



CANADA

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## THE HIGH PRICE OF PEACE

On December 3, Brigadier J.H. Price, the Canadian representative on the Fifth Committee of the United Nations General Assembly, introduced drafts of two resolutions dealing with the financing of the world organization. Referring to the item under which the two resolutions would be debated, Brigadier Price observed that "we are here presented with this Committee's most challenging opportunity to assist the United Nations to move toward a firmer foundation of orderly financial management". "I need hardly remind this Committee", he said, "of the extent to which the attempts to achieve an equitable and workable method of meeting the sometimes heavy costs of peace keeping have been hampered by differences of view on the basic legal aspects of the matter. These differences have, in large measure, been responsible for the unsatisfactory situation in which reliance on *ad hoc* arrangements has led the organization further and further into serious financial difficulty".

This emphasis on the urgent need to find a more suitable way of financing the peace-keeping tasks of the United Nations was maintained throughout Brigadier Price's address, which continued as follows:

"When the Working Group of Fifteen on the Examination of Administrative and Budgetary Procedures met in 1961, it soon found that it, too, could make little progress in the absence of common understanding of the legal relation between the costs of peace keeping and Article 17 (2) of the Charter. Accordingly, the Working Group recommended that

the guidance of the International Court of Justice was an essential preliminary to the United Nations finding a satisfactory way out of its financial dilemma.

### LEGAL GUIDANCE SOUGHT

"Subsequently, at the sixteenth session of the General Assembly, discussion in the Fifth Committee confirmed that little could be accomplished in regard to the financing of peace-keeping activities in the absence of authoritative legal guidance. Accordingly, the Delegations of Brazil, Britain, Cameroun, Canada, Denmark, Japan, Liberia, Pakistan, Sweden and the United States tabled a draft resolution, which was adopted as Resolution 1731 (XVI). By this decision, the Secretary-General was asked to request an advisory opinion from the International Court of Justice as to whether the costs of the United Nations operations in the Middle East and the Congo constituted expenses of the organization within the meaning of Article 17, Paragraph 2, of the Charter.

"In response to the General Assembly's request, transmitted by the Secretary-General, the Court considered this question during the spring and summer of this year in the light of the oral and written statements of a number of governments and all the relevant documents. On July 20, the Court handed down its advisory opinion, which, to quote it in summary, found that 'the expenses authorized in the General Assembly resolutions...relating to the United Nations operations in the Congo...(and) the UNEF...constituted "expenses of the organization" within

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the meaning of Article 17, Paragraph 2, of the Charter of the United Nations'.

"Now that the United Nations has this legal guidance, how should the Assembly react? In the past, it has been the usual practice in matters of this kind for the Assembly to honour, in a suitable resolution, the advisory opinion it has requested. In this instance, the co-sponsors of L.760 see no reason to break with this established practice, and their simple proposal is that the General Assembly accept the opinion. Indeed, they feel strongly that any other course would be interpreted as a slight on the high reputation of the International Court of Justice and a step back from the progress that is steadily being made towards promoting the rule of law in the conduct of international affairs. We have little doubt that most of our colleagues will wish to join with us in supporting L.760 to mark our respect for pronouncements of the International Court of Justice generally and for the measured views it has furnished on this occasion to guide this organization.

#### RESOLUTION OF DOUBTS

"But there is a further important reason why this modest resolution in Document L.760 should be widely endorsed. We earnestly hope that this step will lay the groundwork for a practical approach to the questions which have prevented the United Nations from bringing order and stability into its financial affairs. So far as present financial difficulties are concerned, member states that have hesitated to pay their assessed part of UNEF and ONUC expenses owing to their doubts about the legality of financing methods adopted should now find it easier to fulfill their obligations. This would, of course, greatly ease the precarious financial position of the organization.

"Even more important, acceptance of the Court's opinion would enable the United Nations to turn its attention constructively to the task of evolving orderly financial procedures to meet future peace-keeping costs. That is, of course, the essential purpose of Document L.761, the second draft resolution which my Delegation and eight other delegations are co-sponsoring and which provides for the re-establishment of the Working Group of Fifteen. On the assumption that the Court's opinion will be widely respected, the Working Group would be in an excellent position to resume its important studies, with emphasis on practical considerations; my Delegation is confident that fair, practical and sensible criteria can be devised on which to base an acceptable formula for sharing among all members the cost of such peace-keeping responsibilities. Canada's consistent aim has been to establish a firm pattern for financing in this field, so that the organization can effectively meet any new emergency without hesitation.

#### INEFFECTIVENESS OF PRESENT ARRANGEMENTS

"In the past, each important United Nations peace-keeping operation has been financed by more or less *ad hoc* methods. Such methods have been far from effective and have not been acceptable to all member states. In fact, some states have been unwilling or unable to contribute their assessed share

of UNEF and ONUC expenses. As a result, the balance due for UNEF and ONUC totalled over \$112.5 million, as of September 18. This situation has led to confusion in the planning and administration of peace-keeping operations. The evidence of the ineffectiveness of *ad hoc* arrangements is the present financial dilemma of the United Nations. If the situation which existed is permitted to continue, it is possible that all member states will be faced with undesirable implications. What are these implications? First, if the Assembly employs *ad hoc* arrangements to finance any future peace-keeping operations, the United Nations may be faced again with the regrettable situation which exists today as regards UNEF and ONUC arrears. I am certain that all delegations would prefer to avoid such a repetition, if at all possible. Second, the organization's primary task, as outlined in Article 1 of the Charter, is to maintain international peace and security. Now, while there is a certain relation between satisfactory economic, social and political conditions and the maintenance of peace, there can be little hope for major improvements in the economic and social spheres if world peace is not maintained. Therefore, it is desirable to endeavour to ensure the maintenance of international peace as a foundation upon which economic and social advancement may be achieved.

#### BACKGROUND OF NEW RESOLUTIONS

"Delegations will recall that the Working Group of Fifteen was originally established by Resolution 1620 at the fifteenth session to study methods of covering the costs of peace-keeping operations and the relation between such methods and existing administrative and budgetary procedures of the organization. Members of the Working Group of Fifteen were: Brazil, Britain, Bulgaria, Canada, China, France, India, Italy, Japan, Mexico, Nigeria, Sweden, the Union of Soviet Socialist Republics, the United Arab Republic and the United States. Governments which served on the Working Group were appointed by the President of the General Assembly, in accordance with a formula for regional representation set out in Resolution 1620 (XV). Resolution 1620 also requested member states to submit their observations on the principles to be applied in determining a special scale of assessments for peace and security and other matters. These observations and other matters before the Working Group were discussed during two series of meetings in the spring and fall of 1961. However, the Working Group was unable to come to an agreement on all the principles and elements involved in financing peace-keeping operations. This lack of agreement was clearly illustrated in its report to the sixteenth session (Document A/4971). As I have previously mentioned, one serious impediment to agreement was the difference of opinion over the legality of the financial obligations of member states in respect of the costs of UNEF and ONUC. In view of the Court's very clear advisory opinion, the co-sponsors of Document L.761 are convinced that it is as possible as it is desirable to move ahead to find an orderly and acceptable solution to covering the future costs of peace-keeping

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## CANADA'S NUCLEAR-POWER STATUS

The following is the text of a paper read by the President of Atomic Energy of Canada Limited, Mr. J.L. Gray, to the annual conference of Atomic Industrial Forum in Washington, D.C., on November 28:

"The 20,000 KWe Nuclear Power Demonstration (NPD) station has been in operation for some months now and is not only producing electric power very successfully but it is producing very significant results needed to confirm some of the basic design concepts of the heavy-water pressure-tube reactor system.

"The reactor went critical in April and the station reached full power before the end of June. By the end of August most of the improvements and modifications shown by the commissioning programme to be necessary had been completed. The usual type of mechanical difficulties common to any new high-pressure water system have been experienced. Some fittings have required repair and replacement and the life of the seals on the main pumps must be improved; but there are no faults in evidence, or expected, that will cause lengthy and major delays in operation.

"The protective system and (perhaps more particularly) the regulating system are performing very satisfactorily. The operators are well pleased with the completely automatic start-up and steady-state regulation of the plant.

"The results of the initial physics information from the first approach to criticality were disturbing when first observed. The majority of the difference between predicted and actual critical height has now been accounted for. The main error resulted from an underestimate of the effect of the depleted uranium used in the fuel for initial loading. The temperature and moderator level coefficients of reactivity were close to the predicted values, and our original estimates of fuel burn-up remain unchanged.

"Heavy-water losses during the run-in period and up to date are within the amounts allowed for. The unrecoverable loss will probably stabilize by next spring to less than 15 pounds a day, or 3.5 per cent a year. In full-scale plants, we can clearly see ways of reducing this to less than our target of 2 per cent a year, which is equivalent to about a tenth of a mill a kilowatt hour.

### FAMILIAR CONSTRUCTION PROBLEMS

"This plant, as it stands, is a fine engineering job, but it was not built without experiencing many of the problems common to the construction of 'first-off' nuclear plants. We had some major delays in equipment supplies, some very difficult construction problems were met, and in the supply and installation of some equipment the initial quality of workmanship did not meet the standards required for nuclear plants. The effect of this sort of trouble was the normal one of delay in completion, resulting in an increase in cost.

"Over a period of four and a half years from late 1957 to the spring of 1962, the cost estimates for the plant facilities rose steadily from the original figures to a final cost that was up by nearly 20 per

cent. There are the usual standard explanations for this increase that are a familiar story. The original estimate was based on a conceptual design only, the final job necessitated additional work not in the original design, the difficulty of meeting the rigid specifications was not fully appreciated, and the form of contract and job organization were not conducive to lowest cost.

### USING LESSONS LEARNT

"The problems associated with delays and increase in cost taught us many lessons and, fortunately for the overall Canadian programme, we have been able to make use of them while they are still fresh in our minds. We are applying them to our second nuclear-power project and they are already reflecting savings and additional control that more than make up for our troubles with NPD. Probably most important is the evolution of a system of organization to handle the design, specifications, purchasing and construction of a full-scale nuclear-power plant. Our present form of organization, although only today's stage in the evolution, is proving to be very successful under our specific conditions.

"In our second nuclear plant, the full-scale 200 megawatt Douglas Point Generating Station employing the CANDU reactor which we are building in Ontario, we have a rather unique arrangement between a Federal Government agency and a public utility.

"Atomic Energy of Canada Limited, the national atomic-energy agency corresponding in large measure to the Atomic Energy Commission in the United States, is designing and building the station. The site belongs to the Hydro-Electric Power Commission of Ontario, the country's largest utility, and they are providing the 30-mile transmission link with their system. When the station is built, Ontario Hydro will operate it for AECL and will buy energy at the same rates at which they purchase energy from inter-connected utilities such as Detroit Edison and Niagara Mohawk. When, after two or three years, the plant has proved itself, the utility will purchase it from AECL at a price that is calculated to render the cost of energy from it equal to the cost of energy from a contemporary coal-fired station. The difference between this price and what it cost AECL to build the plant is regarded as part of the national cost of developing nuclear power in Canada. AECL's initial investment, apart from research and some development expenses, amounts to about 93 per cent of the capital cost; Hydro's contribution, including salaries of certain personnel engaged in the work, amounts to about 7 per cent.

"Ground was broken at Douglas Point about two years ago. At the present time, civil construction is nearly complete. All buildings are closed in and internal structure is ready and is now receiving the first of the equipment. The plant is still scheduled to be completed in 1964 and to be in commercial service in 1965.

COST PICTURE

"I have not attempted in these few minutes to tell you anything of the design of the station. However, you may be interested in the cost picture. In 1959, we estimated the total capital expenditure at \$81 million, including a contingency allowance of \$8 million. To date, we have paid for or committed items corresponding to 70 per cent of the direct costs. Actual costs are running 5 per cent below estimate without infringement on the contingency allowance. Devaluation of the Canadian dollar has added about \$1.5 million to the job, but this has been offset by a lower than predicted rate of escalation.

"The initial charge of fuel has been purchased in Canada at a firm price of \$29.50 a pound UO<sub>2</sub>. Our latest estimates of fuel burn-up in Douglas Point are within our earlier predictions and, with an overall station efficiency of 29.1 per cent, the unit fuel cost may be calculated as 1.1 mills a kilowatt hour.

PROBABLE LINES OF DEVELOPMENT

"Ideas of concepts for power reactors are very abundant. Any of some hundreds or even thousands of nuclear engineer-physicists could, by a few weeks' work, come up with a proposal that would have merit and be different, and some few might be original and extremely good.

"On the other hand, it takes some thousands of man-years, all directed to the development and design of a single reactor, to bring it to fruition.

"Even after coming to fruition, economic competition or even some mischance may stop further progress and, in retrospect, it may be realized that a significant fraction of those thousands of man-years was wasted labour.

"A good case may be made for limiting the development of power-reactor types throughout the world to a relatively small number - perhaps a dozen. Producing new reactors is not an end in itself; the objective is abundant and low-cost power to enable civilization to pursue its objectives, such as raising the standard of living of all people of the world or exploring the moon or hopefully keeping away from war.

"Putting this perspective on power-reactor development, we in Canada find ourselves in the position that we believe we have achieved by thousands of man-years of co-operative effort by AECL, by Canadian industry and by Canadian utilities a very satisfactory power-reactor design in NPD and CANDU. For the last few years we have, therefore, been trying to assess whether this design would survive the economic competition and escape serious setbacks. In every detail of design, we sought a second string to our bow to guard against setbacks; we continue to seek improvements and, in the overall design, look for any ideas that may contribute to cost reduction so that a promising selection of these may be developed as an extension of our work. We do not expect to take more than one or two such developments very far, and we have devised means of reviewing and assessing the prospects in order to be satisfied when one or another line ought to be stopped.

"We have put into operation a formal review procedure to evaluate the competition between our alternative developments, knowing that we have limited resources and hopeful that our choice of a development route will be the right one.

"The competing systems of immediate concern have a common base: they are all heavy-water moderated pressure-tube systems and all must be capable of operation with natural uranium. The proponents of any system may claim advantages from enrichment if such advantages exist with no credit for spent fuel.

"The systems at present under detailed analysis are:

1. pressurized heavy-water cooled, with or without boiling;
2. organic-liquid cooled;
3. fog cooled, light water, direct cycle;
4. steam generating or boiling light water, direct cycle.

"These systems are being compared in the 450 MWe size, with an additional study being done on the CANDU type at 750 MWe.

"The most obvious line of immediate development is to increase the size of units. We regard the 200 MWe capacity, such as Douglas Point, as the smallest size of economic unit in a well developed economy. We are therefore very interested in larger units and see no obstacle in sizes up to 1000 MWe. Even increasing from 200 to 300 MWe and designing for a two-unit station shows substantial reduction in both capital cost a kilowatt and unit-energy cost.

"The evaluation programme, comparing the four systems, will be producing results next year and before the end of the year we will concentrate our effort on a much narrower band. If one type should show significant superiority for both the short and long term application, we could conceivably limit our future major effort to a single system.

"The only conclusion of the relative merits we can draw today is that they are all strong contenders.

ROLE OF CANADIAN-TYPE PLANT

"We in Canada are, of course, convinced, that, under certain conditions, such as those found in the public utility in Ontario, the CANDU type of nuclear plant is unsurpassed at present. We recognize that these particular conditions do not necessarily apply in other areas of the world, and this is particularly so in the United States.

"Enriched-fuel systems seem to naturally fit many applications in the U.S. Many of the utilities are privately owned, which can only result in higher annual charges for capital invested and enriched nuclear plants are generally lower in capital cost a kilowatt than natural-uranium plants. Enrichment is readily available within the national boundaries at very attractive prices. Chemical reprocessing facilities for handling irradiated fuel already exist with their fission-product disposal facilities. A market is assured for the plutonium contained in the spent fuel, even though the price may not be guaranteed. Under these conditions, even if nuclear fuel is transferred to private ownership, firm plans may be made with full knowledge and expectation that

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fuel and reprocessing facilities will be available as required for the life of the plant.

"Many countries are not in this fortunate position, and any national programme of nuclear-power development must look beyond the initial cost of a nuclear plant and its initial fuel. Thirty years, or the life of a plant, is a long time to be dependent upon the decisions or perhaps the whims of a foreign government, and the situation tends to worsen if a significant portion of a nation's power resources becomes nuclear and is dependent primarily on one foreign source of fuel. As time goes on, of course, if the consumption of enriched uranium in civil power reactors is sufficient to economically justify the construction and operation of more isotope-separation facilities, countries such as Canada could become an alternate source of supply. Such an economic climate is not yet in view and may be some time developing.

"With these conditions, the high burn-up natural-uranium reactor seems to meet a specific requirement if it is competitive or even near-competitive with other nuclear systems. It has the advantage of the simplest fuel cycle, using a fuel that is generally available throughout the world. Sufficient energy may be extracted in a 'once-through' operation so that it is economically feasible to treat the spent fuel as waste material, eliminating the need for re-

processing facilities, storage of highly radioactive liquids, and the problems of economic utilization of the plutonium.

"Storage of this irradiated fuel, particularly the present CANDU fuel, poses little or no problem and, although it is treated as waste in costing power, it may have a long-term value. When there is a sufficient quantity of irradiated fuel from a nuclear-power complex to allow a reasonable throughput to a separation plant, and if there is an economic civil use for plutonium and perhaps depleted uranium, and if we have safe and economical means of disposing of fission products, then perhaps this waste may have some value and, if so, can be processed to return a dividend to the owners.

"Because a well-designed heavy-water moderated and cooled nuclear plant can be fuelled with natural uranium taken to a relatively high burn-up, and because it has very low unit fuel costs compared to other systems, and because unit capital costs are falling as experience is gained, sizes increase and heavy water costs lower, it is becoming a very serious contender for many applications in various areas of the world. We do not predict a swing from enriched systems to natural systems in the U.S. for a number of reasons, but we do predict an increasing world demand for a good high burn-up, natural-uranium system and that is what we are keeping our eyes on in Canada."

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### LOOKING FOR TROUBLE PAYS

If "a stitch in time saves nine", then a nail (or a board, or a coat of paint) may save even more. This is the theory behind the programme of Preventive Maintenance (PM) instituted three years ago by Royal Canadian Air Force construction engineers as the most efficient way of dealing with minor repair work to buildings and installations. So successful has the programme been that today, with PM's yellow-painted service vans a familiar sight on every base, construction officials estimate a reduction of 80 per cent in the number of trouble calls received.

### LONGSTANDING PRACTICE

The principles behind PM are not new to the RCAF, since they are inherent in longstanding systems for the care of aircraft and other mechanical equipment. Even in construction, the method has long been used to service such installations as heating and electrical plants. What is new, however, is its application to buildings and other fixed facilities.

Operating on a continuous basis, PM is designed to reduce deterioration and to detect and correct minor faults, thus preventing them from developing into major problems. Since most such work is being carried out by the "PM Flight" and operators of power and heating plants are practising PM as a routine part of plant operation, a high percentage of construction-engineering resources is freed to concentrate on larger and more complex requirements.

### CREW TYPES

On large RCAF stations, the PM flight is made up of two types of crews—the structural crew for repairs to building structure and fittings only and the mechanical crew for heating, plumbing, electrical and similar equipment. On smaller stations where the employment of specialist crews is not warranted, a third type of PM unit, the combined crew, is the rule.

The centre of PM activity is the van, or trailer, always located with its crew of tradesmen in the area where work is being carried out. And since the van is stocked with all tools and materials likely to be needed in minor maintenance work, time lost in return trips to the main workshop is almost entirely eliminated.

### VISIT FREQUENCY

Most important in the PM plan is the "cycle", or frequency of visits the van makes to each area. While too long a cycle would result in poor maintenance and overwork, too many visits would be wasteful of time and manpower. After experiment with different time cycles, the period of four months has been standardized throughout the service.

The savings effected by the RCAF's PM programme take on added importance in a country called on to practice economy. The total annual saving so far achieved is \$3 million, which reduces the previous cost of minor repairs by more than half. In the next ten years, it is estimated, savings will total \$50 million.

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operations. This, then, is the background against which the Delegations of Britain, Cameroun, Canada, Denmark, Japan, Liberia, Pakistan, Sweden, and the United States have tabled Draft Resolution L.761.

"That draft recognizes that peace-keeping operations such as UNEF and ONUC can impose a heavy financial burden on all member states and in particular on those having a limited capacity to contribute.

"It also recalls Resolution 1620 (XV) by which the Assembly established a Working Group of Fifteen and notes that one of matters discussed by the Working Group was the desirability of requesting an advisory opinion from the International Court. The co-sponsors of this text think that, in order to facilitate the work of the Group, governments might wish to consider the desirability of appointing the same individuals as served on the Working Group in 1961. Furthermore, the sponsors feel that the original Working Group of Fifteen was of a desirable size to facilitate its work and that its composition was appropriate for its tasks.

"In preambular Paragraph 3, the co-sponsors have employed a procedure which has been utilized on a number of occasions in various committees. Since the co-sponsors of the draft resolution on the re-establishment of the Working Group view it and Draft Resolution L.760 (acceptance of the Court's opinion) as two related resolutions, directed towards attainment of the same ultimate objective, they have proceeded on the assumption that Draft Resolution L.760 will be adopted by the Assembly. If this is the Assembly's decision, the co-sponsors of the second draft, Document L.761, intend to submit a revision which would incorporate into the text the number of the resolution accepting the Court's opinion and its date.

"Operative Paragraph 1 would re-establish the Working Group of Fifteen with the same membership as that established by Resolution 1620. The Working Group is requested to consult, as appropriate, with the Advisory Committee on Administrative and Budgetary Questions and the Committee on Contributions and to consider the methods of financing, in the future, peace-keeping operations of the United Nations involving heavy expenditures. The drafters of this resolution consider UNEF and ONUC to be operations which could be said to involve 'heavy' expenditures. Operative Paragraph 3 merely requests the Working Group to convene as early as possible in 1963 and to complete its report to the United Nations General Assembly as soon as possible, or not later than April 1, 1963. This would give the Working Group approximately three months to discuss the financing of peace-keeping operations before submitting its report.

"Some delegations might wonder how the co-sponsors expect the Working Group to reach agree-

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ment in three months when the previous working group had over five months to study virtually the same question. We believe that there are several relevant factors in suggesting a date of April 1 for completion of the Group's report. These factors are: (1) At its previous meetings, the Working Group was able to outline various principles and issues which might provide the necessary elements for determining the methods of financing United Nations peace-keeping operations. Those principles and issues are listed in Paragraph 6 of Document A/4971. Therefore, the re-established Working Group should be able to build on the work of its predecessor and thus concentrate its attention on reaching agreement on practical methods of covering peace-keeping costs, without re-opening the question of principles. (2) It is our hope that, in the light of the advisory opinion of the International Court, the Working Group can proceed on the basis that expenses of peace-keeping operations, in future, are expenses of the organization under Article 17 (2) of the Charter of the United Nations. This should enable the Working Group to concentrate on the question of how the costs of peace-keeping operations in the future should be apportioned among member states. (3) A final point which led the co-sponsors to request an early report from the Working Group relates to the critical nature of the United Nations financial position. While the organization was in serious financial difficulties in 1961, these difficulties have been compounded and the need for adoption of acceptable methods of financing peace-keeping operations has become even more urgent. It is obvious that the Assembly action to provide the means to continue United Nations peace-keeping activities will have to be taken in the not-distant future. Operative Paragraph 4 of the draft resolution requests the Secretary-General to circulate the report of the Working Group of Fifteen to member states as early as possible, so that they may have an opportunity to study it before its consideration by the United Nations General Assembly at an appropriate time.

"The Canadian Delegation and the co-sponsors of Draft L.761 believe that the time has come...when an acceptable method of covering the costs of peace-keeping operations is absolutely essential. We can no longer rely on the *ad hoc* financial arrangements which have characterized previous peace-keeping operations. Furthermore, we believe that the two resolutions which are being introduced are complementary and provide a logical and desirable sequence of events leading to the solution of a problem which has been before us for a number of years. All delegations should be able to agree on the necessity of making available to the United Nations the funds it requires to fulfill its purposes under the Charter. We believe that the path outlined in the two resolutions is the most appropriate one and deserves full support by the United Nations General Assembly."