated research programme on the recovery of uranium as a by-product from phosphate rocks will continue into 1971. A co-ordination meeting is planned for that year. At this meeting it will be decided, following recommendations by consultants, whether to continue the programme as it is, or whether to broaden it to include the recovery of uranium as a by-product from other minerals and resources. Attention will also be given to other research topics relating to the recovery of uranium from low-grade ores.

V.9.73. A panel on non-metallic reactor fuels is proposed for 1971 in which emphasis would be placed on the chemical and manufacturing steps in the preparation of fuel elements, the relations between these and the physical and chemical properties of the fuel, and properties under irradiation. A symposium on fuelling experience for power reactors is proposed for 1972.

V.9.74. Two or three research contracts per year on reprocessing and fabrication are expected to be under way. Basic work on analytical methods compatible with actual industrial processes may be required.

---

[6] See General Assembly Resolution 2605 B (XXIV).

[7] See General Conference Resolution GC(XIII)/RES/258.

The programme for 1973-76

V.9.75. Work will proceed along the lines indicated for previous years. Even more requests for advisory services may be received as developing countries seek to exploit indigenous resources to fuel power reactors.

V.9.76. With regard to the processing of uranium from ores and other sources, it is expected that the programme will continue to be carried out primarily through research contracts. This will also be the case in fuel reprocessing activities.

V.9.77. In the fuel element programme emphasis is likely to be placed on two topics: simplified fabrication methods and the fabrication of highly active materials. Both are considered desirable topics for funds.

V.9.78. A symposium on new technology for non-fissionable nuclear materials is proposed for 1973-74 so that information on D_2O, graphite, beryllium, zirconium, control materials and so on, can be brought up to date.

V.9.79. The programme also includes meetings at the rate of at least one every two years on the technology of peaceful nuclear explosions and envisages continued participation in international studies. The convening of some study groups or seminars may be desirable in 1973-74.

Reactor physics and research reactors

V.9.80. The design and operation of safe and efficient reactors requires a thorough understanding of reactor physics; i.e. a study of the interactions between neutrons and nuclei which take place inside nuclear reactors and are thereby characteristic of them. Reactivity, reactor safety, stability, control, fuel breeding and conversion efficiencies and yields, and changes in the isotopic composition of irradiated materials are aspects of reactor design, operation and utilization concerning which reactor physics furnishes a basic understanding.

V.9.81. The use of research reactors, in particular the control of irradiation conditions, the design and operation of experimental facilities such as in-pile loops and external neutron beams, and the development of adequate in-pile dosimetry are all subjects requiring a knowledge of reactor physics. Conversely, the study of reactor physics itself furnishes many opportunities for research reactor utilization. With regard to research reactor utilization, it has proved very useful to arrange for personnel at nuclear centres in developing countries to meet among themselves and with experts in study groups. Inevitably these study groups have ranged over a wide selection of topics of interest to the centres concerned.

V.9.82. The Agency has a continuing programme in reactor radiation measurement aimed at the development of universally acceptable, standard methods for making the measurements which are essential for a proper interpretation of irradiation experiments.

V.9.83. Reactor control with a view to achieving optimum performance and the related activity, automation of reactor operation, are subjects of growing importance.

V.9.84. The joint NPY project in reactor physics has yielded very satisfactory results and the Member States concerned, Norway, Poland and Yugoslavia, expressed their desire to continue their collaboration after expiration of the current agreement in April 1970 [8]. The experience gained has encouraged the Agency to look for further opportunities for similar collaboration in all regions of the world.

The programme for 1971-72

V.9.85. To supplement the study group programme, a system for an informal exchange of information between reactor centres in developing countries was initiated in 1970 which in-

[8] The text of the agreement is reproduced in document INFCIRC/55.

volves the circulation of letters from correspondents, together with information obtained through various Agency programmes. This activity will continue throughout the period 1971-76.

V.9.86. A panel on reactor burn-up physics is proposed for 1971; the last such panel was convened in 1967, and much more information resulting from the operation of reactor fuel cycles should be available to enable isotopic changes which are important both from the point of view of operation and safeguards to be evaluated. The activities of EACRP will include an annual meeting, various types of data collection and the sponsorship of reviews and meetings.

V.9.87. The research contract programme will be carried out with emphasis on evaluation of group cross-sections for reactor input, neutron spectrum measurement and further investigation of simplified lattice and reactor property measurement techniques.

V.9.88. The reactor radiation measurement group will continue its activities, particularly with regard to specification of the fluence and spectrum of neutrons in studies of radiation damage to materials. Some work may also be done on the in-pile dosimetry of agricultural and biological irradiations. The group will work largely by correspondence, but may again meet in 1972, possibly in conjunction with other meetings.

V.9.89. A symposium on reactor irradiation rigs in 1971 or 1972 and a panel on advanced research reactors in 1972 are proposed as part of the general research reactor programme. The symposium should also deal with the use of less powerful research reactors for engineering studies.

V.9.90. With regard to reactor computations, a seminar on numerical reactor calculations is planned for 1971, by which time systems of programmes for modern-generation computers will be available for presentation. Consideration of this specialized topic will not duplicate discussions at the Fourth Geneva Conference. The use of computers for reactor work in developing countries will be encouraged by computer programme exchange, suitable contracts for coding or adapting reactor programmes, and the provision of certain other services.

V.9.91. A symposium on power reactor control is proposed for 1972 in which both process instrumentation and on-line computing are likely to be considered.

V.9.92. Study groups on research reactor utilization will continue to meet in 1971 for Asia and the Far East and in 1972 for Latin America. By 1971 the system for the exchange of information between reactor centres in developing countries should be in full operation. In 1972 a panel should review the entire research reactor utilization programme.

V.9.93. At least two joint projects are expected to be under way in 1971 and 1972, one being a project concerning reactor physics and related topics along the lines of that covered by the existing NPY agreement, the other being a joint research reactor utilization programme, possibly in Latin America. These projects will be fully integrated into the other reactor physics and research reactor utilization programmes.

The programme for 1973-76

V.9.94. The general outline of the programme will be the same as in previous years. Activities in relation to reactor control and radiation measurements, study group meetings and other activities concerning research reactor utilization, and the provision of support for joint projects will continue. As reactor centres become more sophisticated, research contracts are likely to be replaced by co-ordinated programmes of research agreements on specific reactor physics problems, but an exception may be made in the case of reactor computations, which will need continuing support in developing countries.

V.9.95. In anticipation of the increased emphasis that special purpose reactors for use in research, space, under-sea, shipboard, desalting, and other such applications will be

receiving by 1973-74, a panel is proposed on the physics problems of special purpose reactors.

V.9.96. By 1975-76 there should be less need for the Agency to support activities concerning reactor physics and research reactor utilization in developing countries. Most reactor centres can be expected to be quite sophisticated by then and the Agency's task should therefore be primarily the co-ordination of research rather than the provision of advice and guidance. There may be some merit by that time in combining reactor physics and other disciplines in reactor engineering into a single activity.

Budget estimates

Explanation of major cost changes in 1971

V.9.97. The net decrease in the cost of this programme for 1971 is $12 000. As shown in Table 26 there are reductions in expenditures for several types of activities which by far offset the price increases for salaries, common staff costs and travel, which amount to $12 800.

V.9.98. As shown in this table, increases in salaries and common staff costs due to price increases amount to $ 12 000, but are partially offset by $3500 in programme reductions under these items of cost due to the replacement of one P-1 post by a GS post at a lower salary level. No other changes in staff are foreseen.

FIGURE 21

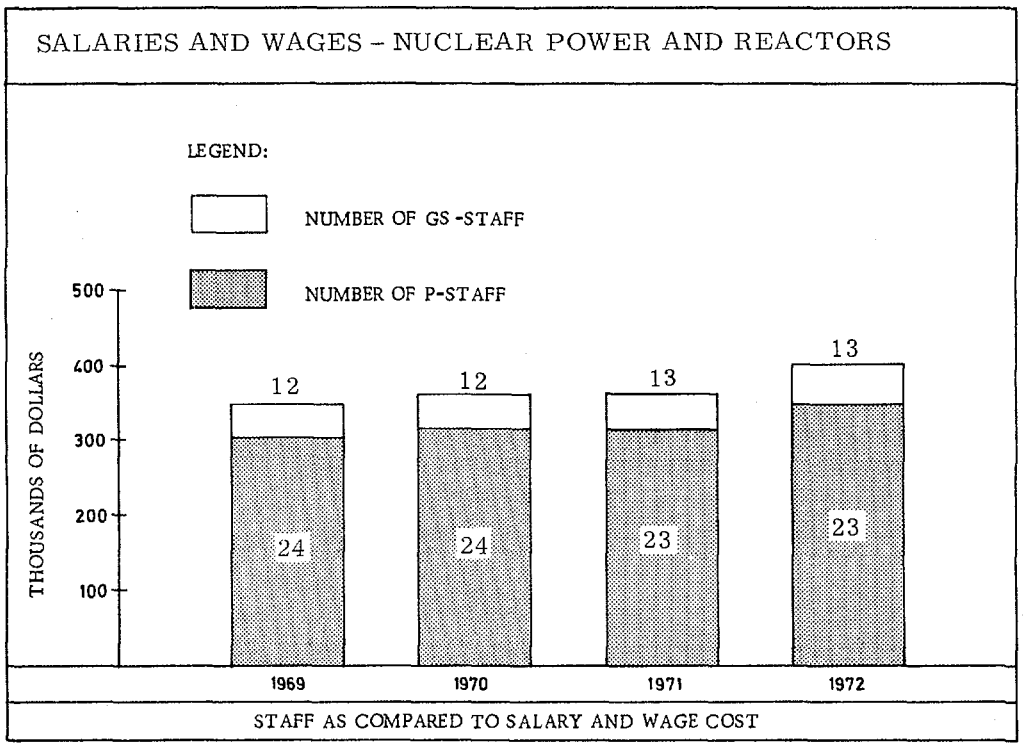
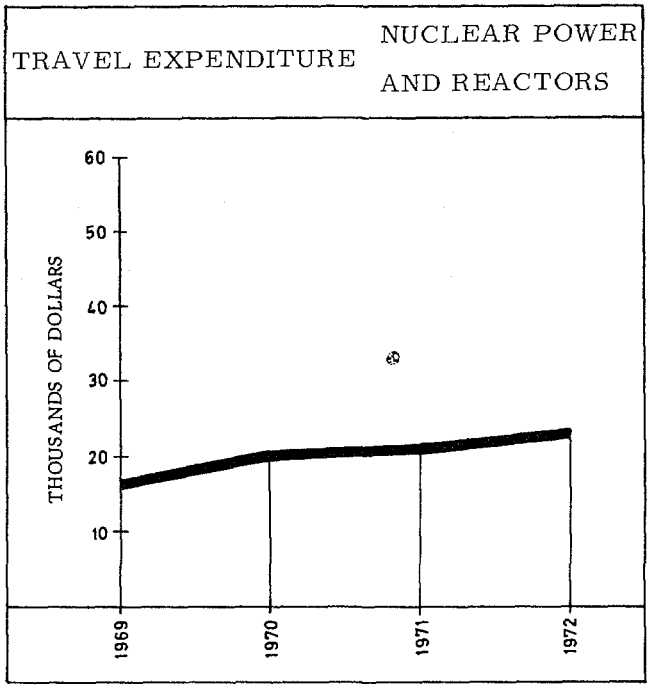
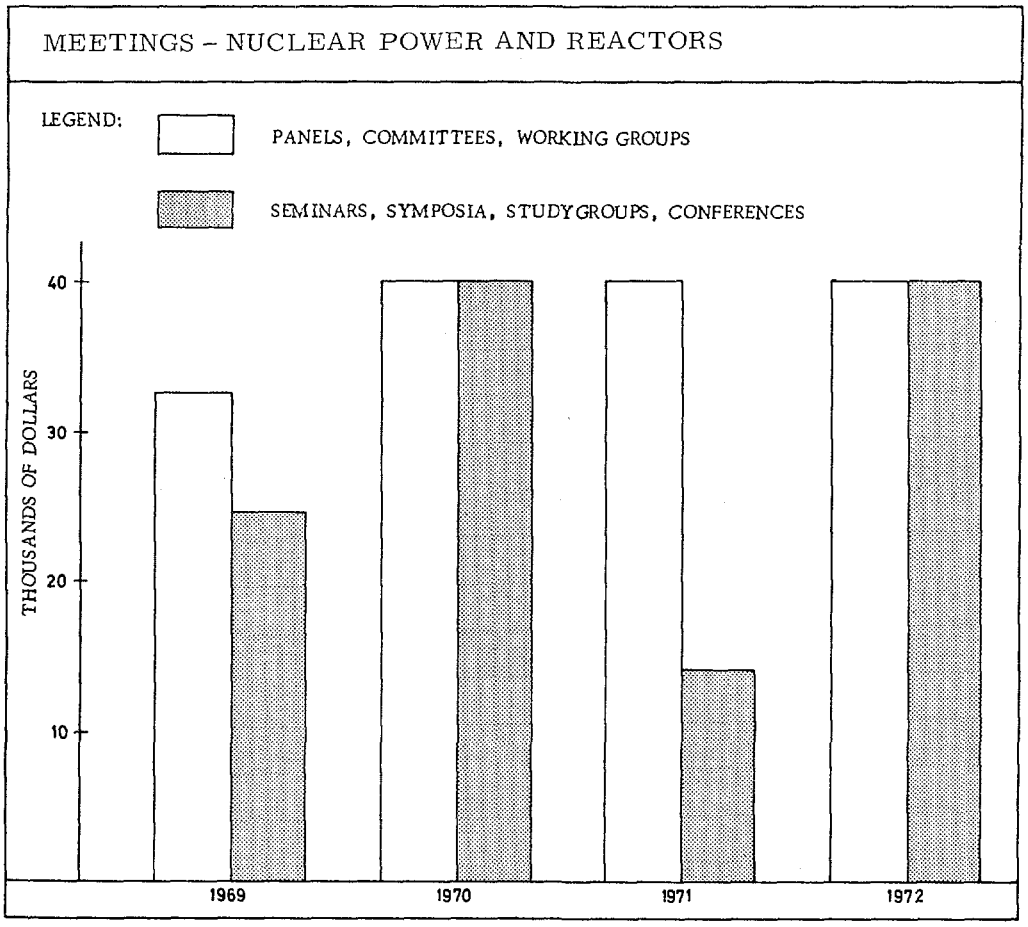


FIGURE 22



V.9.99. The cost of symposia, seminars and conferences in 1971 is substantially reduced, i.e. from $ 40 000 to $14 000, as a result of the curtailment of the number of meetings because of the Fourth Geneva Conference.

FIGURE 23



V.9.100. The amount provided for research contracts in 1971 has been reduced by $5000 for reasons of economy, but this is more than offset by the purchase of a calculating machine at a cost of $9700. This machine is essential to facilitate many of the computations required in the day-to-day work of the Division

Preliminary budget estimates for 1972

V.9.101. No staff increases are foreseen for 1972, but additional salary and common staff costs for existing staff are expected to amount to $ 55 000 more than in 1971. An increase of $1700 for duty travel and missions, the restoration of the number of symposia and conferences and research contracts programme to the 1970 level, and the production of a training film on research reactor experiments at a cost of $10 000 result in a preliminary estimate for 1972 which is $88 000 above the 1971 level.

10. Health, safety and waste management

Summary of costs

Table 28

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	227 866	293 300	6 100	-	6 100	299 400	357 400
Common staff costs	85 050	106 200	4 000	-	4 000	110 200	134 200
Duty travel and missions	16 614	16 000	1 800	-	1 800	17 800	18 800
Meetings: Panels and committees	21 066	30 000	1 500	2 500	4 000	34 000	34 000
Seminars, symposia and conferences	20 160	15 000	-	5 000	5 000	20 000	17 000
Representation and hospitality	667	1 600	-	-	-	1 600	1 600
Scientific and technical contracts	84 250	168 000	4 000	8 000	12 000	180 000	180 000
Scientific services, supplies and equipment	5 378	4 000	-	-	-	4 000	4 000
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	6 000	6 000	6 000	12 000
Other	-	-	-	-	-	-	-
TOTAL	461 051	634 100	17 400 2.74%	21 500 3.39%	38 900 6.13%	673 000	759 000

Summary of manpower

Table 29

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	1	-	1	1
P-5	7	7	-	7	7
P-4	7	7	-	7	8
P-3	2	2	-	2	2
P-2	-	-	-	-	1
P-1	1	1	-	1	1
Sub-total	18	18	-	18	20
GS	11	11	-	11	12
M&O	-	-	-	-	-
TOTAL	29	29	-	29	32

Highlight summary

V.10.1. This part of the programme consists of the activities of the Division of Health, Safety and Waste Management of the Department of Technical Operations. This Division, in co-operation with other international organizations where necessary, establishes standards of health and safety in the fields of atomic energy; evaluates the health and safety hazards associated with projects submitted to the Agency and applies safety standards to the Agency's operations; undertakes studies and collects and disseminates information on the safe design and operation of facilities using radioactive materials and on the safe management of radioactive wastes; promotes research and its co-ordination in the fields of health, safety and waste management; and provides advisory services to Member States and is prepared to render assistance in case of radiation accidents.

V.10.2. The costs of this programme are expected to increase by $38 900 in 1971, or 6.13% over the 1970 budget. Of this increase, $17 400 is attributable to salary and price increases and $21 500 is for programme increases. The programme increase is made up of $7500 for additional panel and symposia costs, $8000 for scientific and technical contracts, and $6000 for a training film.

V.10.3. No additions to the staff will be required in support of this programme in 1971, but it is foreseen that in 1972 an additional P-4 staff member and P-2 staff member will be needed to cope with the increased work-load in the Radiological Safety and Nuclear Safety Sections respectively. Total cost increases of $86 000, as compared with the 1971 budget estimates, are foreseen for 1972. Of this increase, $58 000 is for salaries and wages, including the two new Professional posts and one new GS post as well as normal increases in emoluments; $24 000 for associated common staff costs; $1000 for duty travel; and $6000 for training films costing twice as much as the one provided for in 1971; minus a reduction of $3000 for symposia.

Programme

General

V.10.4. The excellent safety record of the nuclear industry has been achieved because all nuclear activities have from the beginning been kept under very strict control.

V.10.5. The four main activities which the Agency must regularly carry out to ensure that the safety record is maintained are as follows:

(a) The keeping up to date of health and safety standards. To achieve this, the existing regulations and recommendations published in the Safety Series as well as some in the Technical Reports Series must be reviewed and further subjects will have to be covered, such as the treatment and ultimate disposal of high-level-activity radioactive wastes, the safety aspects of the use of radioisotopes in conventional industries, and radiation protection legislation;

(b) The development of the necessary measures concerning radiation protection, nuclear safety and waste management to be applied in new nuclear activities, such as the peaceful uses of nuclear explosives, the use of fast-breeder reactors for nuclear plants, and work on radiation protection problems resulting from space research;

(c) The collection and dissemination of information on recent developments in techniques, and the encouragement and co-ordination of research in radiation protection and waste treatment and disposal; and

(d) The provision of assistance to developing countries in introducing and implementing radiation protection and nuclear safety measures and the radioactive waste management methods necessary for the safe use of nuclear energy and radioisotopic techniques.

Radiological safety

V.10.6. Emphasis has been placed on the preparation and harmonization of standards, recommendations and guidance for radiological protection in all aspects of the peaceful application of atomic energy and the use of radiation sources, and on the dissemination of information and guidance on the design and construction of facilities, on methods of monitoring and dosimetry, and on the construction, use and calibration of instruments for radiation protection monitoring.

V.10.7. There will be increasing emphasis, however, on helping Member States to apply these standards and recommendations in their work and to solve the particular problems that are encountered in doing so in different parts of the world.

V.10.8. An attempt will be made to make the general public and persons who are not specialists in radiation protection more aware of the stringent precautions that are taken to prevent over-exposure of persons and damage to property and of the excellent safety record that has been achieved by the nuclear industry.

The programme for 1971-72

V.10.9. Since suitable types of packaging for the transport of large radioactive sources are complex and very expensive, it is necessary to develop non-destructive methods of demonstrating that they would pass the prescribed mechanical and thermal tests. It is proposed to organize a seminar to review the complex computational procedures involved and their application to specific package designs.

V.10.10. Any detailed packaging or package designs submitted by Member States for incorporation in the Annexes to the Agency's Regulations for the Safe Transport of Radioactive

Materials will be reviewed. Information will also be collected and distributed on the facilities in Member States that could be made available for testing packagings constructed in other Member States.

V.10.11. Guidelines will be prepared, if possible in collaboration with WHO and ENEA, on the safety aspects of radioisotopic power generators for use in medical and other miniature devices to be carried on the body, and for the safety assessment of specific products containing radioisotopes that are available to the public.

V.10.12. With the help of consultants, an attempt will be made to establish performance criteria for anti-contamination clothing, face masks, respirators and other types of personal protective devices.

V.10.13. The determination of the amount of radioactive material retained in the organs after internal contamination of the body is one of the difficult problems encountered in radiation protection monitoring. The last Agency meeting on this topic was held in 1964 and it is now proposed to organize a symposium, if possible in collaboration with WHO and ILO, on the assessment of radioactive body burdens.

V.10.14. Possibilities of devising improved methods for the medical treatment of persons who have been over-exposed to radiation have been reported in recent years and it is proposed to review this topic on a broad scale in a symposium, organized jointly with WHO, on the diagnosis and treatment of acute radiation injury and radioactive poisoning. The last Agency meeting devoted exclusively to this topic was held in 1962.

V.10.15. The criteria for the assessment of airborne radioactive contamination in uranium and thorium mines have for long been the subject of debate among radiation protection specialists. It is now proposed to convene a panel of experts which would attempt to develop uniform criteria and would recommend suitable instruments and procedures for assessing these radiological hazards.

V.10.16. Small amounts of plutonium are being handled in an increasing number of laboratories. In this connection inadequate measures could lead to serious radiological hazards, and a panel of experts will therefore be convened to prepare a manual on the safe handling of plutonium. It will be assumed that the quantities are sufficiently small to preclude the possibility of criticality.

V.10.17. A number of countries are likely to embark on the manufacture of fuel elements and it is considered appropriate that a panel of experts should be convened to prepare guidelines on the radiological safety aspects of reactor fuel fabrication.

V.10.18. With the help of consultants, manuals of guidance will be prepared on nuclear accident dosimetry systems and on the monitoring of radiation of low penetrating power.

V.10.19. The postal service for the intercomparison and assessment by means of glass dosimeters of the radiation fields used in Member States for instrument calibration will be continued and extended.

V.10.20. In response to suggestions from radiation protection specialists in a number of countries, an attempt will be made to collect available data on reported radiation accidents of all types and to issue summary reports on those that are of special interest.

V.10.21. An effort has been made to establish an international register of persons with significant body burdens of plutonium. A small group of consultants will be convened, if necessary, to advise on the further development of the register and to review the information recorded.

V.10.22. If a number of co-ordinated research contract programmes have been established, it is proposed to hold a research co-ordination meeting on nuclear accident dosimetry at

which the principal investigators would meet to report progress and to discuss the inter-comparison tests.

V.10.23. The system under which abstracts of research on topics relating to health physics in progress or recently completed in Member States are collected and distributed will be continued. In addition information will be given on the general lines of research in the various countries concerned.

V.10.24. Support will continue to be given to research on selected topics that have a direct bearing on the Agency's programme in radiation protection, preference being given to topics recommended by research co-ordination meetings and proposed by institutes in developing countries.

V.10.25. Training courses, visiting seminars, study tours and training films are valuable aids in acquainting radiation protection staff in developing countries with the most recent developments in techniques and procedures. Provided that funds are available, it is proposed to undertake the following activities:

(a) The holding of a training course in the Agency's Laboratory on bio-assay and whole body monitoring techniques;

(b) The organization of a visiting seminar on the planning and organization of radiation protection to be held in countries in South East Asia and the Far East; and

(c) The production of a training film on calibration techniques for radiation protection monitoring equipment.

V.10.26. Interregional and regional study group meetings and tours on radiation protection will be organized in Africa, Asia, Europe, Latin America and the Mediterranean area.

V.10.27. Attention will be given to the establishment, in co-operation with other international organizations, or regional centres for radiation protection dosimetry.

V.10.28. A panel of experts will review the Agency's basic safety standards, taking into account any further work done by ICRP and the experience gained in the application of the standards.

V.10.29. The assessment of organ dose after exposure of the body to neutrons is one of the difficult problems or personnel dosimetry, and improved techniques are being rapidly developed. A symposium on neutron dosimetry will therefore be organized in collaboration with the dosimetry section as a follow-up to the symposium on neutron monitoring which was held in 1966.

V.10.30. Much attention has been given to the implications of emergency exposure of the public and to striking a balance between the risks of exposure and of remedial actions. It is therefore proposed to organize a further seminar on this topic in collaboration with WHO and FAO.

V.10.31. A knowledge of their human metabolic pathways is necessary for an assessment of body burdens of internally deposited radiotoxic substances. There are divergent views on the interpretation of some of the available information and it is accordingly proposed to organize a seminar which would review the present state of knowledge on the metabolism of the actinide group of elements.

V.10.32. Chelation is one of the few methods available for increasing the rate of elimination of some radioactive substances deposited in the body. A panel of experts will be convened to review the role of chelating agents in the treatment of incorporated radionuclides and if possible to prepare recommendations on the use of the method. It is hoped that this meeting will be jointly organized with WHO.

V.10.33. In assessing the extent of the radiological hazard from the results of air monitoring it is often of great importance to be able to estimate the sizes of the particles on which the activity is deposited. It is proposed therefore to convene a panel to consider and, if possible, recommend suitable methods of particle-size analysis for airborne radioactive contamination.

V.10.34. The nuclear industry has so far had an extremely good safety record. As time goes on, however, it will become increasingly necessary to ensure that the best value is obtained for the costly radiation protection measures that are now in common use. It is therefore proposed to investigate, with the help of consultants, possible means of assessing the cost-effectiveness of radiation protection programmes for different types of operations with the aim of making the most economical use of resources without any reduction in the level of safety provided.

V.10.35. The topic for the research co-ordination meeting to be held in 1972 will be biological radiation indicators.

V.10.36. Advisory services will continue to be made available either by correspondence or by short visits of staff members or consultants. Every effort will be made to encourage the full use of the services offered, as this is probably the most effective method of helping Member States to overcome specific difficulties. During this period a modest increase in Professional staff may be necessary to handle the growing volume of work.

The programme for 1973-76

V.10.37. The safety standards, including the basic safety standards and the transport regulations, will be kept under review and amended, if necessary. Standards may also be prepared for additional types of operations, such as the use of particle accelerators and the use of gamma radiography units.

V.10.38. Means will also be sought for facilitating the international implementation of the transport regulations.

V.10.39. The exchange of scientific and technical information will continue on a world-wide basis through the organization of symposia and seminars.

V.10.40. Close collaboration will be maintained with other organizations in the derivation of levels and limits of contamination of the environment following normal or accidental releases of radioactive materials.

V.10.41. Recommendations and guides will be prepared as required, with the help of panels or consultants, on operational topics such as air and neutron monitoring, environmental monitoring requirements, the calibration of instruments, remote control systems and the keeping of adequate monitoring and exposure records.

V.10.42. Regional study group meetings with emphasis on selected topics in radiation protection will remain an important part of the programme.

V.10.43. Provided funds can be made available, regional training courses and other regional projects will be organized on such topics as the use, calibration and maintenance of radiation monitoring instruments, the assessment of radioactive body burdens, and the handling of radiation accidents.

V.10.44. Attention will be given to a continuously increasing extent to the provision of advisory services on all aspects of radiological safety.

V.10.45. Symposia and seminars will be organized to provide for an exchange of information on subjects that are not adequately covered on a world-wide basis in the programmes of other specialized organizations. In addition to the traditional subjects, special attention may

be given to the handling of high-activity sources, the radiological safety aspects of the use of nuclear propulsion devices and of the peaceful uses of nuclear explosives, and the general relationship between radiation protection and industrial hygiene in the nuclear industry.

Waste management

V.10.46. Satisfactory methods for treating and disposing of low- and intermediate-level radioactive solids, liquids and gases have been developed, and the Agency has almost completed an initial programme consisting of the review, publication and dissemination of information on these methods to Member States. Supplementary reviews of some of the methods are planned and more emphasis will be placed on securing wider distribution of waste management information both within the nuclear industry and among the general public.

V.10.47. Since most high-level waste has so far been stored on an interim basis, a review will be made of the current research and development work aiming at long-term storage and disposal. Since high-level waste management practices will vary between countries and there is a need for a central review of the methods employed, their applicability and the requirements of industry, the Agency could play an important role in this respect.

V.10.48. The disposal of gaseous effluents from nuclear plants requires particular care since their components may come directly and rapidly in contact with the population and the environment. The great increase in nuclear power production will produce a proportional increase in gaseous wastes. The methods of treating and storing gaseous components such as radioiodine and radiokrypton will be reviewed with the object of establishing limits of release and possible waste treatment processes. Efficient processes will be particularly necessary when the fast-breeder reactor fuel cycle is in operation.

V.10.49. Up to now most of the effort in waste management in the nuclear industry has been directed towards radioactive waste. The Agency will review the subject of non-radioactive waste in the continually expanding nuclear industry with the object of extrapolating in order to deal with such problems as the release of oxides of nitrogen (from reprocessing plants), the release of fluorides (from feed-materials plants), the release of beryllium (from fuel fabrication plants) and - probably the most important - the release of waste heat from nuclear reactors. The source, effects and control of each of these wastes will be reviewed so that the information obtained can be used by Member States, taking into account their individual conditions.

The programme for 1971-72

V.10.50. A symposium is planned on interim- and long-term treatment and storage of high-level radioactive waste. This topic is becoming more important as the fuel cycle becomes completed in more countries and spent fuel recovery plants produce high-level waste.

V.10.51. The interaction of radioactive contaminants with constituents in the marine environment is proposed as the topic of a joint symposium with the Monaco Laboratory. This subject is of particular importance to the ecologists and marine biologists who are planning the basis of a maximum permissible dosage of radioisotopes in various regions of the sea.

V.10.52. A panel will be convened to review the publication entitled "Radioactive Waste Disposal into the Sea".

V.10.53. It is becoming increasingly important to define the decommissioning of a nuclear installation when preparing the safety analysis report. Information on the decontamination of a nuclear site is also needed in the economic analysis of the process. A panel will be held to discuss methods of decontamination and disposal of residual radioactivity.

V.10.54. Chemical wastes are closely associated with radioactive wastes in the nuclear industry. A panel will be held to discuss the production, treatment and permissible releases of various related non-radioactive wastes in the nuclear industry in co-operation with other interested United Nations agencies.

V.10.55. Guidebooks will be prepared for small producers of radioactive waste and on the deep-well disposal of low-level waste.

V.10.56. It is proposed to convene a much-needed training course on radioactive waste management for Asia if funds are available.

V.10.57. The build-up of stockpiles of wastes from the uranium-thorium mining and milling industry has shown the need for dealing with these on a long-term basis, and a symposium on the subject is planned.

V.10.58. Air cleaning in the nuclear industry was discussed at a symposium in 1968. A symposium to review the changing needs and technology is planned.

V.10.59. The treatment of radioactive waste resulting from accidents on land and at sea will be the topic of a long panel meeting. This topic has been superficially considered at earlier meetings held by the Agency. Considerable thought has been given to the treatment of persons involved in such accidents but very little to the clean-up of the contamination and disposal of radioactive waste.

V.10.60. A panel is planned to discuss the basic chemistry of waste treatment processes with the objective of picking out processes most likely to meet the high-performance requirements involved in the treatment of wastes containing transuranic elements, strontium-90, radioiodine and other radioactive materials.

V.10.61. In 1968 the Agency established, through a panel meeting, a set of standardized waste categories. The application of these categories to technical programmes will be reviewed.

V.10.62. A guidebook is planned to assist those who might have need of a process for the recovery of noble gas from process off-gas.

V.10.63. Subject to the availability of funds, a training course on radioactive waste management will be held in the Mediterranean area for countries in North Africa, Southern Europe and the Middle East, and a study tour on waste management will be carried out in Eastern and Western European countries.

V.10.64. The Waste Management Section will assist in establishing significant research contracts in Member States and in administering these contracts. Advice in waste management will be given to developing countries. Educational material and films will be prepared on the subject of waste management.

The programme for 1973-76

V.10.65. The continuing programme in radioactive waste management will concentrate on the problems which will be characteristic of a more mature industry. The primary problem will be the assessment of radioactive waste treatment processes for the ultimate treatment of high-level waste.

V.10.66. Technical information on safe waste management must be converted into a form easily understood by the general public and available for public relations purposes in many countries.

V.10.67. The problem of decommissioning nuclear sites will continue to require consideration with a view to achieving improved design, operation and economies.

V.10.68. With increasing emphasis on fast-breeder reactors, waste treatment methods must be largely concerned with the handling of shorter-cooled fuels containing much higher quantities of radioactive wastes. In particular, improved air cleaning methods will be needed.

V.10.69. It will be necessary to review and bring up to date the publications in the Safety Series, Technical Reports Series and guidebooks.

Nuclear safety

V.10.70. The Agency offers its Member States, on request, assistance in the siting and safety evaluation of nuclear power plants, research reactors and chemical plants processing nuclear fuels.

V.10.71. Health and safety measures will be applied to all Agency-assisted projects, and health and safety missions will be organized, when appropriate. With regard to the increasing number of nuclear plants, the Agency will advise Member States on the problems arising during operation and provide guidance on regulatory philosophy and programmes for atomic energy commissions.

V.10.72. It should be noted that various discussions have taken place on the Agency's role in connection with nuclear explosions for peaceful purposes. A working group of experts met in December 1969 and a panel of experts on the phenomenology of the peaceful uses of nuclear explosives was held in March 1970. It is proposed to hold in the future a number of meetings dealing with the safety and environmental aspects of such uses.

The programme for 1971-72

V.10.73. The panels and symposium to be convened in 1971 and 1972 will be chosen from among the meetings listed below:

(a) A symposium on criticality control is planned. It will be six years since the last international meeting on this topic, and the symposium would discuss exact as well as simplified methods of calculation, detailed administrative methods of control and experiment, and calculations relating to low-enriched systems and carbide fuel systems;

(b) A panel on engineered safety devices may be convened to discuss the experience gained, methods used and possibilities of the quantitative description of the reliability of safety devices, the additional requirements for large power plants and the influence of population density;

(c) A panel on the safety of pressure-tube reactors may be held. The safety problems raised by this type of reactor are quite different from those of the pressure vessel reactors;

(d) The study of vibration in reactors is of great importance in ensuring reliability and availability, and a panel may be held to review the present position; and

(e) A panel may consider the safety problems which arise in the use of pre-stressed concrete structures for gas-cooled and other reactors;

(f) The Agency has for many years concerned itself with the problems relating to nuclear power plant siting. A symposium is planned on this subject which would discuss such topics as probability methods of safety evaluation, seismic effects and aseismic design, flooding and liquefaction and particular urban siting problems;

(g) A panel on guidelines for safety analyses may be held, which would have, as its main purpose, the provision of advice to developing countries on the ways in which they might be able to assess their nuclear power plants;

(h) Reliability analysis is being used by many safety groups to analyse reactor safety factors, and a panel may be held on the subject to exchange data, experiences, methods and standards used;

(i) Much remains to be done by the Agency and other international organizations in the delineation of codes and practices in the design of many reactor components and systems with the desired levels of engineering margins. A panel may consider this topic; and

(j) The safety of fast reactors will receive increasing attention as numerous research and development programmes move towards larger designs. A panel may consider the problems involved.

The programme for 1973-76

V.10.74. During 1973-74 meetings are likely to be convened on topics which will include:

(a) Changes and trends in reactor control systems, e.g. liquid control rods;

(b) The problems resulting from radiocontaminants released to the environments of more than one country;

(c) Collection and use of data concerned with reactor component reliability;

(d) Decommissioning and dismantling of old or obsolete reactors; and

(e) Specific safety problems arising in the design and operation of a variety of engineering projects involving nuclear explosions, such as seismic problems, the definition of the maximum credible accident, problems of spectrum and fission products, and airblast effects.

V.10.75. Safety problems will arise in connection with energy centres such as large agro-industrial complexes.

V.10.76. With the increasing number of nuclear power plants, chemical and metallurgical plants processing nuclear material and nuclear-powered merchant ships in operation and the potential increase in the international uses of nuclear explosives, it is foreseen that the number of requests by Member States for services relating to nuclear safety will grow quite rapidly.

Budget estimates

Explanation of major cost changes in 1971

V.10.77. The major increases in 1971 costs over the approved budget level for 1970 for this programme are shown in Table 28, from which it is seen that $17 400, or 2.74%, is due to price and salary increases, and $21 500, or 3.39%, to programme increases.

FIGURE 24

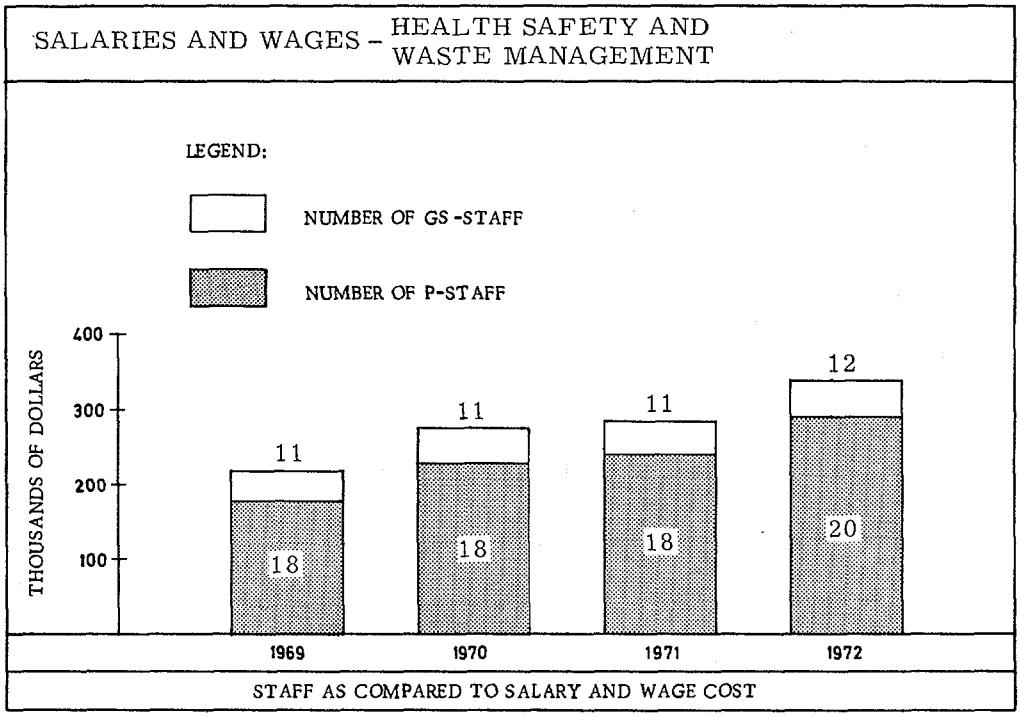
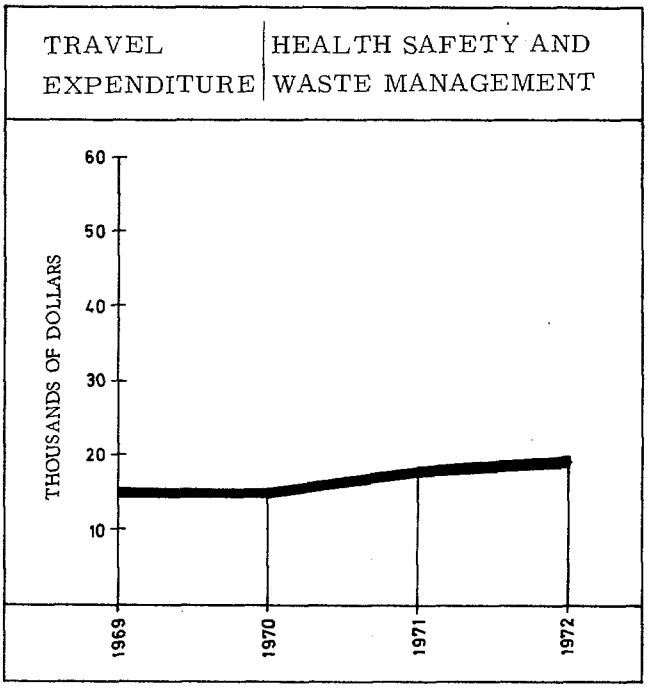
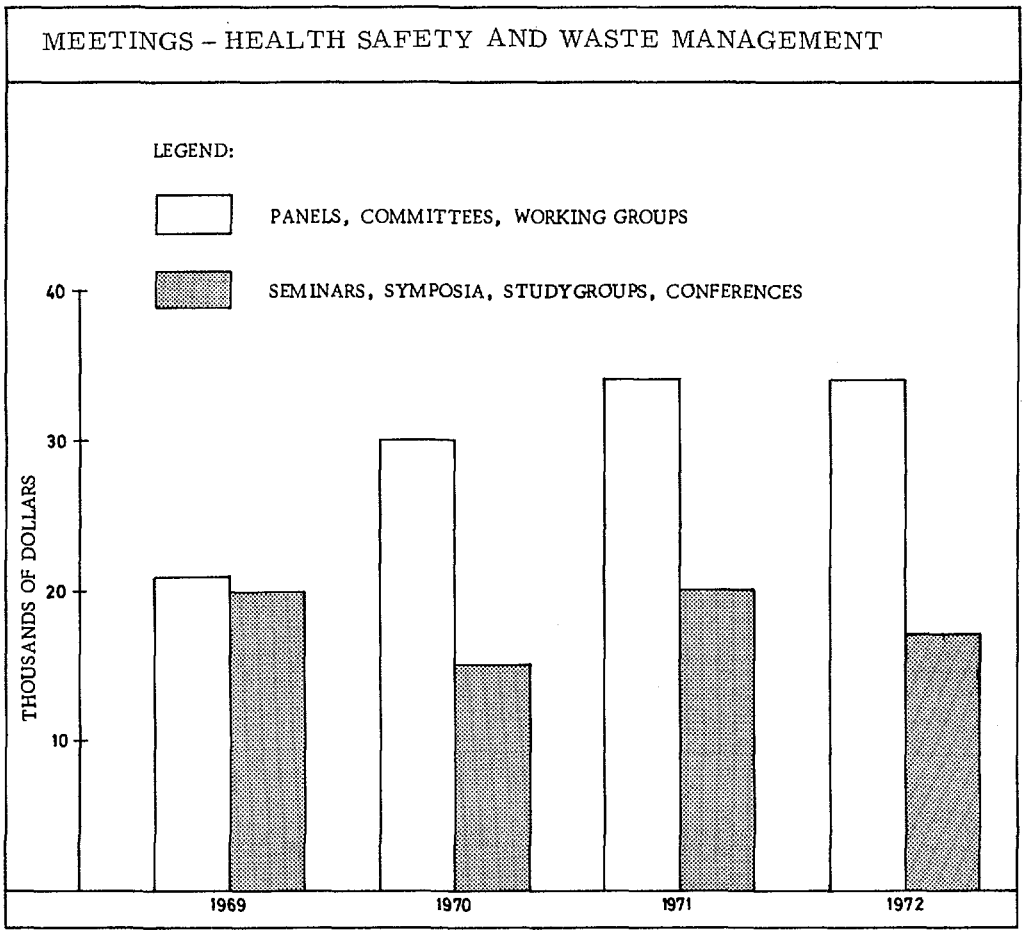


FIGURE 25



V.10.78. The programme increases requested for 1971 represent a shift of costs between programmes of the same Department to reflect the highest priority needs for meetings. The net increase of $7500 for meetings under this programme is more than offset by a substantial curtailment of similar costs under Nuclear Power and Reactors.

FIGURE 26



V.10.79. With regard to the increase of $12 000 in costs for scientific and technical contract a continuing contract in the amount of $2800 for work in environmental contamination has in the past been financed from funds allocated to research contracts, but since it involves purely technical rather than research work, the sum will be added to the technical contract category. Of the remaining increase, $4000 is to cover general cost increases and the balance of $5200 represents a programme increase offset by decreases in research contract support under other programmes of the Department. The annual support to ICRP is kept at the level of $9000. The remaining programme cost increase for 1971 is required to produce a training film on radiation monitoring at a cost of $6000.

Preliminary budget estimates for 1972

V.10.80. The preliminary estimates for 1972 provide for an additional P-4 staff member ar an additional GS staff member in the Radiological Safety Section to cope with the expected increase in the volume of work in radiation protection. The Nuclear Safety Section will also require an additional P-2 staff member for record keeping. The balance of the $58 000 increase in salaries and wages represents normal salary increases of existing staff member Common staff costs associated with staff increases as well as existing staff are expected to increase by $24 000 in 1972. The only other significant increase in programme costs in 197 is for an additional training film, costing $12 000, which is $6000 more than in 1971.

11. International Laboratory of Marine Radioactivity

Summary of costs

Table 30

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	121 122	136 300	8 100	2 000	10 100	146 400	159 000
Common staff costs	26 723	41 500	4 600	1 000	5 600	47 100	54 600
Duty travel and missions	3 399	4 000	-	-	-	4 000	4 400
Meetings: Panels and committees	-	-	-	-	-	-	-
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	-	-	-	-	-	-	-
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	19 597	18 500	500	-	500	19 000	19 500
Common services, supplies and equipment	3 737	5 000	-	-	-	5 000	5 000
Publications and other information media	1 068	500	-	-	-	500	500
Other	-	-	-	-	-	-	-
TOTAL	175 646	205 800	13 200 6.41%	3 000 1.46%	16 200 7.87%	222 000	243 000
Source of funds:							
Operating Fund I	42 413	45 000	-	-	-	45 000	45 000
Regular Budget	133 233	160 800	13 200 8.20%	3 000 1.87%	16 200 10.07%	177 000	198 000
TOTAL	175 646	205 800	13 200 6.41%	3 000 1.46%	16 200 7.87%	222 000	243 000

Summary of manpower

Table 31

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	-	-	-	-	-
P-5	1	1	-	1	1
P-4	3	3	-	3	3
P-3	-	-	-	-	-
P-2	-	-	-	-	-
P-1	1	1	1	2	3
Sub-total	5	5	1	6	7
GS	12	13	(1)	12	11
M&O	-	-	-	-	-
TOTAL	17	18	-	18	18

Highlight summary

V.11.1. The International Laboratory of Marine Radioactivity was established in 1961 as a co-operative venture between the Agency, the Monegasque Government and the Oceanographic Institute of Monaco for joint research on the effects of radioactivity in the sea. In 1969 a new agreement was signed which reoriented the programme to place more emphasis on standardization and co-ordination and less emphasis on basic and scientific studies for the next six years.

V.11.2. Although there are no staff or other programme increases requested for 1971, it is foreseen that costs will increase by $16 200 or 7.87% over the approved level for 1970 as a result of increases in the emoluments of staff, the upgrading of one post and other price increases. Further increases of $21 000 are foreseen for 1972. The only staff changes proposed are the upgrading of one GS post each year to the P-1 level so that qualified staff can be recruited.

V.11.3. This programme will continue to be financed partially from a special contribution by the Monegasque Government under Operating Fund I, with the balance chargeable to the Regular Budget of the Agency.

Programme

General

V.11.4. The initial programme of scientific research on the effects of radioactivity in the sea has been reoriented to give greater emphasis to the part that the Monaco Laboratory plays in the Agency's waste management programme, particularly as regards marine waste

releases. On this basis the Board in June 1968 authorized the Director General to conclude an agreement providing for the continued operation of the Monaco Laboratory for an additional six years.

V.11.5. The Laboratory is administered by the Division of Research and Laboratories but its programme is now guided both by this Division and the Division of Health, Safety and Waste Management.

V.11.6. The Laboratory's principal objectives are:

(a) To promote intercomparison, calibration and standardization of the widely different methods and techniques being used in national laboratories and institutes for marine radioactivity studies;

(b) To obtain and evaluate scientific information needed for the assessment of consequences of the release of radionuclides into the sea;

(c) To promote collaboration with national laboratories and to serve as a focal point in the Agency's co-ordinated research programme in marine radioactivity studies; and

(d) To help Member States, on request, to solve problems they may face in connection with the release of radioactive waste into the sea.

V.11.7. To ensure the international comparability of results obtained in the study of the health and safety aspects of marine radioactivity the Laboratory promotes and undertakes calibration, intercomparison and standardization of various methods and techniques. Reference methods, once determined, will be recommended for adoption by national and international institutions.

V.11.8. In collaboration with the Seibersdorf Laboratory and some national laboratories, the Laboratory prepares and distributes reference standards needed in the study of marine radioactivity. The standards include different matrices uniformly contaminated with a suitable level of radionuclides.

V.11.9. The intercomparison has been applied firstly to the sea-water samples contaminated at relatively high levels of radioactivity. These samples, as well as those of low-level radioactivity are prepared and distributed; the samples of high-level radioactivity are analysed. Suitable methods are also being developed to determine the capacity of marine sediments to bind radionuclides and to characterize their properties in relation to this capacity. The different procedures commonly used in the experiments on bio-accumulation of radionuclides are compared.

The programme for 1971-72

V.11.10. In 1971-72 the homogeneity of biological and sediment samples will be investigated, and the intercomparison will be focused on various analytical methods dealing with ^{60}Co, ^{65}Zn, ^{90}Sr, ^{95}Zr-Nb, ^{106}Ru, ^{137}Cs, ^{144}Ce and their stable counterparts. Methods will be developed to determine the rates at which radionuclides bind to sediments in a natural environment. Sediment samples for chemical and radiochemical analysis will be distributed. The results of laboratory experiments on the bio-accumulation and retention of radionuclides will be compared with the results of field observations and experiments. A second panel on reference methods in marine radioactivity studies will be organized.

V.11.11. At least one review of the distribution and concentration of an important radionuclide and its stable counterpart in marine environment will be completed. The physico-chemical forms of ^{55}Fe, ^{60}Co and ^{65}Zr in sea water and the biological availability of these forms will be studied. A symposium and a panel on this subject are planned in collaboration with the Division of Health, Safety and Waste Management. Interactions between natural trace metals and their radionuclides, with regard to binding and scavenging by sediments,

and the impact of these interactions on the rate of transport in the natural environment will be studied. The diffusion processes will be investigated in collaboration with national institutions using a computerized model. Collaboration with other international organization in studying problems relating to marine pollution will be continued.

The programme for 1973-76

V.11.12. In 1973-74 the technical studies started on the preparation of standards and inter-comparison of different methods will be continued, another review will be carried out, and the results will be used in assessing consequences of marine pollution. A consultants' meeting will be convened to evaluate the results obtained and to investigate the feasibility of adopting "recommended" analytical procedures and carrying out "standard" experiments.

V.11.13. The co-ordinated research agreement programme, which has been under way sinc 1968, has been extended to 15 countries. The intercomparison of the methods used in marine radioactivity studies is the central activity in this programme. In the future an increase in the number of participating laboratories is envisaged.

V.11.14. The active bilateral co-operation with national laboratories will be continued and broadened with a view to solving some specific problems.

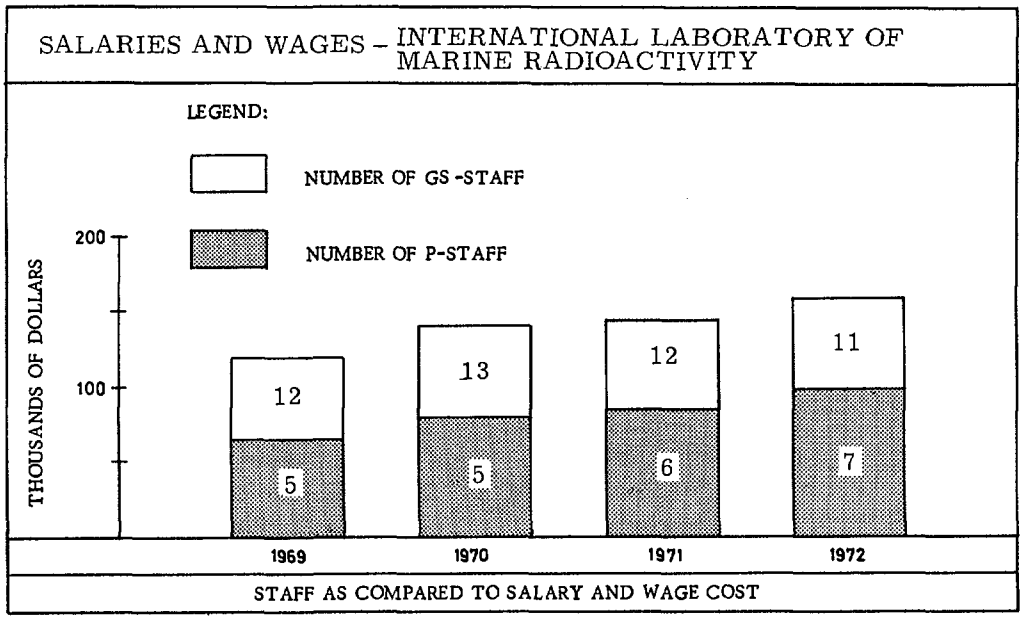
V.11.15. With the increasing development of nuclear power, particularly in developing countries, many atomic energy authorities and reactor operators will have to deal with problems arising from the release of radioactivity into the sea and it is probable that they will request advice and assistance from the Agency. The Laboratory will be prepared to undertake research on specific urgent problems of Member States, especially those that do not have their own facilities for such work. In the same manner the Laboratory will continu to provide training.

Budget estimates

Explanation of major cost changes in 1971

V.11.16. Of the increase of $16 200 for 1971 for operation of the Monaco Laboratory $13 200 is due to price increases, of which the vast majority is for salaries and related common staff costs, as shown in Table 30. The remaining $3000 is for the upgrading of one GS post to the P-1 level.

FIGURE 27



V.11.17. Regular Budget. The $16 200 increase in the budget for 1971 is all to be borne by the Regular Budget of the Agency in accordance with the basic principles of the agreement signed with the Monegasque Government and the Oceanographic Institute. However, since price increases have accelerated much more rapidly than anticipated, efforts will be made to secure agreement to provide for contributions more nearly on the same relative percentage basis as provided for in the 1969 budget, upon which the agreement was based.

V.11.18. Operating Fund I. The budget estimates are prepared on the basis of a special contribution of $45 000 from the Monegasque Government, although the devaluation of the French franc has resulted in a reduction in the dollar equivalent of the contribution to only $39 640. It is assumed for budget purposes that the Monegasque Government will agree to contribute an amount equivalent to $45 000.

Preliminary budget estimates for 1972

V.11.19. The 1972 preliminary budget estimate provides for further salary and common staff cost increases and minor cost increases for travel and supplies. It is proposed to upgrade one GS post to the P-1 level in 1972.

12. Information and technical services

Summary of costs

Table 32

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	389 857	493 300	11 100	15 900	27 000	520 300	634 300
Common staff costs	149 785	181 700	7 600	7 000	14 600	196 300	242 000
Duty travel and missions	10 318	20 000	1 000	400	1 400	21 400	22 700
Meetings: Panels and committees	2 982	12 000	-	5 000	5 000	17 000	15 000
Seminars, symposia and conferences	-	10 000	-	(3 000)	(3 000)	7 000	7 000
Representation and hospitality	3 835	1 000	-	-	-	1 000	1 000
Scientific and technical contracts	28 610	57 000	-	(7 000)	(7 000)	50 000	50 000
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	232 723	296 000	4 000	(1 000)	3 000	299 000	368 000
Sub-total	818 110	1 071 000	23 700	17 300	41 000	1 112 000	1 340 000
Publications and other information media	77 415	119 000	7 000	20 000	27 000	146 000	175 000
Less: Income	-	(25 000)(a)	-	25 000(a)	25 000	-	-
Sub-total	77 415	94 000	7 000	45 000	52 000	146 000	175 000
TOTAL	895 525	1 165 000	30 700 2.63%	62 300 5.35%	93 000 7.98%	1 258 000	1 515 000

(a) The income deducted in 1970; for 1971 the gross expenditure is shown, i.e. without deduction. Compared with 1970 gross expenditure, the programme increase in 1971 would be 3.13% only.

Summary of manpower

Table 33

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	1	-	1	1
P-5	3	3	-	3	3
P-4	6	7	-	7	7
P-3	7	7	1	8	9
P-2	6	5	-	5	8
P-1	4	7	-	7	7
Sub-total	27	30	1	31	35
GS	39	44	3	47	52
M&O	-	-	-	-	-
TOTAL	66	74	4	78	87

Highlight summary

V. 12. 1. This part of the programme covers the work, and the related costs, of the Division of Scientific and Technical Information, except for scientific conference administration. The programme therefore includes those activities related to INIS, computer services, the Agency's Library, the computer programme library, and the publication of the Atomic Energy Review and Nuclear Fusion Journal.

V. 12. 2. Costs under this programme are expected to increase by $93 000 or 7. 98% in 1971 compared with the approved budget for 1970. Of this amount, a total of $30 700 or 2. 63%, is due to salary and price increases, and $62 300 or 5. 35%, to programme increases. Part of this programme increase (about $25 000) is due to the change in budget presentation compared with 1970. The budget for 1971 is, to the extent possible, a total expenditure budget with all revenues shown under miscellaneous income. Up to 1970, on the other hand, some activities were budgeted for on a net basis with revenues deducted from directly associated expenditures. On a comparable basis, the programme increase in 1971 would be only 3.13%. The major increase in actual programme expenditures is in support of the computer services and the Library, as explained in more detail below.

Programme

V. 12. 3. Each of the major parts of this programme for the next six years is described below, special emphasis being given to the biennial period 1971-72.

INIS

V. 12. 4. The operation of INIS consists of the following three distinct activities:

(a) An international sharing of the collection of input data and their preparation in a standard format, so as to produce a comprehensive, world-wide

collection of nuclear information. Since each country's effort will be proportional to the volume of its literature, and hence to the size of its nuclear activity, the sharing will be equitable;

(b) The use of computers to process these data, so that modern standards of speed and efficacy can be achieved in the system's output; and

(c) The collection and distribution of microfiches.

The exploratory work and all initial system studies have been completed, culminating in the study prepared by the team which met in Vienna in March-June 1968 [1].

V. 12. 5. The implementation recommendations, which are now being put into effect, involve the following activities:

(a) Preparation of the Instruction and Guidance Manuals and their distribution to the input centres in Member States;

(b) Development, in contractual co-operation with EURATOM, of the INIS Thesaurus of index terms, and indexing rules;

(c) Systems analysis, adaptation of EURATOM software, and development of new programmes for the mechanized preparation of input, processing and production of output for all material entering the system;

(d) Upgrading, both in terms of equipment and working methods, of the Microfiche Clearing-house;

(e) Start of INIS operations with a limited subject scope in 1970; and

(f) Holding of a regional seminar for the training of cataloguers and indexers in Member States.

The programme for 1971-72

V. 12. 6. By the beginning of 1971, INIS will have been in operation only for a few months and only with a limited subject scope. Problems revealed during the early months of operation will have to be solved, and the system will have to be improved to ensure that the operations become as automatic as possible.

V. 12. 7. In consultation with Member States, the subject scope of the system will be progressively increased until it covers all nuclear science and its peaceful applications; the full scope should be reached in 1972, by which time it is expected that input will amount to 120 000 items per year.

V. 12. 8. Close relations will be maintained with input centres and users in Member States. This will necessitate the holding of at least one panel in Vienna each year, the provision of advisory services to Member States, and the holding of perhaps three regional training seminars. The Advisory Committee that is to review the performance of INIS will meet once each year.

V. 12. 9. The indexing system will require considerable attention and the thesaurus will need continuous updating and may need radical revisions in its structure. A need is fore seen for two meetings of thesaurus specialists each year. By 1971 the Agency should have developed the computer programmes for extracting references from the accumulated files. Retrieval services will be offered, first to Agency staff on an experimental basis, and then to Member States on the basis of a cost-recovery formula. The existence of a retrieval system will greatly facilitate the improvement and revision of the whole indexing system.

[1] "Report of the INIS study team", IAEA, PL-308, July 1968.

V. 12. 10. By 1972 a more efficient system for computer input may be needed. This would involve the purchase of a machine by which information could be directly keyed to magnetic tape. It will by then also be practicable to consider photo-typesetting of the printed product.

V. 12. 11. The volume of work to be handled by the Microfiche Clearing-house will rise as the subject scope broadens. For INIS purposes, a second step-and-repeat camera will be installed in 1972. If the Member States make a sufficient demand for full-size copies of information recorded in microfiche, a step-and-repeat enlarger would also be installed in the same year.

V. 12. 12. By 1972 operations should have become sufficiently predictable to enable charges for printed products and microfiches to be fixed that are designed to cover fully the cost of production.

V. 12. 13. Studies to improve the efficiency of the system will be carried out by outside organizations.

V. 12. 14. The Agency may need to conduct, by contractual arrangement, studies on the compatibility of machines in eastern and western countries to facilitate the exchange of INIS output and input between the Agency and centres having hardware different from its own.

The programme for 1973-76

V. 12. 15. The programme during this period will consist in the first instance of the routine operation of the fully implemented system with a full subject scope. The activities of the Agency and its relationship with other members of the United Nations family may necessitate further development of the subject scope and consequently of such items as the thesaurus. To follow closely these developments, the Advisory Committee will continue to meet once a year and there will be further yearly panel meetings.

V. 12. 16. One regional seminar for the training of cataloguers and indexers will be held each year. Computer systems will be maintained and improved. Entirely new aspects, such as automatic indexing, may necessitate the award of contracts. The possibility of starting remote-console teleprocessing may be entertained in view of the larger-capacity computer that will probably be operational at this time.

V. 12. 17. The Agency may need to co-operate with other international organizations in the development of a world-wide information system for all branches of science and technology. This matter is being studied by UNESCO and ICSU.

V. 12. 18. Apart from the further increase in volume of material to be handled, the Clearing-house will continue with the same services as in the previous two-year programme.

V. 12. 19. Among matters that should be considered at a later date are: a retrieval service for developing countries on a large scale; automatic indexing; mechanization of all input and output; and the installation of an optical reader to exclude keypunching of input. Budgetary provision will need to be made for consultants and panels to study these advanced systems.

Computer services

V. 12. 20. The services of the centre have embraced the following activities: systems analysis and programming of the basic INIS system as at present defined, completion of the administration system, Agency accounting, hydrology, scintigraphy, mailing lists, neutron data, and a variety of small systems such as statistics, listings, research contracts, library, and safeguard models, plus the UNIDO payroll.

The programme for 1971-72

V. 12. 21. The further expansion of systems already partly developed and the new applications which can already be reckoned on will include: continued development of INIS and of the reactor information system; the initial safeguards systems; technical assistance; expansion of the accounting activity; the legal information system; scientific applications; non-expendable inventory; library; a variety of minor applications; and unforeseen systems.

V. 12. 22. The work for UNIDO will include development on the following systems: accounting; technical assistance; experts information system; industrial information system; statistical work; a variety of minor applications; and unforeseen systems.

V. 12. 23. Experience in progressive computer centres has shown that forecasts of computer workloads are often underestimated. The utilization of automated systems by various levels of management invariably generates new ideas for further applications which are difficult to anticipate. For this reason the item listed as "unforeseen systems" cannot be ignored as it is likely to represent a significant portion of the workload.

V. 12. 24. Current computer use is well into the second shift. It is expected that by 1972 operations will be well into the third shift. At this point turn-around time will become very long and cause ineffective use of manpower and delays to the user. It is proposed therefore that a more efficient machine, the IBM 360 model 40 with a doubled storage capacity, be installed at this time. Such equipment would also be essential for the further installation of teleprocessing from remote consoles.

The programme for 1973-76

V. 12. 25. The programme for 1973-76 for an activity such as computer services is necessarily ill-defined. Apart from improvement, maintenance and expansion of all previously described systems, with some major changes which might be required for INIS, further development of the Agency's and UNIDO's activities is entirely dependent on the needs that will be identified by the managements of the two organizations.

V. 12. 26. During this period the installation and use of remote consoles for teleprocessing should be spreading to such places as the Library, UNIDO, the Agency's Accounting Section, the Division of Personnel, INIS, the Laboratory at Seibersdorf, etc. Such typewriter terminals would permit immediate access to the information files in the computer, and response to queries, editing of input data, standard calculations, etc., could be expected to be carried out very rapidly.

Library

V. 12. 27. Normal library services are provided, including reference services and the circulation of books, films, journals and documents.

The programme for 1971-72

V. 12. 28. The normal services will continue. The greater mechanization of library circulation and serial check-in should enable the library staff to provide more reference services within the Agency and to Member States.

V. 12. 29. The Library will work towards the publication of a printed catalogue and will begin to offer a broad-scope Selective Dissemination of Information (SDI) service to the Agency's staff. The microfiching of journals will be increased so that fewer journals will be bound. The increased volume of microfiche preparation will require the purchase of one step-and-repeat camera and other related equipment. This new equipment will be located in the INIS Microfiche Clearing-house and operated by its staff.

V. 12. 30. It is proposed to invite consultants to continue to assist in the design of facilities and advise on the choice of equipment for the Library at the Donaupark site.

The programme for 1973-76

V. 12. 31. During this period the programme will be aimed at increasing the mechanization of the Library's operations. The regular circulation system should then be made on-line to the computer, and with the completion of the new computerized word index it should be possible for staff members to have ready access to descriptions of the Library's holdings via their remote terminals and to obtain short bibliographies quickly.

V. 12. 32. The Library should be in a position to increase greatly its services in training librarians for Member States.

V. 12. 33. Later the Library may be moving to the Donaupark site, where it will merge some of its facilities and services with the UNIDO Library; this will result in improved general services and a reduction in operating costs.

Computer programme library

The programme for 1971-72

V. 12. 34. Close collaboration will be maintained with the ENEA computer library. It is expected that the office established by the Agency on an experimental basis at the ENEA library will continue to render services to Member States and that efforts will increase in this respect. While the library is at present restricted to programmes related to reactor calculations, there are indications that its subject scope may be widened to cover other areas of nuclear science and its applications.

The programme for 1973-76

V. 12. 35. The Agency will need to ensure the development of computer programme libraries covering many aspects of nuclear science and its applications. This will require significant budgetary appropriations for operating as well as for staff costs. It may require the creation of a network of regional libraries under the Agency's auspices.

Journals

The programme for 1971-72

V. 12. 36. The Atomic Energy Review and Nuclear Fusion Journal will continue to be published quarterly, but consideration will be given to extending the range of topics. If enough new material becomes available, the advisability of increasing the frequency of publication will be considered.

V. 12. 37. One meeting in connection with the journals to be held in Vienna in 1971 will be arranged.

The programme for 1973-76

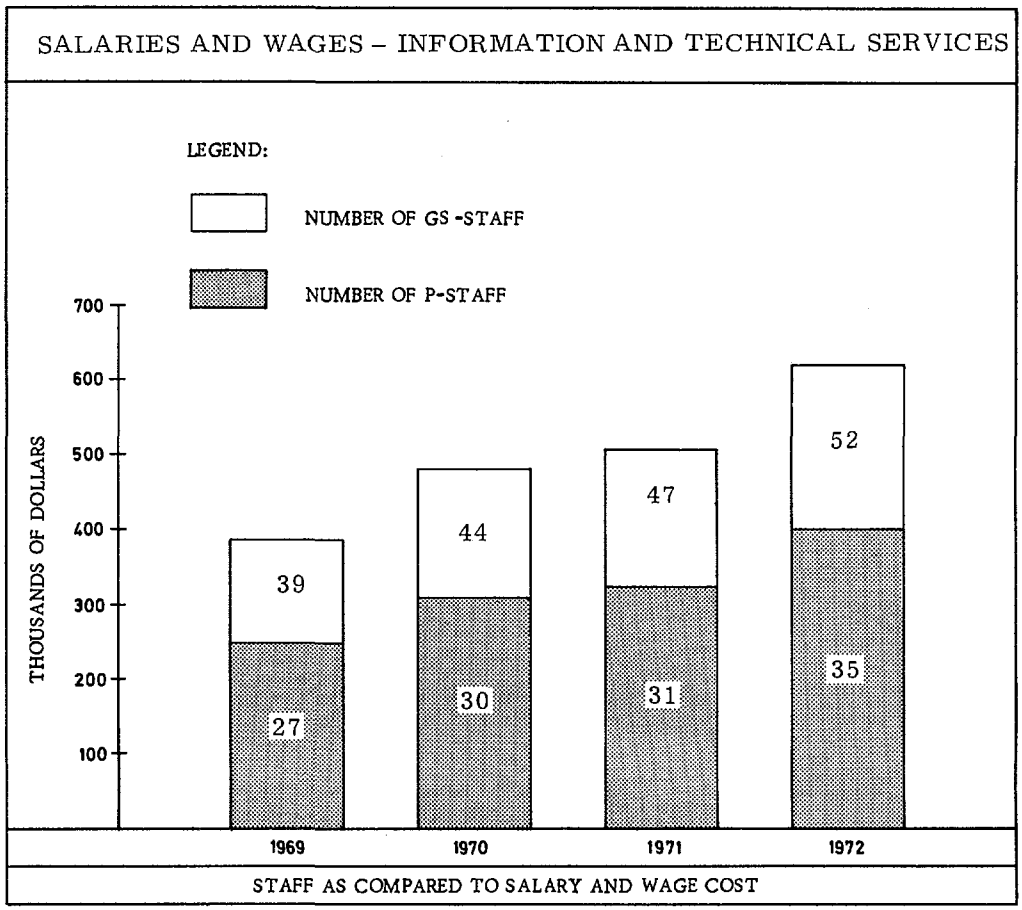
V. 12. 38. It is expected that both journals will progressively develop and there may be a need for new journals. Ultimately, the Atomic Energy Review should become the most authoritative international journal dealing with the peaceful uses of atomic energy.

Budget estimates

Explanation of major cost changes in 1971

V. 12. 39. The total anticipated increase in costs for this programme in 1971 amounts to $93 000, or 7. 98%, as shown in Table 32, which indicates that $30 700, or 2. 63%, is due to price increases pertaining to salaries and wages, common staff costs, duty travel and missions, common services, supplies and equipment, and publications and other information media.

FIGURE 28



V. 12. 40. The only staff increases under this programme in 1971 are in the Computer Section, where one P-3 post is needed for a programmer/analyst for work resulting from the safeguards programme and other scientific work. Three GS posts are also required to provide an assistant programmer for safeguards and reactor information systems, a computer operator for the extended working time of the machine and a key puncher to cope with the increased volume of input material. In addition to the various scientific programmes, the general accounts of the Agency will be placed on the computer at the beginning of 1971.

V. 12. 41. It is also proposed to provide a sum of $1000 for the services of a consultant to advise on equipment and specialized furniture for the use of the Library at the Donaupark site for the Agency's Headquarters which is, however, more than offset by reductions in consultants' funds in other sections of the programme.

V. 12. 42. Minor increases in estimated travel costs and costs for panels are more than offset by reductions in programme costs for symposia, technical contracts and equipment.

FIGURE 29

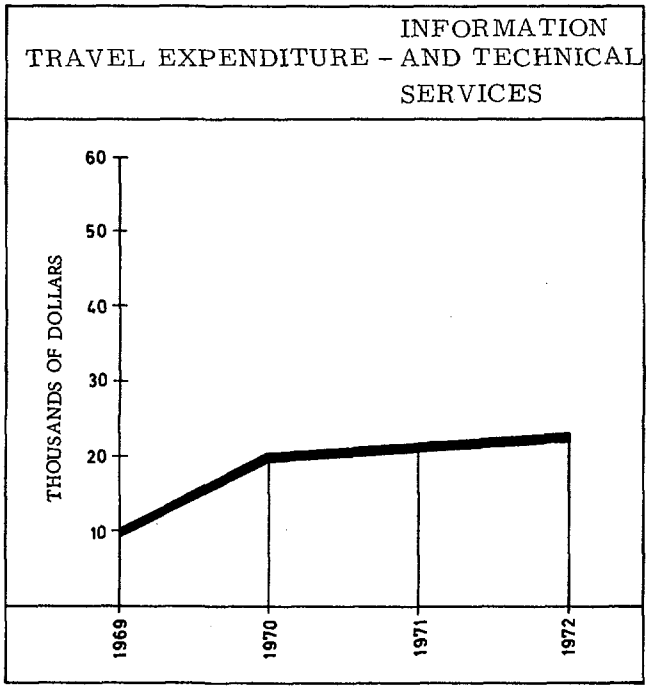
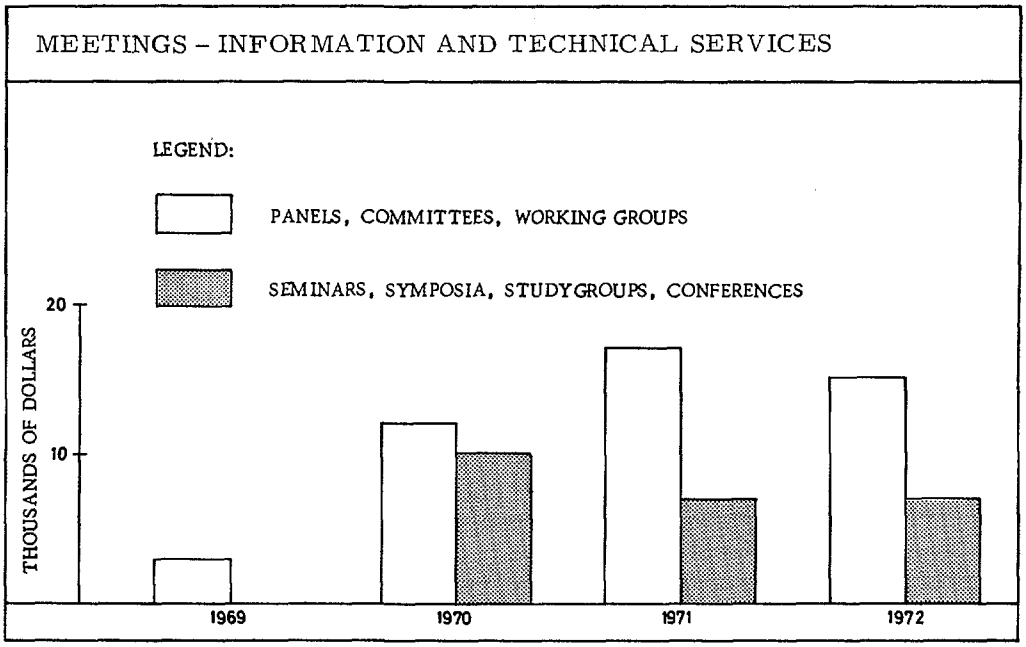


FIGURE 30



V. 12. 43. The largest programme increase in 1971 amounts to $45 000 for publications and other information media, which is entirely offset by revenues. This increase reflects the change-over to the method of accounting for revenue on a gross basis. In 1970 $25 000 of this amount was deducted from expenditures to arrive at a net figure. In 1971 an additional increase of $20 000 in revenue is expected to result in the total reaching $45 000.

Preliminary budget estimates for 1972

V. 12. 44. In 1972 it is foreseen that there will be a need for further increases in staff in support of this programme, as demands for INIS services, including microfiches, and for

computer services in support of INIS, safeguards, nuclear data, administrative work, and other scientific information expand. It is expected that a total of four additional Professional and five GS staff members will be required to meet these demands. Together with the normal salary increases expected for existing staff members, expenditure in respect of salaries and wages and common staff costs is expected to increase by about $159 700.

V. 12. 45. Other significant increases in programme costs totalling $77 300 are foreseen mainly for common services and supplies and equipment in support of INIS and the computer programme, together with an increase of $20 000 for INIS publications.

V. 12. 46. The above costs are all shown on a gross expenditure basis. Of the total increase in expenditures foreseen for 1972, it is estimated that $40 000 will be offset by additional income from the sale of INIS publications, microfiches, or reimbursable services furnished to UNIDO, other international organizations or Member States. It is foreseen that the net increase in costs under the Regular Budget will be about $217 000 in 1972.

Comparison of costs and manpower by major organization units

V. 12. 47. In order to allow the cost components of this programme to be reviewed by organization unit, several additional tables are included for information. Table 36 shows the anticipated costs for the INIS programme in 1971 and 1972 compared with the adjusted 1970 budget. From this table it will be seen that cost estimates for 1971 are in total lower than in 1970 owing to a small reduction in expenditures for consultants' travel and technical contracts and a curtailment in the procurement of equipment for INIS to permit purchase of a microfiche camera by the Library at a cost of $30 000. This camera will be so located that it will meet the needs both of the Library and INIS.

V. 12. 48. The estimated increases in prices and programmes for 1971 are shown by organization unit in Table 34, which indicates that the major programme increases are for the procurement of the microfiche camera and the employment of additional staff for the Computer Section, plus an increase of $24 000 for other computer service costs, consisting of $3000 for additional supplies, $16 000 for rental of more expensive equipment and rental of equipment for an additional shift, and $5000 for the purchase or rental of a paper tape magnetic tape converter.

V. 12. 49. Table 35 shows the comparative manpower of the various organization units over the four-year period 1969-72.

Summary of total costs by organization unit

Table 34

Organization unit	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Office of the Director	68 937	69 700	2 800	2 000	4 800	74 500	101 700
INIS Section	265 974	488 100	1 500	(17 300)	(15 800)	472 300	595 300
Computer Section	371 996	414 100	16 200	44 600	60 800	474 900	573 000
Library	188 618	193 100	10 200	33 000	43 200	236 300	245 000
TOTAL	895 525	1 165 000	30 700 2.63%	62 300 5.35%	93 000 7.98%	1 258 000	1 515 000

Summary of manpower by organization unit and category

Table 35

Organization unit	1969 budget			1970 budget			1971 estimate			Preliminary 1972 estimate		
	P	GS	Total	P	GS	Total	P	GS	Total	P	GS	Total
Office of the Director	2	2	4	2	2	4	2	2	4	3	3	6
INIS Section	12	13	25	14	16	30	14	16	30	15	18	33
Computer Section	8	11	19	9	13	22	10	16	26	11	18	29
Library	5	13	18	5	13	18	5	13	18	6	13	19
TOTAL	27	39	66	30	44	74	31	47	78	35	52	87

Costs of INIS activities

Table 36

Item of expenditure	1970 budget(a)	1971 estimate	Preliminary 1972 estimate
Salaries and wages	231 700	230 100	270 600
Common staff costs	84 400	84 800	102 000
Duty travel and missions	12 000	10 400	10 700
Meetings:			
Panels and committees	12 000	15 000	15 000
Seminars, symposia and conferences	10 000	7 000	7 000
Representation and hospitality	-	-	-
Scientific and technical contracts	57 000	50 000	50 000
Common services, supplies and equipment	66 000	15 000	60 000
Sub-total	473 100	412 300	515 300
Publications and other information media	40 000	60 000	80 000
Less: Income	(25 000)(b)	-	-
Sub-total	15 000	60 000	80 000
TOTAL	488 100	472 300 (3.24%)	595 300

(a) Adjusted 1970 budget.

(b) The income deducted in 1970; for 1971 and 1972 the gross expenditure is shown, i.e. without deduction.

13. Safeguards

Summary of costs

Table 37

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	482 292	671 500	47 000	249 200	296 200	967 700	1 417 700
Common staff costs	184 871	257 000	20 000	94 000	114 000	371 000	547 000
Duty travel and missions	114 663	120 000	6 000	74 000	80 000	200 000	300 000
Meetings: Panels and committees	26 927	20 000	-	-	-	20 000	25 000
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	1 886	3 500	-	800	800	4 300	4 300
Scientific and technical contracts	100 700	140 000	4 000	16 000	20 000	160 000	180 000
Scientific services, supplies and equipment	41 311	60 000	3 000	47 000	50 000	110 000	170 000
Common services, supplies and equipment	-	-	-	2 000	2 000	2 000	-
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	50 000	50 000	50 000	-
TOTAL	952 650	1 272 000	80 000 6.29%	533 000 41.90%	613 000 48.19%	1 885 000	2 644 000

Summary of manpower

Table 38

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	1	1	-	1	1
D	2	2	-	2	2
P-5	10	13	4	17	19
P-4	11	16	1	17	26
P-3	4	13	6	19	31
P-2	4	7	3	10	15
P-1	2	2	-	2	2
Sub-total	34	54	14	68	96
GS	18	25	5	30	37
M&O	-	-	-	-	-
TOTAL	52	79	19	98	133

Highlight summary

V.13.1. This programme covers the work of the Department of Safeguards and Inspection, including the Office of the Inspector General, the Division of Development and the Division of Operations. As seen from Table 37 the major programme increases requested in the Agency's Regular Budget for 1971 and 1972 are related to this programme. The description of the programme below therefore includes a more detailed explanation of staffing and financial requirements for other parts of the programme than any other part of the programme-budget document.

V.13.2. In summary, the increase for 1971 is expected to amount to $613 000, or about 48% more than the total amount approved for 1970. This represents the increased costs in respect of existing staff, plus 14 new Professional and five new GS staff members, and increased travel and development costs entailed by the increasing need for safeguards development, prototype equipment and inspection travel.

Programme

General

V.13.3. The Agency's safeguards tasks are increasing. Member States are continuing to transfer to the Agency the task of administering safeguards in relation to their bilateral agreements. New facilities are being constructed under existing agreements and the amount of nuclear material under safeguards is growing rapidly. The entry into force of NPT will lead to a significant expansion in the number of installations subject to safeguards. Much preparatory work will have to be done in 1971 and 1972 for the implementation of NPT.

V.13.4. The Agency is seeking ways of dealing with this growing responsibility with a minimum necessary increase in staff and budget. Agency safeguards will cover all types of plants in the fuel cycle. Research and development of methods and techniques must keep up with this expansion.

V.13.5. It now seems likely that by 1973 the Agency will have to apply safeguards within the framework of NPT to the nuclear programmes of non-nuclear-weapon States. Some countries may enter into safeguards agreements under NPT in 1971 or 1972. As it is not known how many or which countries this could involve, the operational needs for these two years are largely assessed on the basis of existing safeguards agreements and of the new ones that will be concluded in the normal course of events. Nevertheless, account must be taken of the need to train new staff and to make the other preparations to meet the requirements of NPT.

V.13.6. Assessments for 1973 and following years can only be of a provisional nature since the information on the nuclear activities of the countries concerned is less precise than that available for 1971 and 1972.

V.13.7. Recently, inspectors have been able to make use of some devices to help them in carrying out their inspection tasks, for instance, in measuring the presence of highly enriched uranium in fresh fuel elements before they are put into the reactor. Seals have also been applied in some reactor facilities. Such devices add to the credibility of the inspectors' observations; work now under way should in due course also make available other devices that would help to de-personalize the inspection work.

V.13.8. The estimates of the work-load in the programme period indicate the personnel which should be on the staff early each year to cope with the tasks. New staff members should be recruited and trained in the preceding year. In 1972-76 about twenty experienced staff members will have to spend at least 10% of their working time training new personnel.

V.13.9. It is expected that emphasis in development will shift from feasibility studies to installation and testing of safeguards instruments and devices. While the Agency will take advantage of the development work done in Member States, it will also have to encourage research and development of prototypes to meet its special needs. The programme must keep up with the development of processes used in the nuclear fuel complex. The Secretariat will have more consultations with Member States in planning research work; research co-ordination committees and/or working groups will have to be arranged.

V.13.10. Before operational tasks are undertaken, development work is directed at a broad range of facilities, beginning with conversion and fuel fabrication plants. Safeguards systems studies should eventually enable the Agency to optimize the cost-effectiveness of the operation. Safeguards practices will be improved and extended to all types of installations in the fuel cycle.

V.13.11. Planning and other supporting activities will increase with the expansion of safeguards. This category of work presents a range of novel problems in which technical, administrative, economic and legal aspects are closely interwoven.

Office of the Inspector General

The programme for 1971

V.13.12. This unit assists the Inspector General and deals with the non-technical elements in the Department's work. Its main tasks include the planning and support for negotiations concerning technical aspects of new agreements and subsidiary arrangements, assuring the protection of classified information, arranging for the designation of safeguards inspectors and preparing inspection trips, helping to codify safeguards manuals and maintaining statistics and financial records, and – in collaboration with the Division of Nuclear Power and Reactors – the collection and analysis of information on countries'

nuclear activities that may have an impact on future work. One additional clerk at the GS level will be required to assist the Professional officers in these tasks.

The programme for 1972

V.13.13. One additional GS staff member will be required to cope with the increasing work-load in 1972.

Division of Operations

V.13.14. The work-load of the Division of Operations has grown and is continuing to grow as foreseen in the Agency's budget for 1969 and programme for 1969-74 and the Agency's budget for 1970 [1]. Safeguards transfer agreements have been or are being negotiated in respect of a number of countries. In 1970, Agency safeguards will extend to several additional power reactors including power stations, e.g. in India, Japan, Pakistan and Spain. Fuel fabrication plants in three countries and at least one reprocessing pilot installation will come under safeguards. Preparatory work is needed for new facilities in Argentina, the Republic of China, Finland and possibly Canada and India. In connection with new agreements or newly completed facilities, subsidiary arrangements for the establishment of records and reports must be negotiated.

V.13.15. Preparatory work in connection with NPT and with the Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco Treaty) has had to be accelerated. The study of the safeguards procedures to be applied once States submit all their activities to the Agency's safeguards is more urgently required than was foreseen in the budget for 1970. This preparatory work has also led to a considerable increase in the planning and support activities at Headquarters. Work on the maintenance of records and accounts as well as on the streamlining and further computerization of the Agency's accounting system for nuclear materials under safeguards has become more urgent.

The programme for 1971

V.13.16. The growth in 1971 can also be predicted rather precisely on the basis of the work required under existing safeguards agreements and expected new agreements not connected with NPT. The types and numbers of facilities under Agency safeguards in the years 1969-71, divided into three Groups according to the frequency of their inspection, are shown below.

Group	Type	Year		
		1969	1970	1971
I	Power plants	6	9	13
II	Reprocessing plants (two pilot plants)	3	3	4
	Fuel fabrication plants (pilot plants)	1	5	9
	Research reactors	50	54	65
	Critical facilities	9	9	11
III	Sub-critical facilities	2	2	4
	Research and development facilities	14	17	16
	Other locations	45	57	62
	Total	130	156	184

[1] See documents GC(XII)/385, paras 463-598 and GC(XIII)/405, paras 94-124 respectively.

V.13.17. The geographical distribution of the nine power plants at present under Agency safeguards [2] is as follows:

India	1	United Kingdom of Great Britain and Northern Ireland	1 [3]
Japan	3		
Pakistan	1		
Spain	2	United States of America	1 [4]

V.13.18. The geographical distribution of the 63 research reactors and critical facilities now under Agency safeguards [2] is shown below:

Argentina	5	Indonesia	1	Thailand	1
Austria	3	Iran	1	United Kingdom of Great Britain and Northern Ireland	1
Australia	2	Israel	1		
Brazil	3	Japan	21		
China	1	Korea, Republic of	1		
Colombia	1	Mexico	1	United States of America	2
Congo, Democratic Republic of the	1	Pakistan	1		
Denmark	3	Philippines	1	Uruguay	1
Finland	1	Portugal	1	Venezuela	1
Greece	1	South Africa	1	Viet-Nam	1
		Spain	4	Yugoslavia	1

V.13.19. In paragraph V.13.16. above, the facilities in Group I are those to which the Agency has the right of access at all times, for each of which a theoretical maximum number of 12 inspections a year is assumed. Group II consists of medium-sized research reactors and critical facilities, as well as pilot reprocessing and fuel fabrication facilities, with a theoretically permissible average number of 1.5 inspections a year. Group III consists of small facilities with a theoretically permissible average number of 0.7 inspections a year.

V.13.20. Out of about 200 theoretically permissible inspections in 1969, only 91 were carried out; this represents too small a percentage from a technical point of view. It is considered highly desirable that, in 1970 and 1971, 60% of the theoretically permissible inspections should be carried out, and the number of inspections planned for these years is therefore 160 and 210 respectively. The operational manpower required has been determined on that basis.

V.13.21. Although the time required to make an inspection varies with the nature of the facility being inspected, it is possible to establish the average time and number of inspectors required for each inspection. Experience shows that an inspector requires an average of five days in the field, which includes preparatory and travel time, to make an inspection. In 1969 the average number of inspectors needed to carry out an inspection was 1.6. In 1970 this number will remain the same but, in addition, an average of 0.4 inspectors will be required for training purposes. In 1971, two inspectors will normally be required to carry out an inspection and, in addition, an average of 0.3 inspectors will be needed for training purposes. During each of the years 1970 and 1971 five to six man-years will have to be spent on training, the greater part of this time being required to acquaint new inspectors with the installation to be inspected. Thus the number of man-days spent in the field on inspections in 1969 was 720, and 1600 and 2400 man-days will be used for this purpose in 1970 and 1971 respectively.

---

[2] Based on agreements approved by the Board of Governors.

[3] The reactors in this plant are being used for developing surveillance instrumentation for on-line refuelling.

[4] A new agreement is under consideration covering at least one facility for which the inspection frequency would correspond to "access at all times" (see document INFCIRC/66/Rev.2, the table in para.57).

V.13.22. In 1969, 2880 man-days were required for operational work at Headquarters (for example, the completion of inspection reports, analysis and auditing of accountability reports, correspondence with the authorities in States in which the Agency is applying safeguards, book-keeping in respect of fissile material and training of new Professional staff), which was four times more than the number of man-days spent in the field on inspections. It is planned to limit the number of man-days devoted to such work in 1970 and 1971 to 4800 and 7200 respectively, which is only three times more than that to be spent in the field on inspections. The total working days spent in the field and at Headquarters was divided by the number of working days available each year (210 in 1969) to arrive at the total man-years, which was then used as a basis for preparing the manning table for 1970 [5] and the proposed manning table for 1971 [6], that is, 30 man-years for 1970 and 46 for 1971, as against 17 for 1969. The accuracy of this calculation was checked by determining the time likely to be required in the field for inspections and for work at Headquarters in respect of each facility involved.

V.13.23. The data relevant to manpower requirements are summarized in the following table.

Item	Year		
	1969	1970	1971
Maximum permissible inspections and related Headquarters work (man-years)	38	41	67
Ratio of Headquarters to field work	4	3	3
Percentage performance of permissible inspections	45	60	60
Inspections (man-years)	3.5	6	10
Headquarters work (man-years)	13.5	18	30
Training (man-years)	-	6	6
Total manpower requirement (man-years)	17	30	46

V.13.24. As to the allocation of manpower, the work-load in the area of the Americas and Africa will require ten men, in that of Asia, the Far East and the Pacific 18 men, and in that of Europe 14 men. To these figures, three Professional officers for the Accounts and Reports Section and the Director of the Division should be added, making a total of 46, or an addition of 16 over the manning table for 1970.

V.13.25. The normal increase in staff, as compared with the increase in the megawatts (electric) produced in power reactors and effective kilograms of fissionable materials in facilities under safeguards, is shown below.

Normal growth of safeguards operations staff
(based on agreements approved by the Board at the end of 1969)

	1969	1970	1971	1972
Megawatts (electric)	1119	3274	4448	5617
Effective kilograms [7]	2093	2939	4520	6520
Operational staff (Professional and higher categories)	17	30	46	54

[5] GC(XIII)/405, Annex II.

[6] Annex V.

[7] As defined in document INFCIRC/66/Rev.2, para.72.

The proportional relationship between effective kilograms and manpower is apparent only, as a number of research reactors coming under safeguards in 1970 and 1971 had to be considered as well. A trend towards a higher ratio between effective kilograms and manpower is already visible for 1972. In later years this trend will increase when more large power stations will come under safeguards.

V.13.26. In addition, ten Professional officers will be required in 1971 to assist in the preparations for NPT. Six experienced inspectors will have to spend most of their time in making technical arrangements and working out with national authorities procedures for each facility involved, in the analysis of national activities in the countries concerned and in the preparation of general manuals, practices and procedures for the application of safeguards under NPT. In their regular work they will have to be replaced by new inspectors. Two will be needed for the extension of the records and accounts system at Headquarters and two to replace staff who will be used for training purposes.

V.13.27. In calculating the number of staff needed for preparatory work in connection with NPT an assumption has had to be made with regard to the number of States that will approach the Agency in 1970 and 1971 with a view to concluding the necessary safeguards agreements. It has been assumed that in 1971 technical arrangements will have to be made with all States having nuclear programmes which had ratified NPT when it entered into force on 5 March 1970. There are 19 such States – with a total of more than 70 facilities – which include Canada, China, Denmark, Finland, Greece, Mexico, Norway, Sweden, Yugoslavia and the East European non-nuclear-weapon States.

V.13.28. Experience shows that the average time required to prepare for the application of safeguards in respect of one facility, including the review of design information, pre-operational visits and arrangements concerning records and reports, has been about 20 days. For some facilities part of this work has already been done in connection with existing agreements. There will, however, be many other facilities for which very intensive study, requiring much more time, will be needed, so that the average of 20 days per facility is reasonable. States with no nuclear programmes have not been taken into account.

V.13.29. In view of the uncertainty as to when further States will ratify NPT, no allowance has been made for the staff that may be required in 1971 for preparatory work for the Agency to apply safeguards in such States. It is obvious, however, that in the course of that year extensive discussions will have to start with several additional States which have important nuclear programmes, and that allowance must also be made for the staff required for technical discussions on safeguards arrangements. Since it is hoped that a certain degree of uniformity can be achieved in the technical arrangements with States, after the first such arrangements have been concluded, it is expected that the six staff members at present engaged in these preparations might also be able to deal to a large extent with all such arrangements in 1971.

V.13.30. The total additional staff required for the Division of Operations in 1971 would thus be 26 Professional officers. To assist these Professional officers five additional GS clerical and secretarial staff members would be needed.

V.13.31. However, as a result of the survey of the deployment and utilization of staff in the Agency, nine Professional posts now vacant in other Departments can be allocated to the Department of Safeguards and Inspection for 1971. Consequently the safeguards training programme can be advanced, thus permitting an earlier replacement of experienced inspectors. They can then be used for preparatory work in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). This results in saving the additional five Professional posts.

V.13.32. The total demand for new Professional posts can thus be reduced from 26 to 14 posts. Two GS posts can also be dispensed with. Only 12 additional Professional and three GS posts for the Division of Operations are therefore requiredfor 1971.

V.13.33. Travel costs vary widely for each inspection. The determining factors include the combination of facilities which can be inspected on each trip (this in turn depends on the different periods required to inspect different types of facilities at different times), the combination of countries that can be visited and changes in the cost of fares.

V.13.34. As far as possible inspection visits will be combined to economize on travel costs, with duty travel for international conferences and discussions with Member States on safeguards application. The Secretariat has received indications that several Member States are interested in receiving advice on the establishment of records and reports systems that might serve both national and Agency safeguards needs.

V.13.35. In estimating travel costs in 1971, an attempt has been made to establish the most economic combinations of inspection trips in relation to the main air routes, and it has been found that the costs would be $55 000 for the Americas and Africa, $25 000 for Europe and $90 000 for Asia, the Far East and the Pacific, giving a total of $170 000.

The programme for 1972

V.13.36. The transition to operational strength under NPT must be under way in 1972. All preparations will have to made for the application of safeguards with respect to non-nuclear-weapon States in Europe, in Canada, and other non-nuclear-weapon States where safeguards are being applied but where the entire nuclear programme has not so far been submitted to safeguards. New agreements will have to be negotiated with all countries which have ratified NPT and technical arrangements will have to be made for records and reports. Staff will have to be recruited and trained; at Headquarters the administration will have to be geared to give adequate support to large-scale field operations.

V.13.37. In 1972, existing safeguards agreements will add to the work-load. Plans call for the completion of several nuclear power stations, and in a number of countries sizable amounts of plutonium as well as other nuclear activities will come under safeguards.

V.13.38. This normal growth of safeguards, under existing agreements, would require an operational Professional staff of 54. In addition six Professional officers will be needed in 1972 to assist in the preparations and negotiations for NPT. Three additional clerical and Secretarial staff members will also be needed.

V.13.39. The 1972 estimate will have to be re-examined in the light of the pace of events in connection with NPT.

V.13.40. Safeguards travel in 1972 will continue to pertain mainly to the responsibilities under existing agreements and those which are anticipated outside NPT. Some travel may already have to be undertaken in connection with the application of safeguards under NPT. Total travel requirements including duty and advisory travel will involve a sum of $250 000.

The programme for 1973-74

V.13.41. For the present, it is assumed that 1973 will be the first year of full implementation of NPT. By then, States Parties to the Treaty will have significantly extended the range of their nuclear activities. In Europe more than 15 large power stations are expected to be completed and to start operation in countries with safeguards transfer agreements now in force, or to come under safeguards as a result of NPT agreements in 1973-74. New facilities will be in operation in Asia and in the Far East. The quantities of materials to be safeguarded will have increased considerably.

The programme for 1975-76

V.13.42. On the basis of available plans and construction schedules, the growth in the installed nuclear power capacity in non-nuclear-weapon States will show a marked increase. A realistic evaluation of the situation is however not possible now. Construction plans now known call for the completion of between 10 and 20 power stations all over the world.

Division of Development

V. 13. 43. Research and development in the field of safeguards are part of the Agency's safeguards tasks. As explained under the programme of the Division of Operations, the magnitude of these tasks is increasing sharply, and research and development are required to enable the Agency to deal with this growth effectively. At the same time the nature of the task has changed. The emphasis in Agency safeguards has shifted from research reactors to power plants. They now have also to deal more and more with other types of nuclear plant of great complexity, and increasingly also with the complete nuclear fuel cycle in various countries. The development of the Agency's safeguards methods and techniques must keep up with this expansion and in fact stay ahead of it.

V. 13. 44. The training activity for the new operational staff will have to be enlarged. Formal training courses have been established to impart newly developed techniques and experiences gained so far in the application of safeguards. On-the-job training, which is indispensable, will have to be extended by the organization of field trips for new trainees.

V. 13. 45. The development programme consists of the following three main lines of activities:

(a) The systems analysis, which is aimed at clarifying the relationship between the efficacy of safeguards, manpower requirements, costs, frequency and intensity of inspections, as well as at identifying and possibly avoiding redundancies in safeguards operations;

(b) The work on methods and techniques, to promote, supplement, and co-ordinate research and development programmes so that appropriate safeguards methods and techniques are investigated and developed to a stage where they can be utilized in operation. Emphasis is placed on the testing under plant conditions of specific prototype safeguards instruments and devices now existing in varying stages of development. Means for identification and measurement of special nuclear materials in the various stages of principal nuclear facilities will continue to be investigated with the aim of providing compact portable or transportable non-destructive type equipment; and

(c) The field operations, which apply the results of research and development work on systems, methods and techniques to procedures for the implementation of safeguards, as well as reviewing and testing procedures in use, so that they adequately reflect the stage of development achieved. A safeguards integral test programme has been designed to test and prove complete procedures developed for safeguarding material in different types of facilities and to provide data for the continuation of the systems analysis work. Integral testing is the complete application of safeguards to materials in a facility during a significant period of time for development purposes.

V. 13. 46. Three means of furthering safeguards research and development work have proven to be effective. They consist of:

(a) Obtaining and evaluating the results of research and development programmes in Member States;

(b) Entering into research contracts with appropriate organizations and laboratories in Member States to perform specific safeguards studies and development work; and

(c) Initiating and executing safeguards studies at Headquarters, which is frequently done in collaboration between the staff of the Department of Safeguards and Inspection and other Agency Departments.

V.13.47. The development programme is broken down into individual projects, which are listed at the end of this part of the programme. The responsibilities for these projects are distributed among the three Sections of the Division of Development. This programme covers several years. The personnel and budget needs are specified for 1971 and indicated for 1972 in the following paragraphs.

The programme for 1971

V.13.48. For the preparation of lectures for the training courses and for the demonstration of safeguards techniques in facilities outside Headquarters, it will be necessary to engage the full-time service of an experienced Professional officer. As the development of safeguards procedures for activities involving plutonium is expected to become more important, one additional Professional staff member, with a background in plutonium fuel fabrication, must be available. The Division will also need one more secretary in 1971.

V.13.49. Consultants will be required to assist in the integral testing programme, for the improvement of the records and reports system through electronic data processing and for lecturing at safeguards training courses, at an estimated cost of $10 000.

V.13.50. It is planned that three working group meetings be convened, which would help keep both the Agency and experts in Member States abreast of work. A further working group will be needed to discuss development problems involved in applying safeguards to reprocessing and fabrication plants. A total provision of $20 000 is foreseen for all these meetings.

V.13.51. Activities can be split up into:

(a) Research and development contracts on measuring techniques for safeguards purposes for fast reactors, conversion, fabrication and reprocessing plants, scrap processing and material in storage and the development of safeguards instrumentation. These contracts are envisaged only if similar projects are not undertaken in Member States, or if the Agency does not have access to the results. The safeguards systems analysis work will have to be based on a large number of empirical data, which will be obtained through contracts with scientific institutions in Member States. The total expenditure on this activity will be $140 000;

(b) Technical service contracts, some of which will be required for the installation of equipment at facilities where integral safeguards tests are carried out. To the extent that the equipment is suitable for routine use, it may be left in the facilities to assist in later implementation. The total expenditure on this activity will be $20 000;

(c) The purchase of surveillance instruments for use during integral experiments. The usefulness of instruments that have now reached the prototype stage should be determined. Several devices now available on the market might be used after relatively minor adaptation. Some demonstration equipment will be required for training. For operational purposes several gamma-scanning devices and neutron detectors have to be purchased, as well as power integrators and sample containers. The total expenditure on this activity will be $57 000;

(d) Taking some 520 samples, carrying out analyses and preparing standards. It is assumed that about 10% of these samples may be analysed cost free. The total expenditure on this activity will be $48 000; and

(e) The provision of supplies to cover such expendable items as seals, photographic plate and protective clothing for inspectors. The total expenditure on this activity will be $5 000.

For all the above-mentioned items a total sum of $270 000 will therefore be needed.

V. 13. 52. Travel must be undertaken in connection with research contract co-ordination, the execution of integral tests and reviews of inspection procedures. A total of $30 000 is requested.

V. 13. 53. It is expected that up to 80% of the analytical work referred to in paragraph 51 (d) can be done by outside contracting laboratories. The rest of the work and umpire analysis should be handled in Seibersdorf. For that purpose a small (500 m^2) laboratory for the analysis of active solutions containing uranium, plutonium and fission products would have to be constructed. In 1971 $50 000 should be provided to cover preliminary design work and an engineering cost study to form the basis for a detailed project.

The programme for 1972

V. 13. 54. The increasing amount of routine technical work done in 1972 in connection with field testing will require the employment of a technician in the GS category.

V. 13. 55. Again work on integral testing and on scrap handling problems will require consultants' services, as will the further automation of the record and report system. $14 000 will be needed for that purpose.

V. 13. 56. Two working group meetings are foreseen on systems analysis and system synthesis. In addition, it is considered necessary to convene a small panel on instrumentation questions to guide the Agency in its approach to the use and possible purchase of tamper-proof monitoring instruments and of non-destructive testing devices. Another panel is planned on operational experiments and the results of integral testing. A total of $25 000 is foreseen for these meetings.

V. 13. 57. Activities are again split up into:

(a) Contracts for the development of methods and instrumentation for safeguards on reactors and on various kinds of fuel, fabrication, processing or reprocessing plants. Considerable work on instrumentation will be necessary; a series of devices is likely to become available as prototypes and must be tested and developed to the point where they can be used in the field. The total expenditure on this activity will be $150 000;

(b) Technical service contracts for the installation of inspection devices in facilities under safeguards. It is hoped that the installed equipment can be left there for future operations. The total expenditure on this activity will be $30 000;

(c) The purchase of portable surveillance instruments in so far as they are developed to the point where they will become commercially available. Some scanning devices will be needed for training. The total expenditure on this activity will be $82 000;

(d) The taking of an increased number of samples to be analysed, particularly in respect of facilities handling nuclear material in bulk. It is estimated that upwards of 900 samples will have to be taken. The total expenditure on this activity will be $81 000; and

(e) The purchase of various additional expendable supplies and sample containers, The total expenditure on this activity will be $7000.

For all the above-mentioned items a total sum of $350 000 will be needed.

V. 13. 58. In order to keep up to date on work involving systems studies and the development of methods, it will be necessary to travel and to attend international meetings. A total provision of $50 000 is foreseen for travel purposes in 1972.

V. 13. 59. If the decision is taken to construct a new laboratory, costs of the order of $450 000 will be spread over 1972-73.

The programme for 1973-74

V. 13. 60. The basic part of the systems analysis work may be expected to be largely completed early in this programming period; emphasis will then be placed on optimization programmes for safeguards implementation. The programme for this period should leave room for development work on safeguards in enrichment plants, scrap recovery plants, various other pilot-type plants and high-temperature reactors, as dictated by operational needs.

V. 13. 61. The meetings of the consultants will continue to keep the operational approaches under review. In 1973 a panel on this subject will be arranged. Another panel on safeguards problems not previously explored, such as the closed fuel cycle or plutonium re-cycle, will be convened. A third panel on the review and further development of the operational approaches, coupled with a review of the cost effectiveness of the safeguards operations, should be held in 1974.

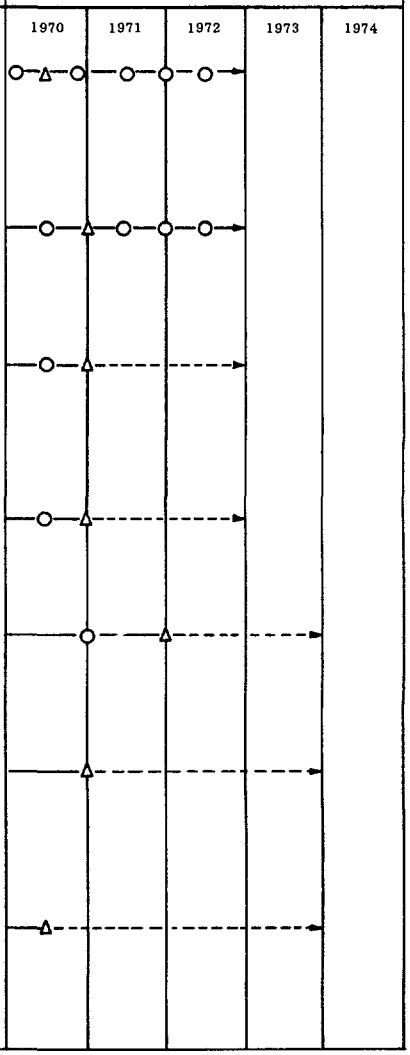
The programme for 1975-76

V. 13. 62. Development work in the third two-year period of this programme should continue at the same pace as in the second two-year period. Systems analysis and operations analysis work should level off, and the work on technical services should become routine and not require any additional staff, even though analytical operations will increase. The development of methods and techniques that has so far been undertaken should be re-evaluated on the basis of the results of the systems studies and the practical experience gained. Account should be taken of any new problems arising from the increase in the operations and possible new technical developments.

RESEARCH AND DEVELOPMENT PROJECTS

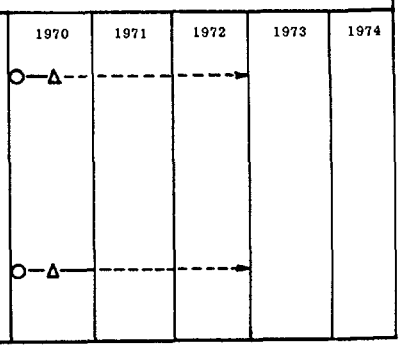
Responsible Section: Systems Analysis

	Title and aim	Means and use of results
A.1.	Description of the nuclear materials system	
	Develop computer simulation of national power generation programmes; characterize flow and distribution of special nuclear materials; describe sampling and measurement procedures; determine scale of activity.	Division of Development project. Obtain and evaluate programmes in Member States. Collaboration with Division of Operations.
A.2.	Develop safeguards concepts and criteria	
	Quantify the results to be achieved; evaluate effects; state alternate policy decision.	Division of Development project.
A.3.	Define requirements and use of safeguards information	
	Specify information requirements for initial design review, monitoring changes in design, and maintaining nuclear material accounting system.	Division of Development project. Collaboration with Division of Operations.
A.4.	Safeguards inspection methods and effectiveness	
	In each type of facility define safeguards inspection methods and techniques to verify status of special nuclear materials.	Division of Development project. Collaboration with Division of Operations.
A.5.	Safeguards integral experiments	
	By computer simulation and actual experiments, test the application of safeguards to a process or part of a fuel cycle.	Division of Development project. Collaboration with Member States. Collaboration with Division of Operations.
A.6.	Model safeguards requirements under NPT	
	Forecast fuel cycle growth including manpower requirements and cost; prepare model subsidiary arrangements and annexes for specific types of facilities; prepare manual of safeguards procedures.	Division of Development project. Collaboration with Division of Operations. Collaboration with other Agency Departments.
A.7.	Safeguards terminology	
	Produce glossary of safeguards terminology to promote understanding of safeguards.	Division of Development project. Collaboration with Member States. Collaboration with Division of Operations and Languages Division. Basis for International Safeguards Terminology.



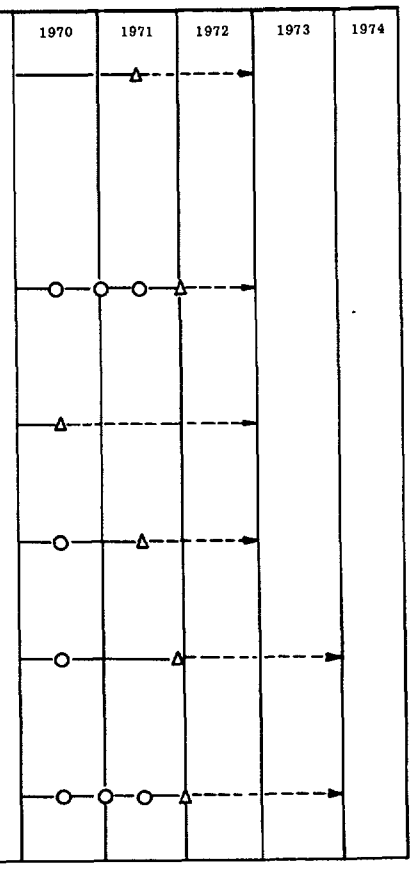
○ Progress Report
△ Report on first round of study
--- Extension of programme

Title and aim	Means and use of results	Schedule
A.8. Analytical services Develop methods for sampling, analysis and transport of safeguards samples of special nuclear materials; determine where and how analytical services can be most effectively performed.	Division of Development project. Collaboration with other Agency Departments. National or regional laboratories in Member States. Research contracts for laboratory services.	
A.9. Analytical standards Develop a mechanism for the certification, production, and distribution of analytical standard reference materials.	Division of Development project. Collaboration with Member States. International co-operation for verification of special nuclear materials	

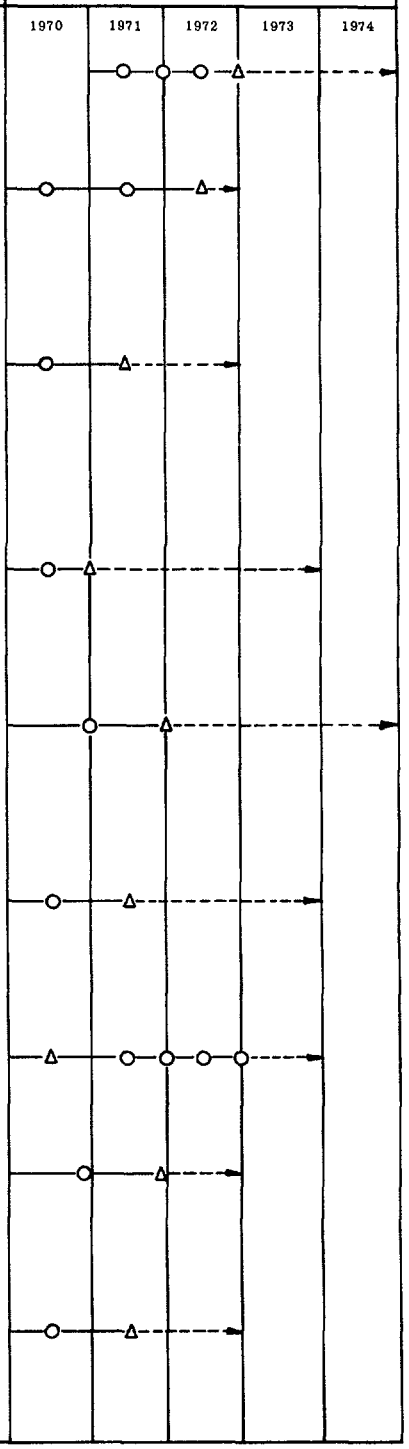


Responsible Section: Methods and Techniques

B.1. Safeguards design criteria studies For each type of principal nuclear facility show how layout, containment, and surveillance can implement and reduce inspection requirements; criteria for specific measurement methods and techniques included.	Research contracts with Member States. Evaluation of R & D programme in Member States.	
B.2. Sealing-safing systems, identification and re-identification and fuel fingerprinting techniques Continue development of Agency's sealing system; foster development of fuel identification techniques to strengthen safeguards and reduce inspection costs.	Division of Development project. Evaluate R & D programme in Member States. Research contract.	
B 3. Scrap handling Reduce uncertainties of scrap measurement by improved classification, segregation, packaging, coding and sampling.	Research contracts. Collaboration with Division of Operations and Member States.	
B 4. Scrap measurement Verify scrap inventories by development of non-destructive measurement.	Research contract. Evaluation of programme in Member States.	
B.5. Fuel measurement Develop compact non-destructive equipment to measure intermediate fuel in bulk, fuel elements and assemblies.	Research contract. Evaluate R & D programme in Member States.	
B.6. Containment, surveillance of products in storage Development techniques applicable to safeguarding highly enriched uranium and plutonium in storage facilities.	Evaluate R & D programmes in Member States.	



	Title and aim	Means and use of results	Schedule
B.7	Plutonium recycle		
	Investigate new safeguards problems arising from fast-breeder reactors and recycle of plutonium.	Evaluate R & D programmes in Member States.	
B.8.	Reactor safeguards instrumentation		
	Develop and evaluate prototype instrumentation applicable to heavy-water type power reactors, test tamper indicating/resistant devices, reactor power, irradiated fuel path, monitoring, spent fuel bay surveillance.	Evaluate R & D programmes in Member States. Participate in experimental programme study group meetings. Results may have wide safeguards application.	
B.9.	Other reactor safeguards studies		
	Develop methods and techniques to implement safeguards for unique situations in specific facilities such as Magnox reactors: Fuel identification and inventory Sealing of spent fuel Reactor bay monitoring Charge-discharge machine monitoring.	Research contracts.	
B.10.	Reprocessing input measurement studies		
	Establish methods and techniques to verify the volume measurement; measure input independently of volume, investigate the measurement problem for non-aqueous processes.	Division of Development project. Research contract.	
B.11.	Reprocessing plant in-line instrumentation		
	Investigate and develop instrumentation for in-line monitoring, sampling, flow measurement applicable to dissolver solution, decontaminated uranium and plutonium streams, high and low activity liquid waste and effluents.	Research contracts. Evaluate programmes in Member States.	
B.12.	Safeguarding reprocessing product loadout		
	Development system using rapid non-destructive techniques to check loadout operations of enriched uranium and plutonium solutions.	Research contract.	
B.13.	Survey of non-destructive measurement methods		
	Keep abreast of current developments and recommended application for specific uses in the fuel cycle.	Division of Development project Collaboration with R & D programmes in Member States.	
B.14.	Safeguarding of special nuclear materials in transit		
	Investigate methods and techniques to identify and secure fuel in shipping flasks, such as gamma monitoring and sealing.	Division of Development project.	
B.15.	Safeguarding reprocessing head end treatments		
	Investigate methods and techniques for surveillance and monitoring of fuel path to dissolver; hull monitoring; fuel exit routes; securing dissolver solution transfer routes.	Division of Development project. Evaluate programmes in Member States. Research contract.	



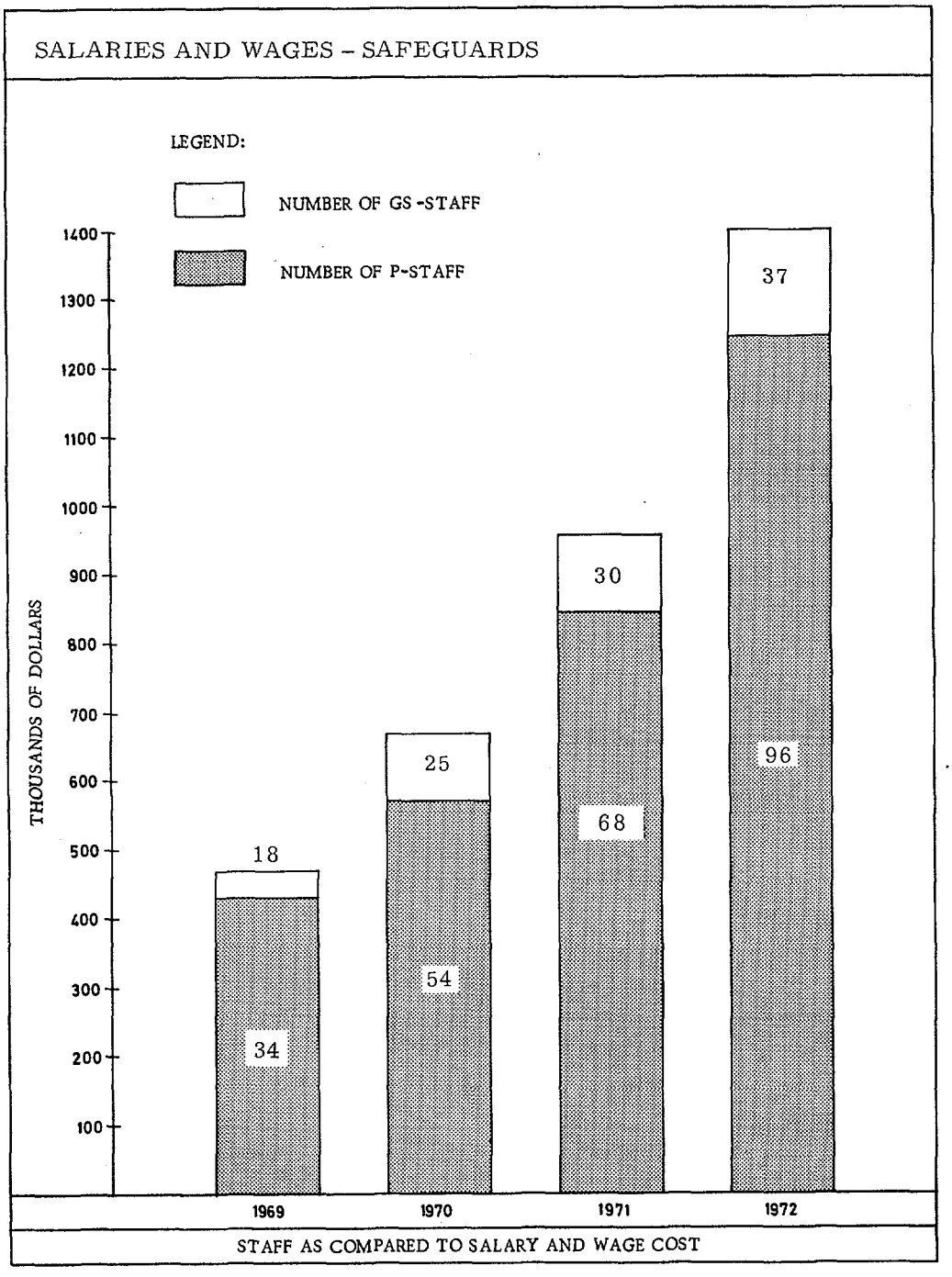
Title and aim	Means and use of results	Schedule
B.16. Automatic data processing		1970 1971 1972 1973 1974
Develop compact systems for collection and processing of data generated by safeguards monitoring and surveillance devices.	Evaluate programmes in Member States.	
B.17. Investigate ways and means of a system for rapid transmission of safeguards inspection and accountability information.	Evaluate programmes in Member States. Eventually research contract.	
B.18. New processes and technology		
Continuously review the developments in new processes and technology and consider the impact on safeguards.	Division of Development project. Evaluate programmes in Member States. Eventually research contract.	
Responsible Section: Field Operations		
C.1. General inspection procedures		
Establish general inspection procedures for the types of facilities listed below. Test procedures in designated facilities and critically evaluate results.	Division of Development project. Collaboration with Division of Operations and Member States.	
1.1. Reprocessing plants		
1.2. Conversion and fabrication		
(i) Natural and low enriched U (ii) Highly enriched U (iii) Plutonium		
1.3. Pressurized light-water moderated and cooled reactor and boiling light-water cooled and moderated reactor		
1.4. Magnox reactors and heavy-water cooled reactor		
1.5. Pu storage, present and future facilities		
1.6. Fast critical facilities		
1.7. Fast-breeder cycles		
1.8. Research facilities, pilot plants and specific plants		as required
C.2. General inspection methods		
Perform appropriate conceptual studies; surveys to define application of safeguards methods and techniques to specific situations listed below:		
2.1. Inspection analytical techniques		
Mobile laboratory		
2.2. Use of seals and surveillance devices		
2.3. Inspection statistical methods		
2.4. Sampling, analysis of bulk quantities of enriched uranium and plutonium solutions in storage facilities		

Budget estimates

Explanation of major cost changes in 1971

V. 13. 63. Of the total increase of $613 000 in expenditures for safeguards in 1971, an amount of $410 200 or 66.9% is attributable to the cost of additional staff, increases in the emoluments of existing staff, a slight increase in consultants' services and temporary assistance, and common staff costs. The higher salary rates for GS staff, a post adjustment for staff members in the Professional and higher categories, additional increments for all categories of staff and corresponding common staff costs are estimated to cost $67 000.

FIGURE 31



V. 13. 64. Salaries and common staff costs resulting from the programme expansion, that is both the normal increase in safeguards activities and preparation for NPT, amount to $343 200. In arriving at this figure, it has been assumed that there will be no delay in the recruitment of safeguards staff in 1971.

V. 13. 65. Of the increases of $80 000 for inspection and other travel and $70 000 for contracts and scientific equipment and supplies, a total of $13 000 is due to price increases, while the remainder, together with the initial cost of $50 000 for the plutonium laboratory and $2 800 for medical equipment and hospitality, is attributable to programme expansion.

FIGURE 32

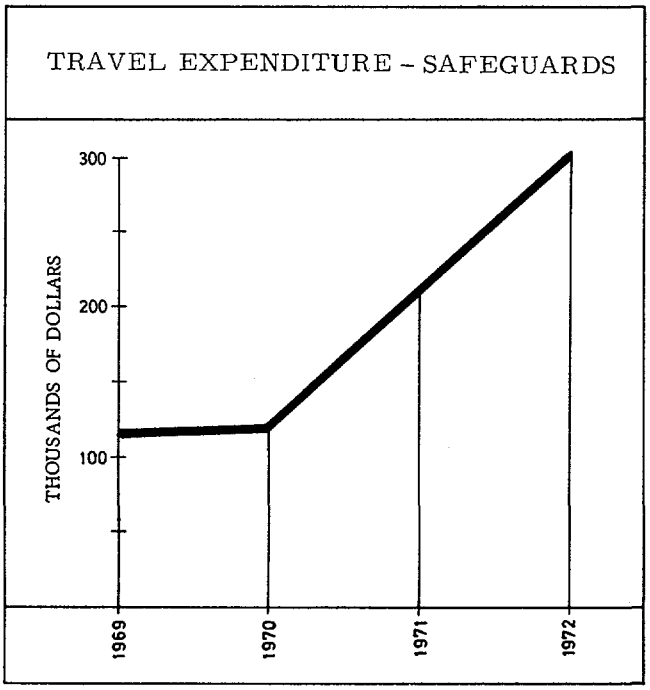
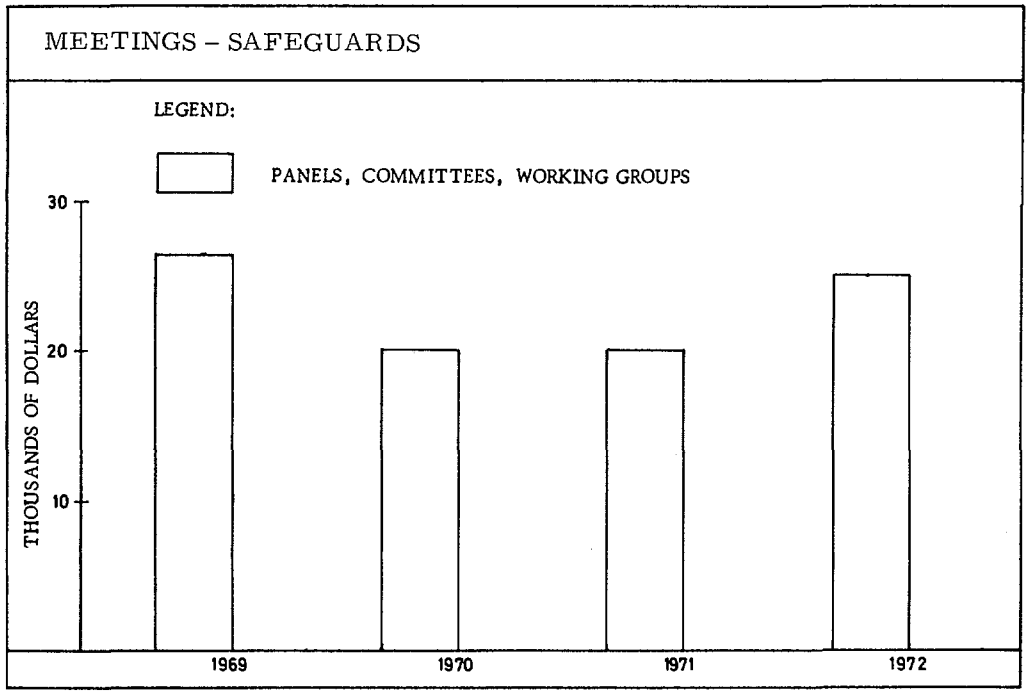


FIGURE 33



14. Service and support activities

Summary of costs

Table 39

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	531 747	554 100	1 200	-	1 200	555 300	631 600
Common staff costs	206 042	211 300	2 700	-	2 700	214 000	244 200
Duty travel and missions	476	200	-	-	-	200	200
Meetings: Panels and committees	-	-	-	-	-	-	-
Seminars, symposia and conferences	20 216	15 000	-	55 000	55 000	70 000	15 000
Representation and hospitality	99	-	-	2 500	2 500	2 500	-
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	-	-	-	-	-	-	-
Publications and other information media	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-
TOTAL	758 580	780 600	3 900 0.50%	57 500 7.37%	61 400 7.87%	842 000	891 000

Summary of manpower

Table 40

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	1	2	-	2	2
P-5	2	5	-	5	6
P-4	22	17	-	17	16
P-3	31	31	-	31	31
P-2	-	1	-	1	1
P-1	2	-	-	-	-
Sub-total	58	56	-	56	56
GS	49	47	-	47	47
M&O	1	1	-	1	1
Sub-total	108	104	-	104	104
Less:					
Staff working for policy-making organs					
P	16	16	-	16	16
GS	17	16	-	16	16
M&O	-	-	-	-	-
TOTAL	75	72	-	72	72

Highlight summary

V. 14. 1. The estimates for this group of activities are made up of the residual costs of such services as are provided by the Division of Languages and the Interpretation services after a certain part has been allocated to the General Conference and the Board of Governors. In addition some services are included which are provided by other Divisions and are not shown as administrative services since their supporting role does not extend to all activities of the Agency, namely, one unit of the Division of Scientific and Technical Information, which provides co-ordinating and administrative support to the whole programme of scientific conferences, symposia and seminars, and a unit of the Office of the Deputy Director General for Research and Isotopes, which is responsible for the administration of all research contracts.

V. 14. 2. No increases in staff are anticipated in support of this programme for either 1971 or 1972. Costs are expected to increase by $61 400 in 1971 over the approved level for 1970. Of this amount, $3900 is due to salary and price increases and $57 500 to programme

increases. The entire amount of programme increases represents the transfer of funds from other programmes in order to provide from this one source the direct financial support which the Agency will give to the Fourth Geneva Conference in 1971. Substantial offsetting reductions have been made elsewhere by curtailing the number of symposia, seminars and conferences normally held, because the Fourth Geneva Conference will be held in that year. The savings thus effected under other programmes, together with a saving of $2500 in respect of hospitality normally provided at such meetings, have been transferred to this programme for 1971 only.

Programme

V. 14. 3. The activities of the four services covered by this programme are outlined below.

Language services

V. 14. 4. The Division of Languages is responsible for the tranlation into the four official languages of documents, working papers, reports, correspondence, publications, etc. required by the Agency; it is also responsible for preparation and editing of the records of meetings of the Agency's legislative bodies, of other advisory bodies and of certain scientific meetings.

The programme for 1971-72

V. 14. 5. In many cases the Division receives no advance information from the users regarding the extent or the timing of their future requirements. Therefore, the forecast of future work-loads can only be made on certain assumptions based on the experience of previous years. Since 1965, however, the total work-load has remained fairly constant, i. e. 26 000-27 000 standard pages of translated material and an increase in the work-load is not expected.

The programme for 1973-76

V. 14. 6. During 1973-76 increased activities in certain areas such as safeguards and INIS may result in a corresponding increase in the demand for services. Furthermore, should there be an increase in the documentation required for legislative organs, or should documentation have to be prepared within a shorter time, it may be necessary to engage a larger number of temporary staff.

Interpretation services

V. 14. 7. Interpretation services are provided by the Secretariat of the General Conference and the Board of Governors. They involve the simultaneous, oral interpretation of the proceedings of various meetings. To the extent required, interpretation from and into the Agency's four working languages – English, French, Russian and Spanish – is always provided. Since the end of 1967 an Agency/UNIDO Joint Interpretation Service has been in experimental operation. This service has been of administrative and financial advantage to the Agency, and, it is believed also to UNIDO.

Scientific conference administration

The programme for 1971-72

V. 14. 8. For the year 1971 it is proposed to reduce the Agency's programme of seminars, symposia and conferences by approximately 50% in view of the convening of the Fourth Geneva Conference and the increased work-load of the Secretariat in this connection.

V. 14. 9. The number of scientific meetings which will be held in 1971 will therefore number between six and eight. In 1972 this activity will again assume its normal level and the number of scientific meetings held will be between 12 and 15.

V. 14. 10. Financial support will continue to be given for selected meetings organized by non-governmental scientific bodies which deal with subjects of special interest to the Agency. However, no increase in the level of support is foreseen for either 1971 or 1972.

V. 14. 11. The practice of granting financial assistance to carefully selected candidates from developing countries for attendance at the Agency's meetings will be continued. The Secretariat will also continue to co-sponsor scientific meetings held by other international organizations and invite appropriate co-sponsorship of its own meetings.

V. 14. 12. Within the limits of the appropriations, and subject to the requirements of the programmes, seminars, symposia and conferences will be selected from the list in Annex II.

The programme for 1973-76

V. 14. 13. The number of scientific meetings will be between 12 and 15 per year. The remainder of the programme outlined for 1971-72 will also be continued.

Research Contract Administration Section

V. 14. 14. A section in the Office of the Deputy Director General for Research and Isotopes is administratively responsible for the research contract programme and for the necessary liaison between the research workers and technical and administrative units of the Agency.

V. 14. 15. The research contract programme has been designed to stimulate research in specific fields of interest to the Agency. In so doing the primary objectives are: to stimulate the growth of scientific knowledge; to assist the developing countries wherever possible in order that they may increase the extent of their participation in nuclear research; and to co-ordinate research between the Agency and the various national centres.

V. 14. 16. Subjects in which research is supported include nuclear technology, radioisotope and radiation applications, and the protection of man against ionizing radiation.

V. 14. 17. Research contract proposals may originate either within the Secretariat or at an institute which is normally a non-profit-making research organization.

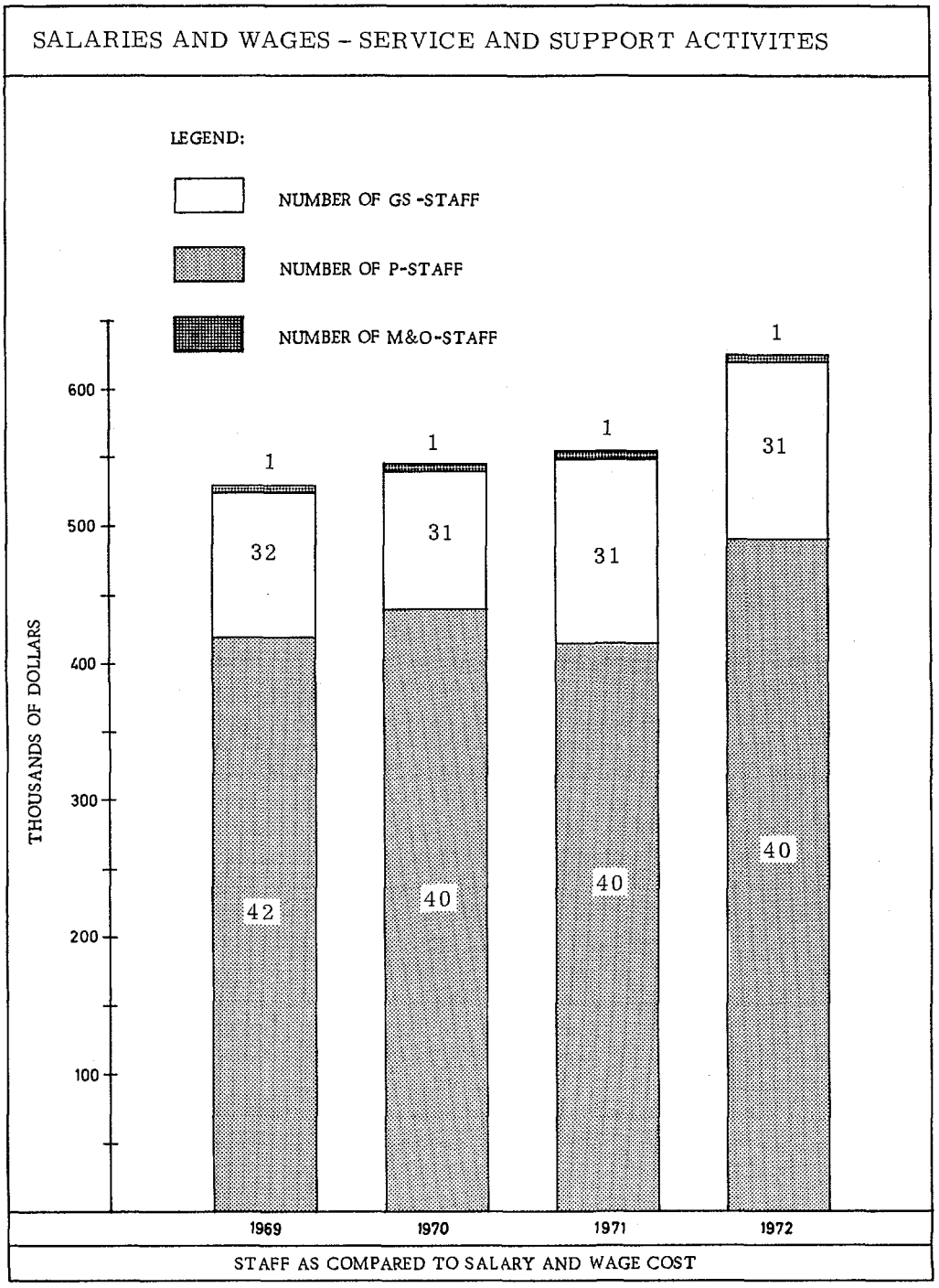
V. 14. 18. In addition to research contracts, which always carry a financial award, the Agency also enters into "research agreements" which are similar in nature and are administered in the same manner but do not provide for financial remuneration. Under this arrangement the institute agrees to provide a technical report on a specified research topic in return for formal sponsorship by the Agency and the possibility to participate in any information exchanges or meetings organized by the Agency with other institutes actively engaged in similar research.

Budget estimates

Explanation of major cost changes in 1971

V. 14. 19. The major price and programme increases for this programme are shown in Tables 39 and 41; the former gives the data on the basis of types of expenditure and the latter by organization unit. From these tables it will be seen that price increases will require an additional expenditure of $3900, or 0. 50%, in 1971, all of which is attributable to increased emoluments of existing staff. The remaining increase of $57 500, or 7. 37%, represents a programme increase to provide full support to the Fourth Geneva Conference, but this is largely offset by reductions in other programmes.

FIGURE 34



Preliminary budget estimates for 1972

V. 14. 20. The only staff change foreseen for 1972 is one upgrading of a P-4 staff member to the P-5 level. Total costs for the programme are expected to increase by $49 000 in 1972. The sum of $57 500 used to support the Fourth Geneva Conference will again be used to finance the normal number of scientific meetings under other programmes. The amount of $15 000 shown for symposia in 1972 represents the amount normally provided to support non-Agency meetings.

Summaries of costs and manpower by organization unit

V. 14. 21. In order that the justification for the level of costs and manpower proposed for the four services in this programme may be more clearly understood, Tables 41 and 42 provide information covering the four fiscal years, 1969 through 1972.

Summary of total costs by organization unit

Table 41

Organization unit	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Division of Languages	505 676	529 300	1 600	33 000(a)	34 600	563 900	603 000
Secretariat of the General Conference and the Board of Governors	136 722	145 700	-	(33 000)(b)	(33 000)	112 700	164 700
Research Contract Administration Section	40 494	32 200	1 100	-	1 100	33 300	41 600
Scientific Conferences Administration Section	75 688	73 400	1 200	57 500	58 700	132 100	81 700
TOTAL	758 580	780 600	3 900 0.50%	57 500 7.37%	61 400 7.87%	842 000	891 000

(a) Programme increase due to a lower deduction for policy-making organs compared with 1970 based on workload statistics.

(b) Programme decrease due to a higher deduction for policy-making organs compared with 1970 based on workload statistics.

Summary of manpower by organization unit and category

Table 42

Organization unit	1969 budget				1970 budget				1971 estimate				Preliminary 1972 estimate			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Division of Languages	41	38	1	80	40	37	1	78	40	37	1	78	40	37	1	78
Less: Staff working for policy-making organs	13	13	-	26	13	13	-	26	13	13	-	26	13	13	-	26
Sub-total	28	25	1	54	27	24	1	52	27	24	1	52	27	24	1	52
Secretariat of the General Conference and the Board of Governors	12	5	-	17	12	4	-	16	12	4	-	16	12	4	-	16
Less: Staff working for policy-making organs	3	4	-	7	3	3	-	6	3	3	-	6	3	3	-	6
Sub-total	9	1	-	10	9	1	-	10	9	1	-	10	9	1	-	10
Research Contract Administration Section	1	3	-	4	1	3	-	4	1	3	-	4	1	3	-	4
Scientific Conferences Administration Section	4	3	-	7	3	3	-	6	3	3	-	6	3	3	-	6
TOTAL	42	32	1	75	40	31	1	72	40	31	1	72	40	31	1	72

15. Administration

Summary of costs

Table 43

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	935 344	908 500	30 000	2 000	32 000	940 500	1 056 600
Common staff costs	354 111	339 900	18 400	-	18 400	358 300	405 200
Duty travel and missions	21 172	19 700	800	-	800	20 500	21 200
Meetings: Panels and committees	8 341	8 000	-	-	-	8 000	8 000
Seminars, symposia and conferences	-	10 000	-	(3 000)	(3 000)	7 000	13 300
Representation and hospitality	7 510	9 200	-	-	-	9 200	9 200
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	48 351	49 000	500	3 000	3 500	52 500	54 000
Publications and other information media	21 587	23 000	-	(19 000)	(19 000)	4 000	10 500
Other	-	-	-	-	-	-	-
TOTAL	1 396 416	1 367 300	49 700 3.63%	(17 000) (1.24%)	32 700 2.39%	1 400 000	1 578 000

Summary of manpower

Table 44

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	1	1	-	1	1
D	5	5	-	5	6
P-5	13	13	-	13	13
P-4	12	12	-	12	12
P-3	8	8	-	8	8
P-2	6	6	-	6	7
P-1	6	7	-	7	6
Sub-total	51	52	-	52	53
GS	64	68	-	68	69
M&O	-	-	-	-	-
TOTAL	115	120	-	120	122

Highlight summary

V. 15. 1. This part of the programme covers the work of the Divisions and Offices of the Department of Administration, with the exception of the Secretariat of the General Conference and the Board of Governors, the Division of Languages, the costs of which are charged partly to "Policy-making Organs" and partly to "Service and Support Activities", and the Division of Conference and General Services, which is part of the common services programme. In addition to the Office of the Deputy Directory General for Administration, the following Divisions or Offices are included under "Administration": Internal Audit and Management Services; Budget and Finance; Personnel; Legal; External Liaison and Protocol; and Public Information.

V. 15. 2. No increase in staff is foreseen for these activities for 1971 and the addition of only one GS post and one Professional post is proposed for 1972. It is anticipated that there will be a net increase of $32 700 in costs for this programme in 1971, or a 2. 39% increase over the approved level for 1970. This increase is made up of rising costs for salaries, travel, supplies, equipment and services in the amount of $49 700, partially offset by a programme reduction of $17 000.

Programme

V. 15. 3. The major functions of each of the Divisions covered by this programme are given below, followed by an explanation of costs related to their individual fields of activity.

Office of the Deputy Director General

V. 15. 4. The Deputy Director General is responsible for directing the activities of the Divisions and Offices. As no increase in the staffing of the Office is considered necessary,

provision has only been made in the estimates for an increase in salary components and related common staff costs.

Office of Internal Audit and Management Services

V. 15. 5. This Office is responsible for reviewing the Agency's financial and other transactions in order to ensure observance of established regulations, rules and procedures, as well as the soundness and adequacy of the accounting, financial and management systems. It advises the Director General on the most economic use of the Agency's resources, provides a management advisory service to all Departments, compiles and maintains the Agency's Administrative Manual and administers the Agency's forms control procedures. The head of this Office is the Internal Auditor, and in this capacity he reports directly to the Director General.

V. 15. 6. No cost increases are foreseen for 1971 or 1972, other than those associated with an increase in salary components of existing staff and the related increase in common staff costs.

Division of Budget and Finance

V. 15. 7. The Division is responsible for programme and budget development and administration, including the preparation of budget estimates and financial plans and the exercise of allotment control over approved appropriations; development of budgetary and financial policies, rules and procedures designed to ensure effective financial control and the exercise of economy; maintenance of the official books of account of the Agency, including both budgetary accounts and general accounts required for proper administration of all Agency funds; examination and approval of all requests for payment and related financial work in connection with officials, experts, fellows, scientific meetings and the purchase of equipment and supplies; preparation and verification of input material for electronic processing of payrolls and manual processing of computer output; financial management of all Agency funds in accordance with normal treasury procedures, including receipt and disbursement of all funds in cash or through banks in respect of all Agency accounts; preparation of the scale of assessments of contributions to the Regular Budget, collection of such contributions, and related correspondence with Governments; and co-ordination relating to financial management including participation in CCAQ discussions on budget and finance matters, representation of the Agency at the ACABQ and co-ordination of responses and action pertaining to external audit or Joint Inspection Unit activities or reports.

V. 15. 8. The staff of this Division will remain in 1971 at the 1970 level of 39. However the expected increase in the work-load of the Division will require an additional GS post and an additional P-1 post in 1972. In addition the re-classification of two P-1 posts to the P-2 level and one P-2 post to the P-3 level in 1972 is also proposed.

V. 15. 9. Total costs of the Division are expected to increase by $14 200 in 1971, of which $12 200 is due to increases in salary components and common staff costs. A further increase of $62 900 is likely in 1972, primarily because of the increase in staff, the re-classification of posts mentioned above and normal increases in the salary components. The only increases not associated with changes in salaries relate to costs of official duty travel in 1972 and insurance premiums and bank service charges in each of the two years, as is explained in more detail below.

Division of External Liaison and Protocol

V. 15. 10. The Division of External Liaison and Protocol is responsible for relations with Member States, the United Nations and its specialized agencies, and other intergovernmental and non-governmental organizations of an international or regional character. It advises on, or approves, the form and content of communications to Governments, the United Nations and other international organizations, and arranges and co-ordinates Agency representation at meetings of these international bodies. It maintains liaison with the host Government and advises on questions arising out of the agreements concluded with it; deals

with all protocol matters, including those connected with sessions of the General Conference; and compiles periodic and special reports to the General Conference, the Board, and the relevant organs of the United Nations. It advises other Divisions on certain policy matters in order to ensure that actions taken by them are consistent with policies approved by the Board and the Director General. It advises the Director General on external relations generally, and prepares draft agreements (in collaboration with the Legal Division), statements and reports.

V. 15. 11. In addition to its staff at Headquarters, the Division is reponsible for the Agency's liaison office at the United Nations Headquarters in New York, the Agency's liaison officer with WHO in Geneva, and its regional officer in Bangkok. No changes in staff are foreseen for the Division during 1971 or 1972. Total costs of the Division are expected to increase by $10 700 in 1971, of which $9700 is due to increases in salary components,related common staff costs and travel costs and the remaining $1000 is due to salary costs of the regional officer. The increase of $21 400 in 1972 is also primarily due to the increase in salary components and related common staff costs.

Legal Division

V. 15. 12. The main fields of work of the Division are: the legal aspects of safeguards in connection with NPT and the Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco Treaty), liability for nuclear damage and insurance in respect of nuclear risks, safety regulations for nuclear activities, licensing of nuclear installations, training in nuclear law and development of the law of international organizations.

V. 15. 13. The Division assists Member States and co-operates with other international organizations in the development of atomic energy law. Its predominant responsibility for some years to come will, however, consist of the preparation of legal instruments resulting from the coming into force of NPT.

V. 15. 14. The Division also assists in the internal administration of the Agency and in particular provides advice on personnel, budgetary and financial questions, reactor projects, health and safety measures, technical assistance projects, research contracts and inter-agency agreements.

V. 15. 15. No increase in the staff of the Division is proposed for 1971 or 1972. However, the re-classification of one P-4 post to the P-5 level and one P-3 post to the P-4 level is proposed for 1972. The costs of the Division will increase by $5300 in 1971 due to an increase in salary components, but this increase will be partially offset by a decrease in the estimated costs of legal panels and symposia, resulting in a net increase of $2300.

The programme for 1971-72

V. 15. 16. It is considered that the two years 1971 and 1972 will be devoted to development of the necessary legal instruments and arrangements with States with regard to the implementation of NPT. This will be the major preoccupation of the Division.

V. 15. 17. Measures to be recommended to Governments, insurers and shipowners under the existing laws and possible initiatives for the harmonization of nuclear and maritime law may be the subject of a symposium in 1971. The conclusions of the Panel on Nuclear Insurance together with the views of Member States and insurance companies on the question of third party liability of operators of nuclear installations, and general insurance problems may also be the subject of a panel meeting in 1972. It may also be appropriate to hold a joint panel meeting with FAO and WHO in 1971 for the purpose of developing guidelines for legislation on the subject of irradiated food which will take account of the internationally recommended technical criteria and safety standards. Should advice be sought from the Agency on national safeguards systems a panel might be convened in 1972 on this subject.

V. 15. 18. In view of the fact that as national nuclear energy programmes expand an increasing degree of legislation is required, it is intended to include in future Agency advisory missions to Member States an expert in nuclear law, provided this is requested and justified.

The programme for 1973-76

V. 15. 19. It is foreseen that the programme of the Division will continue along the same general lines in 1973-76 as during 1971-72, with the possibility of an additional panel meeting being held each year. It is also possible that a Conference on the International Convention on Civil Liability of Operators of Nuclear Ships may be co-sponsored by the Agency during this period.

Division of Personnel

V. 15. 20. The Division of Personnel is responsible for the Agency's programme of personnel administration, including recruitment of staff required to carry out the various operational functions with which the Agency is charged; the administration of the Agency's Provisional Staff Regulations and Rules; the development and review of personnel policies; the provision of medical services in co-operation with UNIDO; and advising the Director General on matters of common personnel policy within the United Nations system.

V. 15. 21. No changes in the level of staff of this Division are proposed for 1971 or 1972. Costs are expected to increase by $9100 in 1971, of which $8100 pertains to increases in salary components and related common staff costs. The remaining $1000 relates to the cost of medical equipment in support of the Joint IAEA/UNIDO Medical Services. A further increase of $20 400 is expected in 1972 made up of price increases for salaries, wages, and common staff costs.

Public Information

V. 15. 22. The Division provides information to the general public as well as to interested specialized groups on the plans, programmes and progress of the Agency and, in this context, on various aspects of the peaceful uses of atomic energy.

V. 15. 23. Activities in the past few years have mainly been centred on the provision of information through the press, but more recently attention has been given to audio-visual media. Other means must also be used to reach certain sections of public opinion. Lectures, public meetings and programmes for specialized groups such as schools, trade unions, prospective diplomats and students of international affairs are being planned and carried out.

V. 15. 24. With the entry into force of NPT, press statements, conferences and filmed interviews will be necessary, and the Treaty will also have a continuing effect on the workload of the Division.

The programme for 1971-72

V. 15. 25. While there has been steady progress in gaining public acceptance, mistrust has recently been stimulated in some sections of the population in areas where nuclear power stations are located or planned. At the same time, debate on the economic aspects of the production of electricity by nuclear means has been intensified. Although the Agency is not directly involved, an appropriate long-range programme is proposed which is designed to promote public understanding of nuclear energy both in developing and in advanced countries.

V. 15. 26. In this regard, not only must the means normally employed by the Agency – the press, audio-visual media and exhibitions – be used but a new and convincing information programme must be developed in close co-operation with those national authorities directly interested in the peaceful applications of nuclear energy.

V. 15. 27. It is planned to make at least one documentary film on the safety of nuclear power plants, to publish a series of pamphlets to promote confidence in atomic energy, and to give a series of lectures both in high schools and institutes of higher education.

V. 15. 28. In 1971 a considerable effort will be required to provide information relating to the Fourth Geneva Conference and to produce material for distribution before, during and after its sessions. The availability of first-hand reports and reliable data and statistics on nuclear power programmes will make it possible to counteract misleading information on both economic and safety aspects of the operation of nuclear plants.

V. 15. 29. Activities proposed for 1971 and 1972 are as follows:

(a) The holding of round-table discussions in 1971 and 1972, to be filmed and recorded for television and radio, on items of interest, particularly to developing countries, at an estimated cost of $3000 for each year;

(b) The production of non-technical publications, at an estimated cost of $1000; and

(c) The production of a film entitled "The Atom and You", at an estimated cost of $6000, which will be designed for educational purposes and will show the application of the atom and how it affects people's daily lives.

V. 15. 30. In addition, it is planned to make, in 1971, a training film on radiation monitoring, at an estimated cost of $6000, and a training film on industrial applications of radioisotopes, at an estimated cost of $8000; the costs of these two films are shown under the scientific programmes to which they pertain.

V. 15. 31. It is planned to make films in 1972 on entomology, hydrology, reactor experiments and radiation monitoring; the costs of these films are shown under the scientific programmes to which they pertain.

The programme for 1973-76

V. 15. 32. The information programme aimed at influencing public opinion will continue and possibly be intensified because of the larger number of power plants in operation and the consequent increasing effect on local opinion. It will probably be necessary to complete the information programme with a limited number of travelling exhibits, especially intended for developing countries and accompanied by lecturers and experts.

Budget estimates

Explanation of major cost changes in 1971

V. 15. 33. The increases in cost in 1971 for this programme are shown by major types of expenditure in Table 43, from which it can be seen that the net increase of $32 700 is made up of salary and price increases totalling $49 700, partially offset by a reduction in the publicity film programme and seminars and symposia.

FIGURE 35

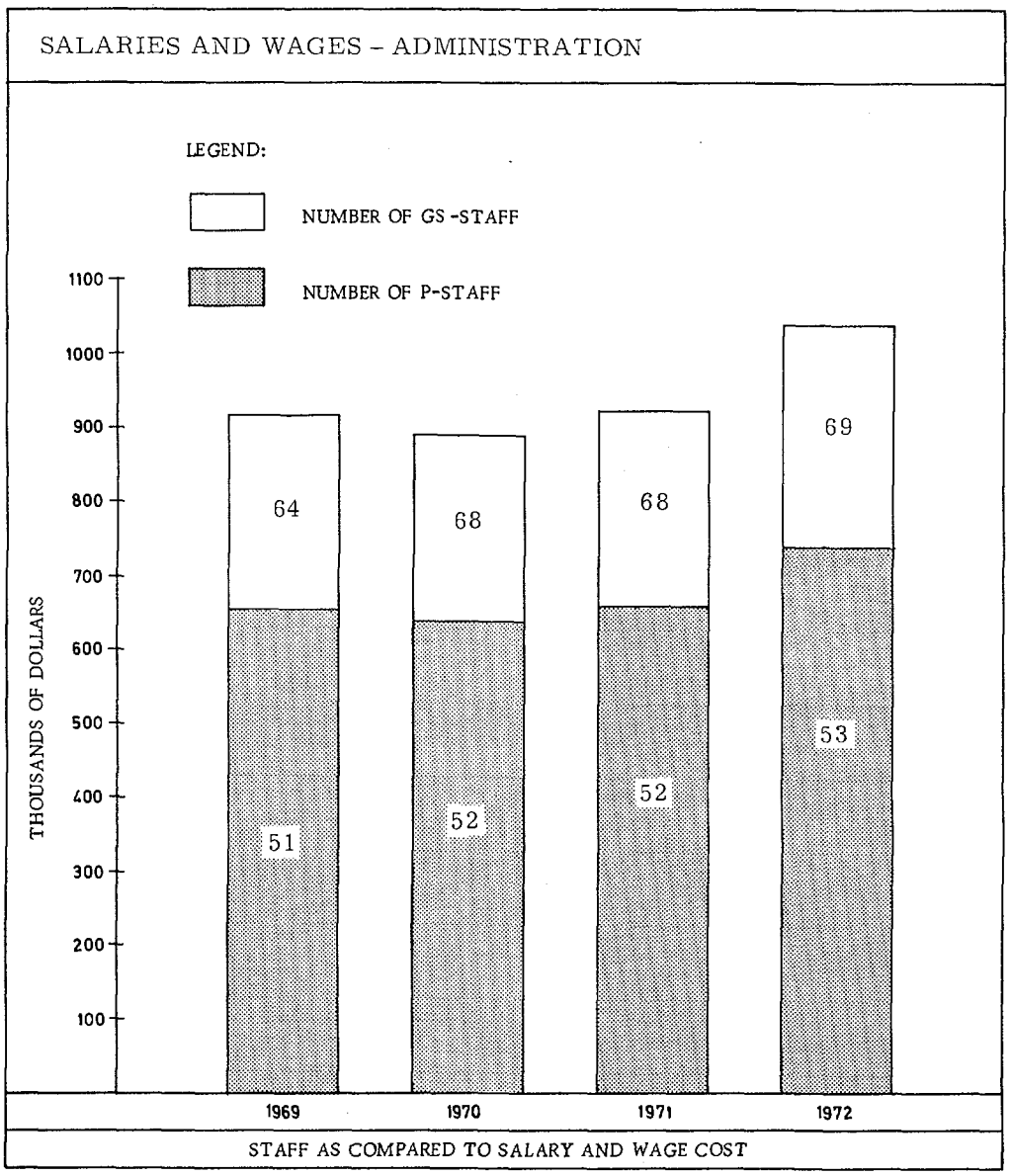

SALARIES AND WAGES - ADMINISTRATION
LEGEND:
NUMBER OF GS-STAFF
NUMBER OF P-STAFF
THOUSANDS OF DOLLARS
1100
1000
900
800
700
600
500
400
300
200
100
64
68
68
69
51
52
52
53
1969
1970
1971
1972
STAFF AS COMPARED TO SALARY AND WAGE COST

FIGURE 36

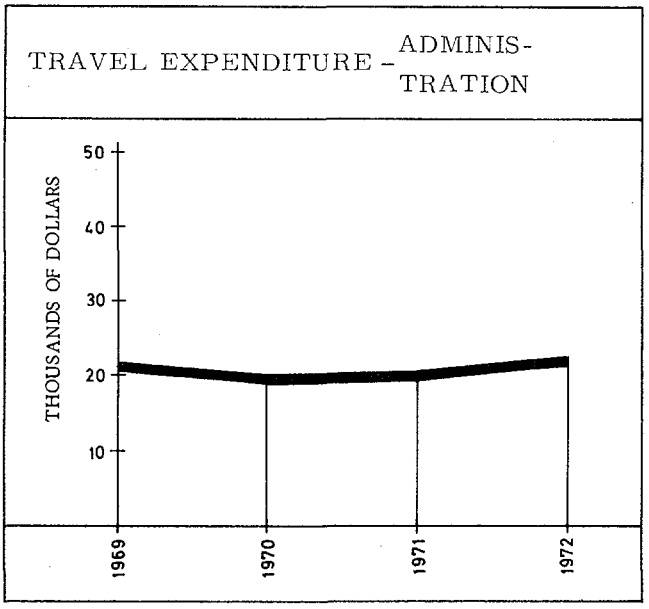
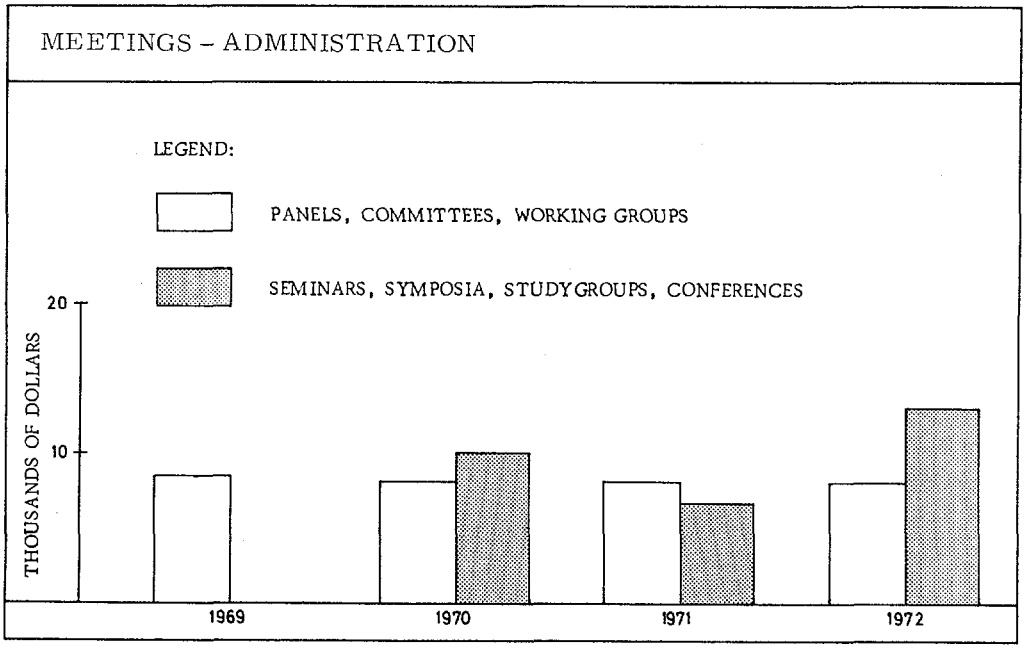


FIGURE 37



V. 15. 34. The costs for Administration are largely for salaries and wages of staff and the associated common staff costs, which in total amount to about 93% of the total costs for this programme.

Preliminary budget estimates for 1972

V. 15. 35. It is now foreseen that the 1972 budget for Administration will increase by $178 000, or 12. 71% over the requested level for 1971. This increase relates largely to salaries and associated common staff costs of existing staff, plus the addition of one P-1 and one GS post in the Division of Budget and Finance and some additional upgradings of posts because of the increase in responsibilities and work-load; the increase also includes a minor increase in travel costs, provision for an additional seminar, minor increases for common services and supplies, and the cost of restoring the budget for information media to a more normal level following the severe reduction proposed for 1971 in the interests of economy.

Summary of total costs by organization unit

Table 45

Organization unit	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Office of Deputy Director General for Administration	62 897	85 700	2 000	-	2 000	87 700	93 900
Office of Internal Audit and Management	100 658	96 100	2 600	-	2 600	98 700	107 300
Division of Budget and Finance	379 269	375 000	12 200	2 000	14 200	389 200	452 100
Division of External Liaison and Protocol	282 732	250 600	9 700	1 000	10 700	261 300	282 700
Legal Division	184 817	189 200	5 300	(3 000)	2 300	191 500	218 500
Division of Personnel	207 391	212 700	8 100	1 000	9 100	221 800	242 200
Division of Public Information	178 652	158 000	9 800	(18 000)	(8 200)	149 800	181 300
TOTAL	1 396 416	1 367 300	49 700 3.63%	(17 000) (1.24%)	32 700 2.39%	1 400 000	1 578 000

Summary of manpower by organization unit and category

Table 46

Organization unit	1969 budget			1970 budget			1971 estimate			Preliminary 1972 estimate		
	P	GS	Total	P	GS	Total	P	GS	Total	P	GS	Total
Office of Deputy Director General for Administration	3	2	5	3	2	5	3	2	5	3	2	5
Office of Internal Audit and Management	5	4	9	5	4	9	5	4	9	5	4	9
Division of Budget and Finance	16	21	37	15	24	39	15	24	39	16	25	41
Division of External Liaison and Protocol	8	10	18	9	10	19	9	10	19	9	10	19
Legal Division	7	5	12	8	5	13	8	5	13	8	5	13
Division of Personnel	7	16	23	7	16	23	7	16	23	7	16	23
Division of Public Information	5	6	11	5	7	12	5	7	12	5	7	12
TOTAL	51	64	115	52	68	120	52	68	120	53	69	122

16. Common services

Summary of costs

Table 47

Item of expenditure	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Salaries and wages	918 032	926 100	66 200	50 000	116 200	1 042 300	1 154 800
Common staff costs	326 013	333 900	46 800	18 900	65 700	399 600	444 600
Duty travel and missions	947	1 200	-	-	-	1 200	1 800
Meetings: Panels and committees	-	-	-	-	-	-	-
Seminars, symposia and conferences	-	-	-	-	-	-	-
Representation and hospitality	48	100	-	100	100	200	200
Scientific and technical contracts	-	-	-	-	-	-	-
Scientific services, supplies and equipment	-	-	-	-	-	-	-
Common services, supplies and equipment	511 368	507 500	17 000	83 200	100 200	607 700	611 600
Sub-total	1 756 408	1 768 800	130 000	152 200	282 200	2 051 000	2 213 000
Publications and other information media	155 249	154 000	1 000	-	1 000	155 000	158 000
Less: Income	(193 853)	(185 000)	-	185 000	185 000(a)	-	-
Sub-total	(38 604)	(31 000)	1 000	185 000	186 000	155 000	158 000
TOTAL	1 717 804	1 737 800	131 000 7.54%	337 200 19.40%	468 200 26.94%	2 206 000	2 371 000

(a) $ 185 000 represents 1970 revenues, which are offset against expenditure. Compared with the 1970 net expenditure, the increase for 1971 is $ 468 200; based on 1970 gross expenditure, the increase is only $ 283 200.

Summary of manpower

Table 48

Grade of post	Number of established posts				
	1969	1970	Change	1971	1972
DG	-	-	-	-	-
DDG/IG	-	-	-	-	-
D	2	2	-	2	2
P-5	3	3	-	3	3
P-4	2	2	-	2	2
P-3	5	5	-	5	5
P-2	5	7	1	8	8
P-1	9	7	(1)	6	6
Sub-total	26	26	-	26	26
GS	119	122	6	128	134
M&O	114	116	12	128	131
Sub-total	259	264	18	282	291
Less:					
Staff working for policy-making organs					
P	-	-	-	-	-
GS	11	11	-	11	11
M&O	4	4	-	4	4
TOTAL	244	249	18	267	276

Highlight summary

V.16.1. The work in this part of the programme is performed by two separate units, namely the Division of Conference and General Services and the Division of Publications, and separate budget estimates are presented for each.

V.16.2. The Division of Conference and General Services is responsible for engineering and maintenance services for the entire Secretariat, including building maintenance, servicing of electronic equipment such as interpretation facilities and purchasing, files and archives, messenger and transportation services.

V.16.3. The services provided by the Division of Publications include mimeograph and offset printing, photoplate work and documents distribution and sales.

V.16.4. In addition, the Division of Publications edits, prints and publishes books originating from the scientific Divisions, the Legal Division and the Division of Public Information, and provides the documents service for the Secretariat. A publishing service

is also provided for the Trieste Centre, the Monaco Laboratory, and the Joint FAO/IAEA Division, and numerous publications jointly sponsored by such organizations as WHO, FAO, ILO are issued. Books to the market value of about $400 000 are annually supplied free to Member States. Revenues from sales help to cover the publication cost of these free copies.

V.16.5. The publications programme reflects the activities of the scientific Divisions and the titles published are normally the results of scientific meetings, panels, studies, surveys, and bibliographical or reference work. The transformation of papers into readable scientific books ensures the wide dissemination of information resulting from Agency activities and enables the Agency to play a leading part in the publication of nuclear literature.

V.16.6. Total costs of this programme are expected to increase by $468 200 in 1971 and by an additional $165 000 in 1972. Staff increases amount to six GS and twelve M&O staff members in 1971 and six GS and three M&O staff members in 1972. Most of the staff and programme cost increases are in respect of new office space required because of safeguards staff expansion, but about $185 000 of the increase is attributable to a change in the method of handling publications income and is offset by revenues shown separately from the expenditure budget. The detailed staff and cost requirements of this programme are explained in detail after the description of the programme.

Programme

The programme for 1971-72

V.16.7. The Division of Publications will be engaged in reviewing its production methods and in keeping up with technical developments in printing. As experience has shown, the scientific programme of the Agency results in an average annual production of approximately 28 000 to 30 000 pages. Preliminary studies have shown that, under present conditions, no economic advantage would be gained from the use of computer composing systems. However, an increase in the volume of CINDA, INIS and other computer-compiled publications might make the use of photo-computer-typesetting equipment economic. Preliminary discussions on the principles governing services to be shared with UNIDO in the Donaupark area will be held.

V.16.8. In 1971, spare capacity resulting from the reduction of scientific meetings in that year will be used for the Agency's contribution to the Fourth Geneva Conference.

V.16.9. An expanded programme has been developed in regard to sales promotion and publicity for Agency publications. Direct sales to customers in Member States have been given preference over the network of exclusive sales agents, and promising financial results have been achieved. It is planned to foster this system by better personal contacts, through visits of sales staff to interested circles in Member States.

V.16.10. The Division of Conference and General Services will continue to provide its services in support of other programmes as required.

The programme for 1973-76

V.16.11. The establishment of INIS will have an effect on new publications, as will the proposed take-over of the CINDA project and the discontinuation of the old Atom Index. Computer-produced publications would increase the total amount of published information and this would justify (together with INIS and CINDA publications) the use of photo-typesetting equipment instead of the computer printer.

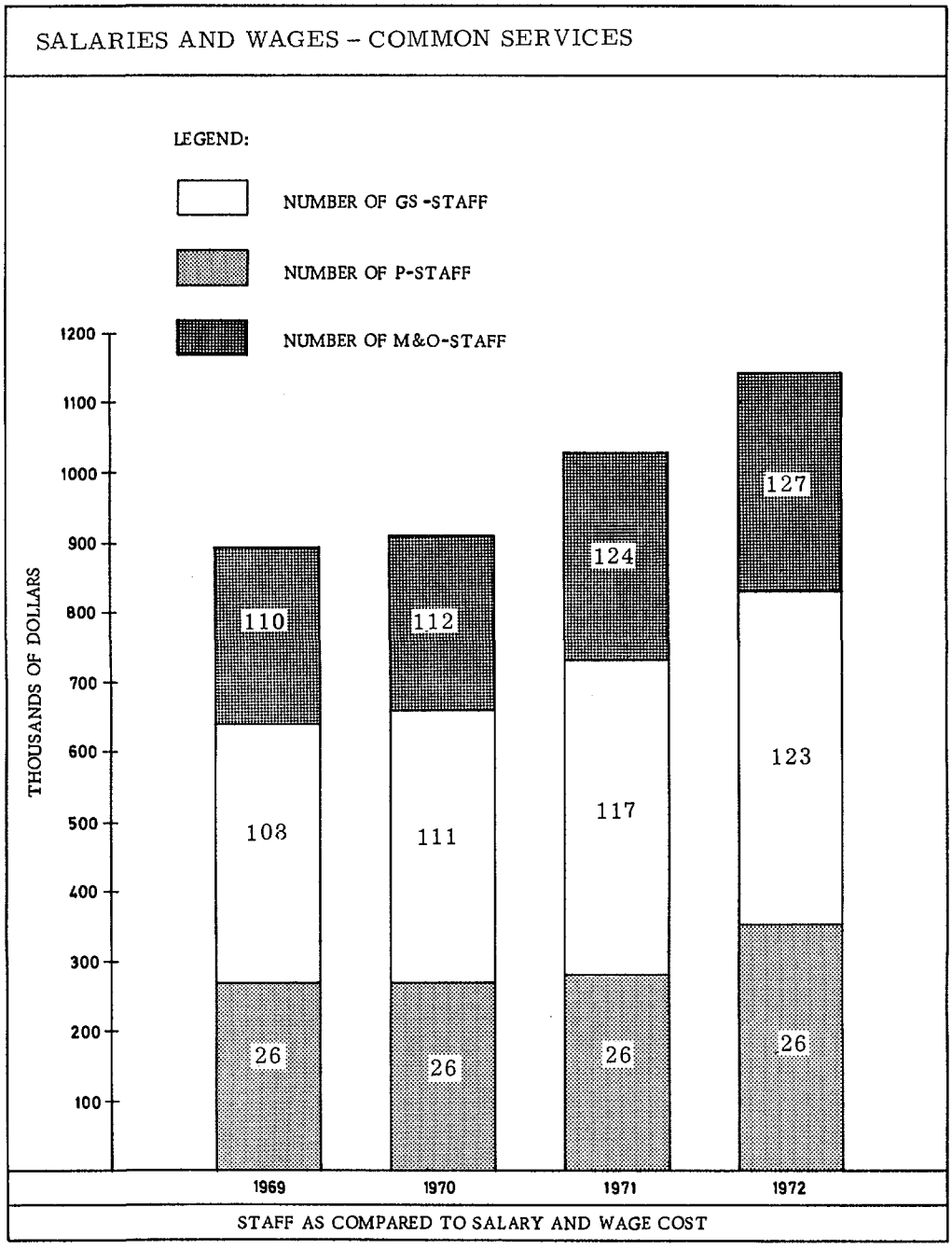
V.16.12. Other parts of this programme are expected to continue with little change except for that which may be involved in moving the Agency's Headquarters to the Donaupark, which will entail substantial moving costs and some new furnishings and equipment.

Budget estimates

Explanation of major cost changes in 1971

V.16.13. Total costs for this programme are expected to increase from $1 737 800 in the adjusted budget for 1970 to $2 206 000 in 1971, i.e. an increase of $468 200, which is equal to 26.94%. Of this increase, $185 000, or 10.65%, is due to a change in handling of revenues; $131 000, or 7.54%, is due to salary and price increases in respect of existing staff and services; and $152 200, or 8.76%, represents true programme increases, of which $68 900 is for salaries and common staff costs in respect of six new GS and twelve new M&O staff members. Eleven new M&O staff members are needed to provide services in the additional office space which the Agency is to start to occupy in 1970 (see paragraph V.16.16 below). One M&O staff member is required to serve as a reproduction machine operator in the

FIGURE 38



Division of Publications. The six additional GS staff will be required by the Division of Publications (see paragraph V. 16. 18 below). Most of the remaining increase in costs is required for the new office space, including the cost of communications, equipment, supplies, materials, contractual services and utilities. Increases in staff and costs for publications work are partially offset by an estimated increase of $10 000 in revenues from sales. The breakdown of these price and programme cost increases in 1971 by major types of expenditure is shown in Table 47.

V. 16. 14. The price increases relating to salaries and wages and common staff costs consist of the normal increases for existing staff. Under the publications section of this programme, common staff costs increase by a higher percentage than in other programmes due to the fact that in the past lower common staff costs had been charged to the appropriation section "Distribution of information". Since most GS and M&O staff are locally recruited, the costs are far below the average for the Headquarters programmes. As it is very difficult to forecast actual common staff costs for the various programmes of the Agency, common staff costs of each programme have been calculated on the basis of a uniform percentage of salaries, with the exception of the operational facilities for which special calculations are applied.

V. 16. 15. The price increase for common services, supplies and equipment represents the change in costs for utilities which took place early in 1969. Actual costs for utilities in that year amounted to $122 827, so that the 1970 provision was underestimated. The 1971 estimates provide for a price increase of $17 000.

V. 16. 16. As stated in paragraph V. 16. 13 above, the programme increases in 1971 include $68 900 for salaries and wages and common staff costs, about half of which are associated with a new office building in Zaunergasse (near Schwarzenbergplatz) which has been offered to the Agency by the Austrian Federal Chancellor; the other half is attributable to new staff required in the Publications Division referred to below. The space offered is rent free, and the offer is a recognition by the Austrian authorities of the impact of NPT on staff requirements. The Agency will have to bear the cost of equipping the building for use and providing the necessary services. These services will necessitate the employment of 11 additional M&O staff members consisting of four cleaning women, four security guards for the two entrances, two workers for building maintenance and repairs and one messenger to service the various offices. The total cost of these posts amounts to $23 500, with a proportionate increase of $9 000 for common staff costs.

V. 16. 17. In the Division of Conference and General Services an increase of $2 000 in overtime costs, mainly for drivers, is foreseen.

V. 16. 18. With regard to the Division of Publications it is proposed to regrade a P-1 post to the P-2 level because of the technical qualifications required. Two new GS staff members are required for sales work because of the work-load, which has made it necessary to employ temporary assistance on a continuing basis. For work now being done on a regular basis it is proposed to employ four further GS staff members consisting of one offset printer, one reproduction clerk, and two reproduction photographers, one of the latter being required to eliminate the existing need for extensive overtime. These posts will necessarily result in an increase in common staff costs. However, overtime payments will be kept to a minimum and the need for temporary assistance will be reduced. As mentioned earlier, one M&O reproduction machine operator will also be required.

V. 16. 19. The substantial increase in costs in respect of common services, equipment and supplies is mainly attributable to expenditures required for the new building in Zaunergasse.

V. 16. 20. The estimated increase of $1 000 in expenditures in respect of publications and other information media is more than offset by the $10 000 estimated increase revenues in 1971. Revenues are expected to amount to $195 000 in 1971 and $205 000 in 1972.

V. 16. 21. The largest item of expenditure under this programme, other than for salaries and wages, is for common services, supplies and equipment. Since this item amounts to

over 27% of the total for the programme, a detailed breakdown of the items included under this heading is given in Table 51. This table shows that, with the exception of minor cost increases, the major increases in 1971 are for utilities and costs associated with the occupation of new office space. The latter costs are shown below:

The latter costs are shown below:

	$
Telephone calls, including long-distance calls	6 000
Utilities (heating, water, garbage)	11 000
Contractual and other administrative services (lifts, window cleaning, etc.)	3 000
Miscellaneous supplies	2 000
Furniture, fixtures	35 500
Switchboard and adaptation of building	20 000
Consultants services for the Donaupark building	20 000
Total	97 500

V. 16. 22. Tables 49 and 50 show the distribution of costs and manpower between the two Division covered by this programme and the impact of price and programme increases on the total costs for 1971.

V. 16. 23. It is foreseen that costs for this programme will increase by $165 000, or 7. 48%, in 1972 over the level requested for 1971. This increase is made up almost entirely of salaries and wages and common staff costs for existing staff as well as costs associated with the addition of six new GS and three new M&O posts to meet the increasing workload, the occupation of additional offices at Zaunergasse and increased printing and publications services. An increase of $10 000 in sales revenues will partially offset the latter cost increases.

Summary of total costs by organization unit

Table 49

Organization unit	Actual 1969 obligations	1970 budget	Increase or (decrease) from 1970			1971 estimate	Preliminary 1972 estimate
			Price	Programme	Total		
Division of Conference and General Services	1 140 073	1 181 000	60 300	119 200	179 500	1 360 500	1 468 000
Division of Publications	577 731	556 800	70 700	218 000(a)	288 700	845 500	903 000
TOTAL	1 717 804	1 737 800	131 000 7.54%	337 200 19.40%	468 200 26.94%	2 206 000	2 371 000

(a) Includes $ 185 000 in respect of income deducted from 1970 expenditure, while for 1971 and 1972 the gross expenditure is shown.

Summary of manpower by organization unit and category

Table 50

Organization unit	1969 budget				1970 budget				1971 estimate				Preliminary 1972 estimate			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Division of Conference and General Services	9	53	95	157	9	54	96	159	9	54	107	170	9	58	110	177
Division of Publications	17	66	19	102	17	68	20	105	17	74	21	112	17	76	21	114
Less: Staff working for policy-making organs	-	11	4	15	-	11	4	15	-	11	4	15	-	11	4	15
Sub-total	17	55	15	87	17	57	16	90	17	63	17	97	17	65	17	99
TOTAL	26	108	110	244	26	111	112	249	26	117	124	267	26	123	127	276

Costs of common services, supplies and equipment by Division and item of expenditure

Table 51

Division and item of expenditure	Actual 1969 obligations	1970 budget	1971 estimate	Preliminary 1972 estimate
Division of Conference and General Services				
Communications and transport	113 997	112 500	115 000	115 000
Utilities	122 827	106 000	142 000	142 000
Rental, alteration and maintenance of premises and equipment	73 193	59 000	71 000	71 000
Services related to new office space	-	40 000	97 500	92 000
Contractual and other administrative services	28 245	30 600	29 600	31 000
Sub-total, Services	338 262	348 100	455 100	451 000
Stationery and office supplies	23 856	28 000	30 000	30 000
Miscellaneous services and supplies	36 578	37 500	40 000	40 000
Sub-total, Supplies	60 434	65 500	70 000	70 000
Furniture and fixtures	18 105	20 000	13 000	13 000
Office machines and equipment	46 193	25 400	22 600	26 600
Transportation equipment	-	4 000	4 000	4 000
Sub-total, Equipment	64 298	49 400	39 600	43 600
TOTAL	462 994	463 000	564 700	564 600
Division of Publications				
Reproduction supplies and paper	33 388	24 500	26 000	27 000
Equipment	14 986	20 000	17 000	20 000
TOTAL	48 374	44 500	43 000	47 000
GRAND TOTAL	511 368	507 500	607 700	611 600

17. Contingent extraordinary expenditures

Highlight summary

V.17.1. In line with a recommendation of the General Assembly's Ad Hoc Committee [1], the Agency's budget for 1968 contained an appropriation of $130 000 for possible use to meet extraordinary unforeseen expenditures [2]. Since no use had to be made of this appropriation, the Board, when elaborating the budget for 1970 in 1969, reduced the corresponding appropriation to $100 000 [3]. During the latter part of 1969, however, it became necessary to use some $113 000 of the $130 000 contingency appropriation for the year to meet that part of salary and price increases which could not be absorbed by the strict exercise of economies.

V.17.2. Since the increased responsibilities devolving upon the Agency in carrying out the role required of it by NPT may urgently necessitate certain expenditures which may not have been provided for in this budget, and since salary and price increases and the costs of some activities other than safeguards activities may have been underestimated, the Board is maintaining the estimate for contingent extraordinary expenditures at $100 000 for 1971, and expects that it will be necessary to do so for 1972. Use of these funds will nevertheless require its specific prior approval [4].

---

[1] United Nations document A/6343, para.41.
[2] GC(XI)/360, Section 13.
[3] GC(XIII)/405, Section 13.
[4] See Annex VII, draft resolution A, para.3.

ANNEX I

PANELS AND COMMITTEES

Apart from the meetings of SAC, INDC and the Scientific Council of the Trieste Centre which it is planned to hold in 1971, the Director General will select, depending upon the priority requirements of the programme, the subjects of meetings from those listed below.

Food and agriculture

1. Panel on the development of nitrogen transformation in soils.
2. Panel on the use of the sterile male technique to control animal insect pests;
3. Panel to advise on the use of isotopic tracer and radioactivation techniques for studying pesticide residue problems;
4. Panel on nuclear techniques for the control of tropical and sub-tropical parasitic diseases;
5. Panel on animal protein production from non-protein nitrogen;
6. Panel to consider the economics of food preservation by irradiation;
7. Panel to consider the acceptability of certain irradiated food items;
8. Research co-ordination meeting on applying new nuclear technology to the production of higher quality plant protein;
9. Research co-ordination meeting on the use of induced mutation in rice breeding;
10. Panel to consider the application of radiation-induced sterility in plant breeding and insect eradication;
11. Panel to review progress on the practical application of insect control by the sterile-male technique.

Life sciences

12. Panel on national and international radiation dose intercomparison;
13. Panel on advances in physical aspects of radiation therapy;
14. Meeting to co-ordinate the Agency's various research projects relating to wide-range dosimetric systems;
15. Panel on the applications of radioisotopes in immunological studies of communicable diseases;
16. Panel on the standardization of radioimmunoassay techniques;
17. Panel to discuss the establishment of standards for bacterial sterility testing of radiation-sterilized biomedical supplies and products;

18. Panel to discuss the abscopal effects of irradiation;

19. Panel to discuss the radiobiological applications of neutron irradiation.

Physical sciences

20. Panel on use of low-energy accelerators in materials technology;

21. Panel on non-neutron nuclear data;

22. Panel on chemical dosimetry;

23. Panel on hot-atom chemistry;

24. Panel on radiation chemistry;

25. Panel on corrosion and mass transport in nuclear reactors;

26. Panel on the production of short-lived isotopes;

27. Panel on the quality control of radioisotopes and radiopharmaceuticals;

28. Panel on activation analysis;

29. Panel on the thermodynamics of nuclear materials;

30. Panel on practical aspects of radiosterilization;

31. Panel on nuclear techniques in the textile industries;

32. Hydrological Decade working group on nuclear techniques;

33. Panel to evaluate isotope hydrological studies;

34. Panel on standards;

35. Panel on exchange of evaluated neutron data.

Laboratory

36. Panel on spectrometric methods for determining small alpha-, beta- and gamma-emitting impurities in the solution samples.

Nuclear power and reactors

37. Working group on fast reactors;

38. Working group on reactor pressure vessel technology;

39. Working group on MHD;

40. Working group on uranium reserves and resources;

41. Working group on heat and mass transfer;

42. Panel on plutonium recycle in light-water reactors;

43. Panel on power reactor shielding;

44. Panel on the technical and economic aspects of the storage, conveyance and distribution of desalted water from large-sclae nuclear desalting plants;

45. Panel on the subject of financing studies;

46. Working group on thorium utilization;

47. Working group on peaceful nuclear explosions;

48. Research co-ordination meeting on recovery of uranium as a by-product from phosphate rocks;

49. Panel on non-metallic reactor fuels;

50. Panel on burn-up.

Health, safety and waste management

51. Panel to review detailed packaging or package designs submitted by Member States for incorporation in the annexes to the Regulations for the Safe Transport of Radioactive Materials;

52. Panel to develop uniform criteria and recommend suitable instruments and procedures for assessing the radiological hazards in uranium and thorium mines;

53. Panel to prepare a manual on the safe handling of plutonium;

54. Panel to prepare guidelines on the radiological safety aspects of reactor fuel fabrication;

55. Meeting on nuclear accident dosimetry;

56. Panel to revise the Safety Series No. 5 publication entitled "Radioactive Waste Disposal into the Sea";

57. Panel to discuss methods of decontamination and disposal of residual radioactivity;

58. Panel to discuss the production, treatment and permissible releases of various non-radioactive wastes in the nuclear industry;

59. Panel on experiences with engineered safeguards;

60. Panel on safety of pressure tube reactors;

61. Panel on a related health and safety topic concerning peaceful uses of nuclear explosives;

62. Panel to review the problem of vibration in reactors;

63. Panel to consider the safety problems in the use of prestressed concrete structures which are being used for gas-cooled and other reactors.

Information and technical services

64. INIS consultative committee on nuclear thesaurus (first meeting);

65. INIS consultative committee on nuclear thesaurus (second meeting);

66. INIS advisory committee;

67. Meeting in connection with the Agency's journals.

Safeguards

68. Working group to discuss development problems involved in safeguards in respect of reprocessing and fabrication plants;

69. Safeguards working groups.

Administration

70. Panel on legal aspects of the irradiation of food.

ANNEX II

SEMINARS, SYMPOSIA AND CONFERENCES

1. As a result of guidance given by SAC, a list of subjects has been prepared on which seminars, symposia and conferences may be held between January 1971 and March 1972. Because the Fourth Geneva Conference will be held in 1971, and a number of topics normally discussed at the Agency's scientific meetings will be considered at the Conference, the number of such meetings to be convened in that year will be lower than usual. Within the limits of the appropriations and subject to the requirements of the programmes, the Director General will select the subjects of meetings in 1971 from those listed below:

(a) Symposium on biophysical aspects of radiation quality;

(b) Symposium on the use of radiation and radioisotopes for genetic improvement in industrial micro-organisms;

(c) Symposium on dosimetry techniques as applied to agriculture, industry, biology and medicine;

(d) Symposium on the molecular basis of radiation damage and repair processes;

(e) Symposium on nuclear activation techniques in the life sciences;

(f) IAEA/FAO seminar on unified monitoring programmes for food and environmental contamination,

(g) Seminar on calculative methods of assessing transport packages;

(h) Symposium on the assessment of radioactive body burdens in man;

(i) Symposium on interim and long-term treatment and storage of high-level radioactive waste;

(j) Fourth conference on controlled fusion reactions and plasma physics;

(k) Symposium on neutron inelastic scattering;

(l) Symposium on analytical methods in the nuclear fuel cycle;

(m) Seminar on numerical reactor calculations; and

(n) Regional seminar for input preparation for INIS.

2. In addition, it is expected that the Agency will in 1971 continue to co-sponsor scientific meetings held by other international organizations, including an IMCO/IAEA symposium on nuclear ship propulsion and an ENEA/IAEA symposium on magnetohydrodynamic electrical power generation, and invite appropriate co-sponsorship of its own meetings.

ANNEX III

ESTIMATED USE OF FUNDS IN 1970 AND 1971

A. By programmes and items of expenditure

	Programmes	Total	Salaries and wages	Common staff costs	Duty travel and missions	Panels and committees	Seminars, symposia and conferences	Representation and hospitality
	1970							
1.	Policy-making organs	560 000	373 000	126 500	500			
2.	Executive management and technical programme planning	330 400	209 300	76 900	18 000	11 000		15 200
3.	Technical assistance and training	2 548 800	427 500	162 200	19 000			3 100
4.	Food and agriculture	553 600	197 300	69 200	22 000	28 000	17 000	1 100
5.	Life sciences	600 200	229 100	82 500	14 500	30 000	7 000	1 100
6.	Physical sciences	701 400	365 800	130 700	29 000	38 000	26 000	1 500
7.	The Laboratory	1 014 000	579 000	189 000	4 000			
8.	Trieste Centre	560 000	122 000	27 000	10 000	5 000	60 000	2 500
9.	Nuclear power and reactors	706 000	367 900	136 500	20 000	40 000	40 000	1 600
10.	Health, safety and waste management	634 100	293 300	106 200	16 000	30 000	15 000	1 600
11.	Monaco Laboratory	205 800	136 300	41 500	4 000			
12.	Information and technical services	1 165 000	493 300	181 700	20 000	12 000	10 000	1 000
13.	Safeguards	1 272 000	671 500	257 000	120 000	20 000		3 500
14.	Service and support activities	780 600	554 100	211 300	200		15 000	
15.	Administration	1 367 300	908 500	339 900	19 700	8 000	10 000	9 200
16.	Common services	1 737 800	926 100	333 900	1 200			100
	Sub-total	14 737 000	6 854 000	2 472 000	318 100	222 000	200 000	41 500
	Other	100 000						
	TOTAL	14 837 000	6 854 000	2 472 000	318 100	222 000	200 000	41 500
	1971							
1.	Policy-making organs	571 000	380 500	130 000	500			
2.	Executive management and technical programme planning	348 000	221 200	82 000	18 400	11 200		15 200
3.	Technical assistance and training	3 210 000	438 900	169 000	17 000			3 100
4.	Food and agriculture	553 000	200 200	71 900	22 800	28 000	10 000	1 100
5.	Life sciences	609 000	234 300	85 600	15 000	30 000	7 000	1 100
6.	Physical sciences	714 000	373 800	135 700	30 000	40 000	14 000	1 500
7.	The Laboratory	1 109 000	634 800	210 000	4 000			
8.	Trieste Centre	635 000	138 500	29 000	5 000	5 000	60 000	2 500
9.	Nuclear power and reactors	694 000	372 800	140 100	20 800	40 000	14 000	1 600
10.	Health, safety and waste management	673 000	299 400	110 200	17 800	34 000	20 000	1 600
11.	Monaco Laboratory	222 000	146 400	47 100	4 000			
12.	Information and technical services	1 258 000	520 300	196 300	21 400	17 000	7 000	1 000
13.	Safeguards	1 885 000	967 700	371 000	200 000	20 000		4 300
14.	Service and support activities	842 000	555 300	214 000	200		70 000	2 500
15.	Administration	1 400 000	940 500	358 300	20 500	8 000	7 000	9 200
16.	Common services	2 206 000	1 042 300	399 600	1 200			200
	Sub-total	16 929 000	7 466 900	2 749 800	398 600	233 200	209 000	44 900
	Other	100 000						
	TOTAL	17 029 000	7 466 900	2 749 800	398 600	233 200	209 000	44 900

Scientific and technical contracts	Scientific services, supplies and equipment	Common services, supplies and equipment	Publications and other information media	Other	Contingency	Operating Fund II
		54 000		6 000		
						1 937 000
219 000						
236 000						
110 400						
	147 000	95 000				
	12 000	65 000	23 500	233 000		
100 000						
168 000	4 000					
	18 500	5 000	500			
57 000		296 000	94 000			
200 000						
		49 000	23 000			
		507 500	(31 000)			
1 090 400	181 500	1 071 500	110 000	239 000		1 937 000
					100 000	
1 090 400	181 500	1 071 500	110 000	239 000	100 000	1 937 000
		54 000		6 000		
						2 582 000
219 000						
236 000						
111 000			8 000			
	154 000	106 200				
	12 000	84 000	23 500	275 500		
95 000		9 700				
180 000	4 000		6 000			
	19 000	5 000	500			
50 000		299 000	146 000			
270 000		2 000		50 000		
		52 500	4 000			
		607 700	155 000			
1 161 000	189 000	1 220 100	343 000	331 500		2 582 000
					100 000	
1 161 000	189 000	1 220 100	343 000	331 500	100 000	2 582 000

B. By activities

(Presented in the form used at present by ACC in its reports to ECOSOC)[a/]
(in thousands of US dollars)

		1970 Budget			1971 Estimate		
		Regular Budget funds	Extra-budgetary funds	Total	Regular Budget funds	Extra-budgetary funds	Total
I.	Policy-making organs	560	-	560	571	-	571
II.	Executive management and technical programme planning	330	-	330	348	-	348
III.	Programmes of activity						
	(a) General development planning and policy						
	(b) Strengthening of institutions and of governmental services						
	(c) Development of human resources (including education and training)	-	687	687	-	682	682
	(d) Social development, welfare and living conditions						
	(e) Human rights						
	(f) Health protection and promotion	1 090	45	1 135	1 113	45	1 158
	(g) Control and eradication of communicable diseases						
	(h) Development of natural resources	179	-	179	168	-	168
	(i) Scientific research and the application of science to development	2 351	605	2 956	2 565	624	3 189
	(j) Culture						
	(k) Transport, communications and related services						
	(l) Industrialization	706	-	706	694	-	694
	(m) Expansion and development of trade						
	(n) Collection, dissemination and improvement of basic reference material (including statistics)	193	-	193	236	-	236
	(o) Material assistance to and protection of refugees						
	(p) Other programmes of activity	1 687	1 250	2 937	2 018	1 900	3 918
	(q) Activities and services common to a number of programmes	1 392	-	1 392	1 470	-	1 470
IV.	Service and support activities						
	(a) Administration	1 209	-	1 209	1 250	-	1 250
	(b) Common services	1 181	-	1 181	1 360	-	1 360
V.	Other budgetary provisions	100	-	100	100	-	100
	Total[b/]	10 978	2 587	13 565	11 893	3 251	15 144

a/ See, for example, United Nations document E/4501.

b/ Excluding Safeguards.

Explanatory notes

In accordance with the recommendations of the General Assembly's Ad Hoc Committee of Experts to Examine the Finances of the United Nations and the Specialized Agencies, the estimated costs of activities of the Agency have been broken down by individual programmes. In cases where the programme titles used by the Agency coincide with the headings used by ACC in its report to ECOSOC, the costs of such programmes have been shown unchanged under the respective headings. This applies to Policy-making organs and Executive management and technical programme planning. In cases where the headings used in the ACC report differ from the titles under the Agency's programme, the activities have been shown under what has been judged to be the most appropriate heading.

I. Policy-making organs

Includes all costs of annual sessions of the General Conference and all meetings of the Board of Governors and its committees, as well as staff costs of the Secretariat of the General Conference and the Board and a part of staff costs of interpretation, language and documents services which is annually calculated on the basis of work-load and output statistics of the preceding year.

II. Executive management and technical programme planning

Includes staff costs, representation allowances and duty travel in respect of the Offices of the Director General and of two Deputy Directors General in charge, respectively, of the Departments of Research and Isotopes and Technical Operations; also the costs of meetings of the Agency's Scientific Advisory Committee.

III. Programmes of activity

(a) and (b) not applicable.

(c) Development of human resources (including education and training)

Includes that part of the Agency's Operational Budget which is described as for "Exchange and training".

(d) and (e) not applicable.

(f) Health protection and promotion

This subject covers the application of isotopes and radiation in medicine; diagnostic and research applications; toxicity of radionuclides in man; therapeutic applications of radioisotopes and radiation. It also covers the health, safety and waste management programme of the Agency and the research carried out at the Monaco Laboratory on the effects of radioactivity in the sea. Included is the cost of the programme of the Section of Nuclear Medicine in the Division of Life Sciences, the total cost of the health, safety and waste management programme and of the Monaco project which is jointly financed by the Agency (from the Regular Budget) and the Government of Monaco (shown under extra-budgetary funds).

(g) not applicable.

(h) Development of natural resources

This subject covers the applications of radioisotopes in hydrology. Included is the total cost of the programme of the Hydrology Section in the Division of Research and Laboratories (Physical Sciences).

(i) Scientific research and the application of science to development

This subject covers the application of isotopes and radiation in agriculture (including soil fertility and plant nutrition, irrigation, soil moisture and structure; insect control and eradication; pesticides, weed killers and residues; plant breeding and genetics; meat and milk production; animal diseases control); and in food irradiation (including food preservation and processing and food disinfestation). It also covers research and services in physical sciences (chemistry, physics and theoretical physics) and life sciences (radiobiology and dosimetry). Included is the total cost of the food and agriculture programme carried out by the Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, the cost of the Physics, Chemistry, Nuclear Data and Industrial Applications Sections and of the Office of the Director of the Division of Research and Laboratories, and the cost of the Dosimetry and Radiation Biology Sections of the Division of Life Sciences, as well as all costs of the Agency's Laboratory and of the International Centre for Theoretical Physics.

(j) and (k) not applicable.

(l) Industrialization

This subject covers nuclear power, reactors and desalting, reactor research, nuclear fuels and equipment, and the economics of nuclear power. Included are all costs of the programme carried out by the Division of Nuclear Power and Reactors.

(m) not applicable.

(n) Collection, dissemination and improvement of basic reference material (including statistics)

Included are all costs of the Agency's Library.

(o) not applicable.

(p) Other programmes of activity

This subject covers technical assistance (experts and equipment only) under the Operational Budget, the Information and technical services programme, excluding the Agency's Library, and also the Publications programme and Public Information.

(q) Activities and services common to a number of programmes

Includes that part of the cost of languages and interpretation services which is not chargeable to Policy-making organs or the Publications programme; further, the cost of the Research Contract Administration Section in the Department of Research and Isotopes, and of the Scientific Conferences Administration Section in the Division of Scientific and Technical Information. It also includes the cost of the Office of the Deputy Director General in charge of technical assistance and the Technical Assistance Division.

IV. Service and support activities

(a) Administration

Includes all costs of the Office of the Deputy Director General for Administration, the Divisions of Budget and Finance, Personnel, Internal Audit, External Liaison, and the Legal Division.

(b) Common services

Includes the cost of the Division of Conference and General Services, excluding costs chargeable to Policy-making organs.

V. Other budgetary provisions

Represents the amount appropriated for contingent extraordinary expenditures.

C. By major functions

(as recommended by the General Assembly's Ad Hoc Committee)

Function	1970 Budget $	1971 Estimates $
1. Policy-making organs	560 000	571 000
2. Administrative costs	2 720 700	2 958 000
3. Operational costs	9 596 100	11 378 000
4. General research and study costs	1 860 200	2 022 000
Sub-total	14 737 000	16 929 000
5. Contingent extraordinary expenditures[a]	100 000	100 000
TOTAL	14 837 000	17 029 000
Sources of funds		
1. Assessments on Member States	11 853 000	13 052 000
2. Miscellaneous income	397 000	726 000
Sub-total Regular Budget	12 250 000	13 778 000
3. Voluntary contributions	2 000 000	2 500 000
4. Special contributions	295 000	295 000
5. Miscellaneous income	292 000	456 000
Sub-total Operational Budget	2 587 000	3 251 000
TOTAL	14 837 000	17 029 000

Explanatory notes

1. This Annex is included in compliance with a recommendation by the General Assembly's Ad Hoc Committee. No standard definitions having yet been adopted, the allocation of costs as shown above has been made on the following basis:

(a) An item entitled "Policy-making organs" has been added in accordance with an agreement reached at a meeting of the Budget and Finance Section of CCAQ in November 1967; the costs shown here are those appearing in appropriation Section 1 of the Regular Budget;

(b) Under "Administrative costs" are included the costs shown in the Agency's programme under "Executive management and technical programme planning", "Administration" excluding the Division of Public Information and "Common Services" excluding the Division of Publications;

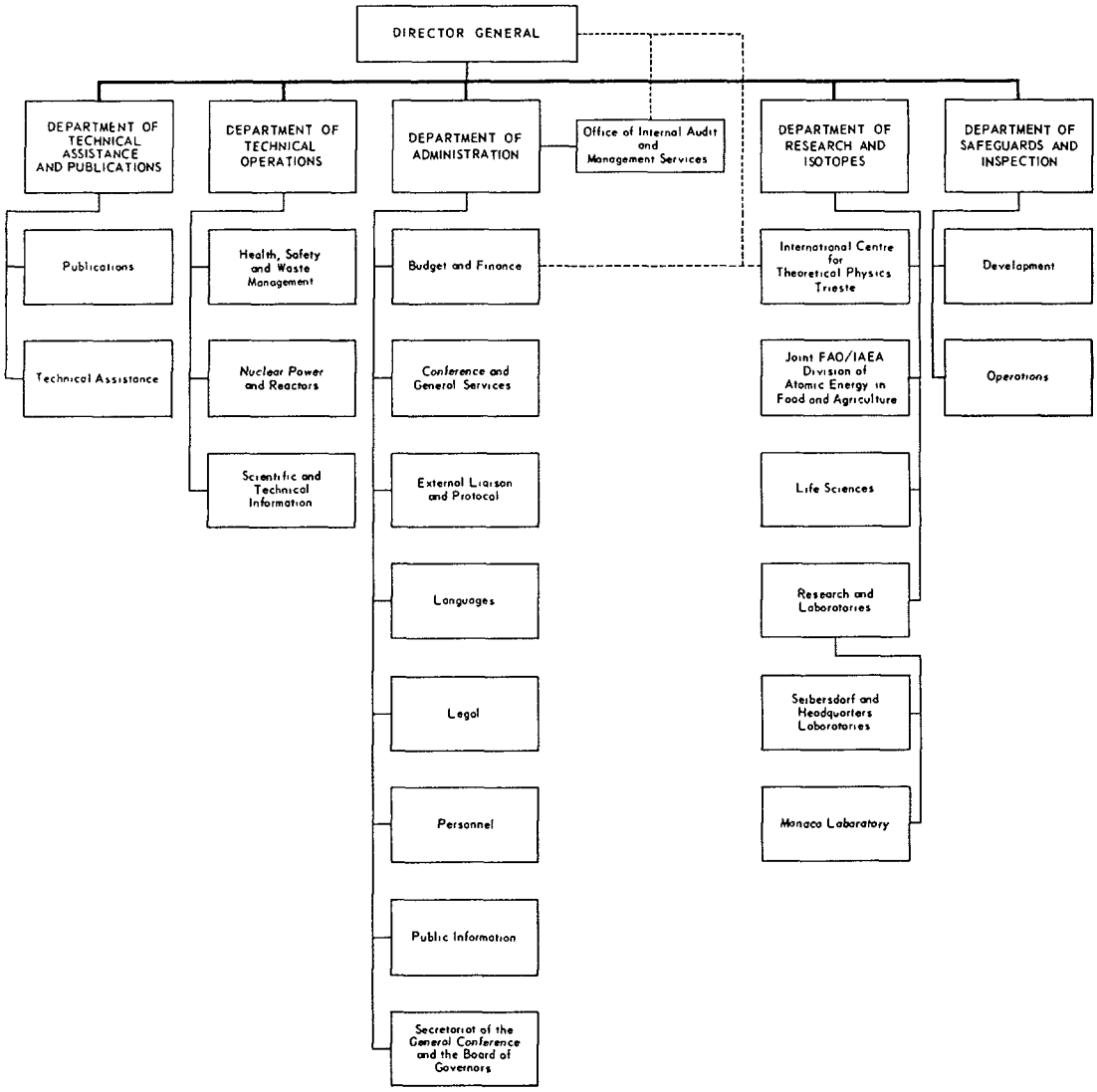
(c) Under "General research and study costs" are included all costs for scientific and technical services, the cost of safeguards development, all costs of the International Centre for Theoretical Physics at Trieste and of the International Laboratory of Marine Radioactivity at Monaco; and

(d) Under "Operational costs" are included all remaining items.

[a] Unallocated; to be used only after specific approval by the Board.

ANNEX IV

Organizational Chart



ANNEX V

THE MANNING TABLE

1. 1970 Revised

	DG	DDG or IG	D	P-5	P-4	P-3	P-2	P-1	Sub-total	GS	M&O	Grand total
Office of the Director General	1		1	1			1		4	3		7
Department of Administration		1		1		1			3	2		5
Office of Internal Audit and Management				1	1	2		1	5	4		9
Division of Budget and Finance			1	2	4	1	2	5	15	24		39
Division of Conference and General Services			1	2	1	1	2	2	9	54	96	159
Division of External Liaison and Protocol			2	4	1		1	1	9	10		19
Languages Division			1	4	11	24			40	37	1	78
Legal Division			1	2	2	2	1		8	5		13
Division of Personnel			1	2	2	1	1		7	16		23
Division of Public Information				1	2	1	1		5	7		12
Secretariat of the General Conference and the Board of Governors			1	1	4	6			12	4		16
Department of Research and Isotopes		1		1	1	1		1	5	6		11
Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture			1	3	7				11	8		19
Division of Life Sciences			1	4	6	1		2	14	10		24
Division of Research and Laboratories			1	6	6	8	3		24	14		38
The Agency's Laboratory				5	11	7	6	1	30	53	19	102
The Monaco Laboratory				1	3			1	5	13		18
International Centre for Theoretical Physics				1	1	1	1		4	12	5	21
Department of Safeguards and Inspection		1		1			1	1	4	4		8
Division of Development			1	6	6	5	1	1	20	8		28
Division of Operations			1	6	10	8	5		30	13		43
Department of Technical Assistance and Publications		1		1	1	1	1		5	6		11
Division of Technical Assistance			1	5	9	3	1		19	24		43
Division of Publications			1	1	1	4	5	5	17	68	20	105
Department of Technical Operations		1				1		1	3	2		5
Division of Health, Safety and Waste Management			1	7	7	2		1	18	11		29
Division of Nuclear Power and Reactors			1	11	6	3	2	1	24	12		36
Division of Scientific and Technical Information			1	3	8	8	6	7	33	47		80
	1	5	19	83	111	92	41	31	383	477	141	1001

2. 1971

	DG	DDG or IG	D	P-5	P-4	P-3	P-2	P-1	Sub-total	GS	M&O	Grand total
Office of the Director General	1		1	1			1		4	3		7
Department of Administration		1		1		1			3	2		5
Office of Internal Audit and Management				1	1	2		1	5	4		9
Division of Budget and Finance			1	2	4	1	2	5	15	24		39
Division of Conference and General Services			1	2	1	1	2	2	9	54	107	170
Division of External Liaison and Protocol			2	4	1		1	1	9	10		19
Languages Division			1	4	11	24			40	37	1	78
Legal Division			1	2	2	2	1		8	5		13
Division of Personnel			1	2	2	1	1		7	16		23
Division of Public Information				1	2	1	1		5	7		12
Secretariat of the General Conference and the Board of Governors			1	1	4	6			12	4		16
Department of Research and Isotopes		1		1	1	1		1	5	6		11
Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture			1	3	7				11	8		19
Division of Life Sciences			1	4	6	1		2	14	10		24
Division of Research and Laboratories			1	6	6	8	3		24	14		38
The Agency's Laboratory				5	11	7	6	1	30	53	21	104
The Monaco Laboratory				1	3			2	6	12		18
International Centre for Theoretical Physics				1	1	1	1		4	15	2	21
Department of Safeguards and Inspection		1		1			1	1	4	5		9
Division of Development			1	7	6	6	1	1	22	9		31
Division of Operations			1	9	11	13	8	-	42	16		58
Department of Technical Assistance and Publications		1		1	1	1	1		5	6		11
Division of Technical Assistance			1	5	9	3	1		19	24		43
Division of Publications			1	1	1	4	6	4	17	74	21	112
Department of Technical Operations		1				1		1	3	2		5
Division of Health, Safety and Waste Management			1	7	7	2		1	18	11		29
Division of Nuclear Power and Reactors			1	11	6	3	2		23	13		36
Division of Scientific and Technical Information			1	3	8	9	6	7	34	50		84
	1	5	19	87	112	99	45	30	398	494	152	1044

ANNEX VI

1. ESTIMATES FOR THE TOTAL HEADQUARTERS ESTABLISHMENT OF POSTS (exclusive of those assigned to the operational facilities)

1969	1970	1971	Position	1969 $	1970 $	1971 $
1	1	1	Director General	20 842	20 000	30 100
5	5	5	Deputy Directors General/ Inspector General	113 615	113 615	113 615
18	19	19	Director (D-1/2)	314 280	331 740	331 740
69	76	80	Senior officer (P-5)	981 732	1 081 328	1 138 240
96	96	97	First officer (P-4)	1 121 472	1 121 472	1 133 154
75	84	91	Second officer (P-3)	724 950	811 944	879 606
29	34	38	Associate officer (P-2)	230 695	270 470	302 290
29	29	27	Assistant officer (P-1)	179 800	179 800	167 400
322	344	358	Sub-total	3 687 386	3 930 369	4 096 145
380	399	414	GS staff	1 303 400	1 368 570	1 457 280
115	117	129	M&O staff	242 650	246 870	277 350
817	860	901	Total	5 233 436	5 545 809	5 830 775
			Post adjustment	122 154	6 800	194 000
			Special post and other allowances	18 944	18 500	25 000
			Salary increments and commutation of annual leave	430 678	390 000	525 000
			Sub-total	5 805 212	5 961 109	6 574 775
			Less: Adjustment for staff turnover and delays in recruitment	405 000	121 409	219 775
			TOTAL[a/]	5 400 212	5 839 700	6 355 000

a/ Exclusive of consultants, temporary assistance and overtime.

2. ESTIMATES FOR THE TOTAL OPERATIONAL FACILITIES ESTABLISHMENT OF POSTS

(a) Laboratory

1969	1970	1971	Position	1969 $	1970 $	1971 $
5	5	5	Senior officer (P-5)	71 140	71 140	71 140
10	11	11	First officer (P-4)	116 820	128 502	128 502
7	7	7	Second officer (P-3)	67 662	67 662	67 662
6	6	6	Associate officer (P-2)	47 730	47 730	47 730
1	1	1	Assistant officer (P-1)	6 200	6 200	6 200
29	30	30	Sub-total	309 552	321 234	321 234
53	53	53	GS staff	195 363	181 790	201 930
19	19	21	M&O staff	36 744	40 090	42 840
101	102	104	Total	541 659	543 114	566 004
			Post adjustment	8 700	-	14 000
			Salary increments and commutation of annual leave	50 208	33 500	58 000
			Sub-total	600 567	576 614	638 004
			Less: Adjustment for staff turnover and delays in recruitment	9 719	2 914	10 004
			Sub-total	590 848	573 700	628 000
			Consultants	-	1 000	1 000
			Temporary assistance	-	800	800
			Overtime	4 258	3 500	5 000
			TOTAL	595 106	579 000	634 800

(b) International Laboratory of Marine Radioactivity

1969	1970	1971	Position	1969 $	1970 $	1971 $
1	1	1	Senior officer (P-5)	14 228	14 228	14 228
3	3	3	First officer (P-4)	35 046	35 046	35 046
-	-	-	Second officer (P-3)	-	-	-
-	-	-	Associate officer (P-2)	-	-	-
1	1	2	Assistant officer (P-1)	6 200	6 200	12 400
5	5	6	Sub-total	55 474	55 474	61 674
12	13	12	GS staff	49 968	52 000	53 200
-	-	-	M&O staff	-	-	-
17	18	18	Total	105 442	107 474	114 874
			Post adjustment	12 396	12 035	12 400
			Salary increments and commutation of annual leave	11 376	13 791	16 126
			Sub-total	129 214	133 300	143 400
			Less: Adjustment for staff turnover and delay in recruitment	8 092	-	-
			Sub-total	121 122	133 300	143 400
			Consultants, temporary assistance, overtime	-	3 000	3 000
			TOTAL	121 122	136 300	146 400

(c) International Centre for Theoretical Physics

1969	1970	1971	Position	1969 $	1970 $	1971 $
1	1	1	Senior officer (P-5)	14 228	14 228	14 228
1	1	1	First officer (P-4)	11 682	11 682	11 682
1	1	1	Second officer (P-3)	9 666	9 666	9 666
1	1	1	Associate officer (P-2)	7 955	7 955	7 955
-	-	-	Assistance officer (P-1)	-	-	-
4	4	4	Sub-total	43 531	43 531	43 531
12	12	15	GS staff	39 000	40 500	50 200
5	5	2	M&O staff	11 000	11 500	6 000
21	21	21	Total	93 531	95 531	99 731
			Post adjustment	2 500	2 550	2 550
			Salary increments and commutation of annual leave	2 500	3 000	3 550
			Special allowances	7 400	7 400	7 400
			Sub-total	105 931	108 481	113 231
			Less: Adjustment for staff turnover and delay in recruitment	6 930	5 481	2 031
			Sub-total	99 001	103 000	111 200
			Consultants	8 883	8 000	10 000
			Overtime	2 570	3 000	4 000
			Temporary assistance	12 770	8 000	13 300
			TOTAL	123 224	122 000	138 500

ANNEX VII

Draft resolutions

A. REGULAR BUDGET APPROPRIATIONS FOR 1971

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Regular Budget of the Agency for 1971 [1],

1. Appropriates an amount of $13 778 000 for the Regular Budget expenses of the Agency in 1971, as follows:

Section	US $
1. Policy-making organs	571 000
2. Executive management and administration [2]	2 590 000
3. Common services	2 206 000
4. Technical assistance and training	628 000
5. Research and isotopes [3]	1 876 000
6. Operational facilities [4]	1 297 000
7. Technical operations [5]	2 625 000
8. Safeguards	1 885 000
Sub-total	13 678 000
9. Contingent extraordinary expenditures	100 000
TOTAL	13 778 000

2. Decides that the foregoing appropriation shall be financed as follows:

(a) $541 000 from miscellaneous income, including refunds from the United Nations Joint Staff Pension Fund;

(b) $185 000 from the Special Account of the United Nations; and

---

[1] GC(XIV)/433.

[2] Comprising Executive management and technical programme planning, Administration, and Service and support activities.

[3] Comprising Food and agriculture, Life sciences and Physical sciences.

[4] Comprising the Laboratory, the International Centre for Theoretical Physics and the International Laboratory of Marine Radioactivity.

[5] Comprising Nuclear power and reactors, Health, safety and waste management, and Information and technical services.

(c) $13 052 000 from contributions by Member States on the basis of a scale of assessments to be determined by the General Conference, the contributions being adjusted pursuant to the Agency's Financial Regulations [6] to take account of the cash surplus for 1968;

3. Decides further that the Regular Budget expenses in 1971 shall not exceed the subtotal of $13 678 000 given in paragraph 1 of this resolution, unless the Board of Governors decides that a need for additional, extraordinary expenditures has arisen;

4. Requests the Board, if it should so decide, to authorize the Director General to use, for the purpose of meeting that need, the funds appropriated for Section 9 up to the limit of $100 000; and

5. Authorizes the Director General:

(a) In respect of the Laboratory, the publications programme, research contracts and services provided to Member States or international organizations, to incur expenditures additional to those for which provision is made in the Regular Budget for 1971, provided that the relevant emoluments of the staff concerned and other costs are entirely financed from revenues arising out of sales, work performed for Member States or international organizations, research grants, special contributions or other sources extraneous to the Regular and Operational Budgets for 1971;

(b) With the prior approval of the Board, to make transfers between any of the Sections listed in paragraph 1 above.

B. OPERATIONAL BUDGET ALLOCATIONS FOR 1971

The General Conference,

(a) Accepting the recommendations of the Board of Governors relating to the Agency's operational programme for 1971 [1], and

(b) Noting that funds from various sources, estimated at $751 000, are expected to be available for that programme,

1. Decides that for 1971 the target for voluntary contributions to the General Fund shall be $2.5 million;

2. Urges all Member States to make voluntary contributions to the General Fund for 1971 in accordance with Article XIV.F of the Statute and with the terms of paragraphs 2 and 3 of its Resolution GC(V)/RES/100, so that this target may be reached;

3. Allocates the following sums for the Agency's operational programme for 1971:

	US $
Operating Fund I	669 000
Operating Fund II	2 582 000
	3 251 000

[6] INFCIRC/8/Rev.1.

[1] GC(XIV)/433.

4. Authorizes the Director General to employ staff and incur other expenditures for the International Laboratory of Marine Radioactivity or for the International Centre for Theoretical Physics in addition to that for which provision is made in the Operational Budget for 1971, provided that the total emoluments of such staff and other costs are met from revenues arising out of work performed for Member States or international organizations, research grants, special contributions or other sources extraneous to the Regular and Operational Budgets for 1971.

C. USE OF THE WORKING CAPITAL FUND IN 1971

The General Conference,

Accepting the recommendations of the Board of Governors relating to the use of the Agency's Working Capital Fund in 1971 [1]

1. Decides:

(a) That the Agency's Working Capital Fund shall remain at $2 million in 1971; and

(b) That the Fund shall be financed, administered and used in 1971 in accordance with the relevant provisions of the Agency's Financial Regulations [2];

2. Urges Member States that have not yet done so to pay their advances to the Fund as soon as possible;

3. Authorizes the Director General to make advances from the Fund:

(a) Not exceeding $25 000 at any time, to finance temporarily projects or activities of a strictly self-liquidating character which will not necessitate an increase in the Fund in future years; and

(b) With the prior approval of the Board of Governors, unless in his opinion the situation requires immediate action before such approval can be obtained, to meet the cost incurred by the Agency in organizing and rendering emergency assistance to Member States in connection with radiation accidents, up to $50 000 in each case; and

4. Requests the Director General to submit to the Board periodic statements of advances made from the Fund under the authority given in paragraph 3 above.

---

[1] GC(XIV)/433.

[2] INFCIRC/8/Rev.1.