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PLAN FOR PRODUCING POTABLE WATER ECONOMICALLY

The summary record of the discussion in the Board of Governors on 12 September 1990 under agenda item "Plan for producing potable water economically" is reproduced in the Attachment.

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ATTACHMENT

RECORD OF THE 735th MEETING
(held on 12 September 1990)

PLAN FOR PRODUCING POTABLE WATER ECONOMICALLY (GC(XXXIII)/RES/515, GOV/2465)

56. The CHAIRMAN said that the present item was before the Board pursuant to General Conference resolution GC(XXXIII)/RES/515. A status report on seawater desalination had been produced by two consultant groups and an expert advisory group, and would be issued later in the year. Document GOV/2465 contained a synopsis of that report, and the cover note to that document requested that it should be transmitted to the General Conference, together with the summary record of the Board's discussion thereon.

57. Mr. CHERIF (Algeria) commended the Secretariat for its swift response to the resolution and said that his delegation looked forward to receiving the full text of the report so that it could be studied in detail. However, it was clear from the synopsis, and from the conclusions and recommendations for future action, that all aspects of the problem as defined in the General Conference resolution had been tackled - except perhaps the matter of assessing the interest of potential beneficiaries and technology holders. It was essential to know what their interests were, so that long-lasting and effective international co-operation could be established under the auspices, and with the active participation of, the IAEA and other international and regional institutions. The conclusions of the synopsis contained an estimate indicating that by the year 2000 there would be a water shortage of about 12 million m³/day. Algeria was already suffering from a water shortage which affected not only its people but also its industrial and agricultural sectors, and was therefore ready to join any initiatives aimed at finding ways of satisfying water requirements - including seawater desalination based on reactor heat, if studies indicated that that method was economically and technologically feasible and would have no deleterious effects on the environment or the health of the population.

58. The conclusions of the expert group appeared to be very relevant. However, the role that small- and medium-size reactors could play in

developing countries should not be disregarded or underestimated, either for seawater desalination alone or for simultaneous electricity production and seawater desalination: a positive approach to those applications could well breathe new line into the IAEA's work on small- and medium-size power reactors.

59. The Algerian delegation supported the suggestion in paragraph 5 of document GOV/2465 that the material contained in that document should be transmitted to the General Conference. It also felt that the preliminary studies should be continued with a view to finding an appropriate framework for implementing the recommendations of the expert group.

60. Mr. VILAIN XIII (Belgium) noted that one of the most significant conclusions of the synopsis was that desalination required a vast infrastructure, both in terms of finance and of qualified personnel, which did not appear to correspond to the needs or the means of the large majority of developing countries. Furthermore, economical production of potable water by nuclear methods seemed to be limited to certain specific situations. If that were so, Belgium could not support the recommendation to involve the Agency in a new round of detailed studies, or in the preparation of an ambitious work programme in that area. The Agency, with its limited resources, should instead concentrate on its priority work.

61. Mr. MONDINO (Argentina) said that, although Argentina did not need nuclear desalting to meet its own drinking water requirements, it could contribute its technology to help solve the problem. Argentina was well advanced in the development of a small reactor which could be used in areas "without an established infrastructure or large population concentrations", as paragraph 10 of the conclusions of the synopsis (section 2.4.1) described them.

62. Argentina supported the recommendations made in section 2.4.2 of the report and was prepared to co-operate fully in any studies or programmes co-ordinated by the IAEA or set up in accordance with the guidelines enumerated in that section.

63. His delegation agreed that the Director General should transmit document GOV/2465 to the General Conference at its forthcoming session.

64. Mr. AMMAR (Tunisia) said that Tunisia lacked drinking water because its water table was sinking. His delegation therefore supported the proposal contained in document GOV/2465 for the economical production of potable water. Tunisia's policy was aimed at promoting agriculture, which meant using all technical means available for the production of potable water which could help the country towards self-sufficiency in food. His delegation therefore supported the proposal to transmit document GOV/2465 to the General Conference.

65. Mr. KENNEDY (United States of America) commended the expertise and speed with which the Secretariat and its consultants had prepared the report on desalination and said that he intended to submit the full text of the report for review by United States experts.

66. However, his delegation had some concerns about the report. First, it contained little technical and economic analysis; second, it did not deal with the interests of beneficiaries or technology holders; and third, what was most important of all, its recommendations went far beyond the request made in the first operative paragraph of General Conference resolution GC(XXXIII)/RES/515. The United States could not support the recommendations contained in the proposed report to the General Conference: the last two sentences of section 1.1 went beyond the mandate; also, section 2.3.2 on cost and finance and the recommendations in section 2.4.2 should be deleted because they in no way corresponded to the requests made in the resolution.

67. Instead of the recommendations in section 2.4.2, his delegation would have preferred to see a request to the effect that the Secretariat should assess the relevance of its regular programme and technical assistance activities to solving water problems and work with other United Nations technical agencies on that issue, bearing in mind the role that nuclear energy and nuclear reactors might play.

68. While agreeing that the report could be submitted to the Conference, his delegation felt that any follow-up activity by the Secretariat - whether based on the report or on subsequent requests to the Agency - should be carefully considered in the normal process of preparing the Agency's programme

and budget and in the light of programme priorities and budgetary constraints.

69. Mr. WALKER (United Kingdom) said the report acknowledged how limited experience with nuclear desalination was throughout the world. The cost of the nuclear option was bound to remain a major concern, if one judged from the evidence produced so far, and it was unfortunate that the report had not done more to compare the cost of nuclear power with that of alternative sources of energy. His delegation had noted the report's conclusion that new technology - the development of advanced membranes for instance - was expected to reduce the cost of desalination whatever energy source was used, and it was therefore by no means certain that nuclear power was the most appropriate response to the problem. That alone was enough to make the wisdom of the Agency's future involvement in the issue doubtful.

70. The United Kingdom remained convinced that the financial implications of further IAEA support for desalting studies should be clarified before any major commitments were made. Subject to such clarification, his delegation would not oppose implementation of the report's specific recommendation to establish a potable water database, but suggested that that task might be more appropriate for the World Bank or an agency other than the IAEA. The recommendation that the technical and economic feasibility of nuclear desalination should be clarified through detailed studies on specific sites might result in a useful contribution to a wider consideration of the problem of potable water shortage. The United Kingdom could also support the third recommendation in section 2.4.2 - a comparative evaluation of a limited number of technologies for desalting at representative sites - and suggested that modular fast reactors be added to the list of reactor types to be considered. At each stage the advantages and disadvantages of different nuclear reactor types should be compared with those of alternative energy sources.

71. Beyond that point, the United Kingdom had difficulty with the report's recommendations. It was not persuaded that a working programme of the kind outlined in the fourth recommendation could be justified on the basis of the evidence available so far; the case for such an initiative under IAEA auspices could perhaps be made when the remaining action suggested in the

report had been completed, and when there was a better understanding of whether nuclear power was in fact the best source of heat for desalination.

72. Mr. KIMURA (Japan) said that his delegation was not in a position to give full support to the draft report. Some of the points made, such as those in sections 2.3.2 and 2.4.2, were difficult to accept, since they implied future expansion of the Agency's budget for the project. In the present stringent budgetary situation, a more realistic and prudent approach should be taken towards the expansion of new projects or activities. Indeed, it would be unrealistic to move into new areas without bearing that basic problem in mind.

73. Furthermore, his delegation continued to wonder whether nuclear desalination was economically viable in comparison with existing conventional desalination methods. No convincing analysis or explanation had been given on that point.

74. With regard to existing natural water resources, although the document indicated that they should be conserved for future generations and for the prevention of desertification, a more thorough study should be carried out in that area, including a study of the use of water resources located deep underground, mainly from the viewpoint of cost effectiveness.

75. It was therefore to be hoped that a more realistic and prudent approach would be adopted in future discussions on the issue.

76. Mr. DE LA CRUZ (Chile) said that water was a limiting factor for the development of any region and vital for dry areas, particularly in view of the forecasts of population growth in those areas. Seawater desalination was thus a very important technology for countries with scarce water resources, but because it was a difficult and expensive technology which could not readily be included in development programmes, alternative solutions had to be considered. The report would undoubtedly make an important contribution to studies carried out by individual countries with a view to meeting current and future water demands, especially as it discussed not only the nuclear alternative but other technologies as well, thereby enabling Member States to select the most appropriate solutions. Chile looked forward to receiving the

full report, which could well prove useful in connection with the studies being carried out on water supplies for the arid regions of the country, where large population groups and a large proportion of the country's mineral resources were located.

77. Mr. TALIANI (Italy) said that his delegation welcomed the new report, particularly since the only other status report on desalination prepared by the Agency was 20 years old, and looked forward to receiving the full text.

78. The Agency should continue to monitor possible developments in the use of reactors for desalination, and so the issues raised in section 2.4.2 were most pertinent and should be pursued. However, it was not clear to what extent the action required was feasible in the short term if one took into account the scarce resources available to the Agency. That issue might usefully be considered further in the context of the Agency's strategy for a medium-term plan.

79. Italy supported the suggestion that the report be transmitted to the General Conference.

80. Mr. SINAI (India) said that the report could be regarded as a first step towards forging international co-operation in the development of a technology which could be beneficial to a large number of developing countries. The report indicated that important research had been done in respect of a liquid-metal-cooled reactor in the USSR; however, it seemed to focus entirely on work connected with gas-cooled and liquid-metal-cooled reactors, so one had the impression that very little work had been done with water reactors. No reason had been given as to why water-cooled reactors - notably the heavy-water reactors which were of special interest to India - should not be suitable for desalination.

81. India had carried out feasibility studies on desalination in the late 1960s, and a report on nuclear powered agroindustrial complexes had been published in 1970; research and development work had followed. A pilot multistage flash (MSF) desalination process plant had been built in Trombay, and India had the capacity to design commercial-size MSF plants. The Bhabha

Atomic Research Centre had also developed reverse osmosis technology, and brackish water osmosis plants developed by India were in operation in villages in Andhra Pradesh and Gujarat. Technology had also been transferred to private parties.

82. India was very interested in the further development of that technology with reactors as heat source, and particularly heavy water and light-water reactors. It accordingly supported the IAEA programme on desalination and would be interested in participating in such a programme.

83. Mr. de KLERK (Netherlands) said that the problem of availability of drinking water would become even more serious in the future, and the report contained in document GOV/2465 was therefore timely and appropriate. According to a WHO estimate, over a billion people on earth had too little drinking water. The "Global Consultation on Safe Water and Sanitation in the 1990s", which was taking place in New Delhi at the present time, had reached a similar conclusion.

84. Identification of the problem was the first step, but finding the best strategy to deal with it was another issue. It was difficult to draw a firm conclusion, on the basis of a summary by a group of consultants, as to the desirability and feasibility of using nuclear energy for the desalination of seawater. The report ignored a number of concerns such as nuclear safety, nuclear waste and those connected with the problem of public acceptance. The problem of costs was dealt with, but on the basis of present experience it was difficult to be sure that the estimates were reliable.

85. Perhaps nuclear energy would have a contribution to make towards solving the problem of potable water in the future. However, his delegation believed that the issue should be handled within a wider framework, for example under the aegis of the UNDP or UNEP. Setting up a database on water consumption and future water needs was not, in his view, a task for the Agency, and at present he could not accept the working programme as recommended by the group of consultants in their study. He did not, however, object to transmitting the report to the General Conference.

86. Mr. CHIKELU (Nigeria) said that potable water was essential to life but was becoming increasingly scarce in relation to the growing demand, particularly in the developing countries. He would support any measure aimed at reversing that disturbing trend. The proposal to use nuclear reactors for seawater desalination was therefore most welcome. Any reservations concerning the cost of the project could surely be resolved with time, and he therefore recommended that the report synopsis be transmitted to the General Conference in accordance with resolution GC(XXXIII)/RES/515.

87. Mr. RYZHOV (Union of Soviet Socialist Republics) said that the report provided a full and accurate description of the technology available, as well as of recent experience with the desalination of seawater and the use of nuclear reactors for that purpose. The Attachment to document GOV/2465 should therefore be transmitted to the General Conference in accordance with resolution GC(XXXIII)/RES/515.

88. The problem of desalination of seawater was of great interest to the Soviet Union, as many regions were suffering from a serious water shortage. Research and development work was under way, and included consideration of the use of nuclear heat sources, a solution which had the ecological advantage of avoiding any release of carbon dioxide into the environment.

89. In one of the Soviet Union's oil-producing areas on the Mangyshlak peninsula, a desalination plant using the BN-350 fast breeder reactor had been operating successfully for a long time. The reactor produced heat both for desalination of seawater and for the production of electricity sufficient to meet the needs of a town with a population of over 100 000. Research was being carried out with a view to further development of the desalination process, one particular aim being improved cost-effectiveness.

90. The Agency could play a useful role in helping to solve the problems of desalination by means of nuclear facilities, and Soviet experts would be happy to participate.

91. Ms. TALLAWY (Egypt) said her delegation had always believed that new, high-level technology - including nuclear technology - should be used to overcome the problems of developing countries. Water shortages were

threatening millions of people and could be a destabilizing factor in the security of many countries, particularly in Africa and the Middle East. The Agency's work in that field was therefore timely and justified, but a full knowledge of all relevant factual information was required before a decision could be made as to whether the use of nuclear technology would be economically viable. In view of the large scale of the problem, co-operation with other UN agencies might be necessary, but the Agency's expertise, as well as the experience of various countries, could make a valuable contribution to the work.

92. Mr. ERRERA (France) said it was clear that the water problem was becoming crucial for a growing number of countries and for very large populations, particularly in developing countries and especially in Africa and the Middle East.

93. The Soviet Union had already demonstrated the technical feasibility of using nuclear energy for desalting seawater. On the other hand, it seemed clear from a number of studies that the present capacity of desalination systems was too low to be economically viable. French experts believed that the minimum capacity stated in paragraph 3 of the recommendations in document GOV/2465 would have to be multiplied by a factor of ten. The problem was clearly economic rather than technical.

94. What contribution should the Agency try to make, particularly in view of its own difficult economic situation? Some of the recommendations in the synopsis appeared to cover areas where the Agency was not necessarily competent, such as the establishment of a database on water needs and a study of the various technologies available for desalination. As the representative of the Netherlands had already said, other international organizations might be in a better position to study the subject within a wider framework and would perhaps have more financial resources available to do so. It seemed inappropriate for the Agency to launch a programme and take the lead in that area, although it would have a contribution to make at some future stage.

95. He had no objection to the proposal to transmit the document to the General Conference.

96. Mr. AHAFIA (Ghana) said that the advisory and consultants' groups had completed their assignment of assessing the technical and economic potential of the use of nuclear reactors for seawater desalination. His delegation endorsed the action recommended in the report but wished to make certain comments, which were not intended as an attack on the report, but rather as a criticism of the scope of the assignment given. The production of potable water by seawater desalination was a solution to a problem prevalent in specific regions of the world; it was a short-term measure, and its limited scope should therefore be recognized. The report contained certain generalizations. For example, on page 2 it said, "If we want to conserve the existing natural water resources, and avoid further desertification, then SEAWATER DESALINATION is the only water source available. If we want to reverse the decline in natural water resources or counteract desertification by reforestation ... SEAWATER DESALINATION is the only logical way." Yet the majority of the world's population lived far from the coast. If fresh water were produced at the coast and then transported over long distances, it would become too expensive for most of the people who needed it. Other possibilities should thus be considered. Perhaps the world was not suffering so much from a water shortage as from changes in the location of water supplies. The digging of wells and boreholes might be a more appropriate solution to the problem.

97. Mr. KHAN (Pakistan) said that, as the Board had at least agreed unanimously that potable water was essential for life, something should surely be done to bring water to the areas where it was needed. The Governor from the Netherlands had already stated that at least a billion people in the world lacked adequate supplies of water, and that was surely a large enough number to attract sympathy and attention. The situation had been described in a WHO study and more recently in a UNDP report on poverty and the development of human resources.

98. Twenty-five years ago the Agency had had an active nuclear desalination programme, sponsored by the United States of America. In the intervening time the drinking water situation had worsened as new cities had emerged and the population of coastal areas had increased to over 10 billion.

The problem was worldwide, and affected both coastal and inland regions. Technology was already available in the United States, Canada and western Europe for small and highly safe reactors that could generate electricity economically and also provide an ideal heat source for the desalination of seawater, a process which had already proved successful in the Soviet Union.

99. The feasibility of seawater desalination on a large scale had also been demonstrated in various Middle Eastern countries, including Saudi Arabia, where oil had been used as fuel. Whether the oil could be replaced by nuclear sources was purely an economic question. As the price of oil had recently doubled from US \$15 to \$30 a barrel, nuclear desalination had become a far more attractive option than it would have been a few years ago. The Agency had a role to play in promoting the applications of nuclear power in all areas and should accept the challenge of investigating and promoting the use of nuclear reactors for desalination of seawater. That activity could be included in the Agency's medium-term plan, and co-operation with other international organizations including UNIDO, UNDP and particularly the World Bank, could profitably be sought. The Agency could not work alone, but should play the role of a catalyst, arousing the interest of other organizations and bringing them together.

100. He agreed that the report should be transmitted to the General Conference, together with the summary record of the discussion.

101. The CHAIRMAN, noting that some Governors had expressed reservations about specific recommendations contained in the synopsis attached to document GOV/2465, said that all comments made in the course of the discussion would be reflected in the summary record of the meeting. He assumed that the Board wished to take the action suggested in paragraph 5 of document GOV/2465.

102. It was so decided.

