A.5.4. Câbles à isolation gazeuse : de l'état de l'art à la faisabilité de liaison de transport 400 kV

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Introduction de la session D2 : Modélisation par M. TARALLI (Pirelli, Brésil)

Résumé: L'expérience internationale des câbles à isolation gazeuse (CIG) montre que les technologies actuelles doivent être profondément améliorées pour constituer une alternative satisfaisante aux lignes aériennes 400 kV, d'un point de vue technique et économique. Cependant, les CIG 400 kV pourraient présenter des avantages qui ont conduit EDF à lancer un programme de recherche les concernant avec des constructeurs. Son objectif est de connaître la faisabilité technico-économique de liaisons de transport 400 kV souterraines par CIG avant la fin du siècle.

A.5.4. Gas insulated cables: from the state of the art to feasibility for 400 kV transmission lines

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Introduction of the session D2. : Modelling by M. TARALLI (Pirelli, Brazil)

Abstract: International experience with gas insulated cables (GIC) show that present technologies must be strongly improved to become a satisfactory alternative to 400 kV overhead lines, from a technical and economic point of view. Nevertheless, 400 kV GIC could present advantages which lead EDF to start a research programme on GIC with manufacturers. Its objective is to assess the technical and economic feasibility of 400 kV CIG underground power links by the end of the century

INTRODUCTION

The continuity of the electricity supply and good management of generating resources call for constant development in electrical systems.

At present, at 400 kV, the overhead line is the only technical solution available in the short or medium term. EDF is therefore making considerable efforts to minimise its impact upon the environment.

At the same time, major research programmes are under way to assess the feasibility of technologies which may be envisaged for underground power transmission at 400 kV over long distances, such as gas insulated cables (GIC).

THE ADVANTAGES OF GIC

Electricité de France considers that the use of GIC on the 400 kV transmission system may be advantageous, for the reasons stated below.

GIC make less of an impact on the environment

In the majority of cases, the visual impact of overhead lines causes a problem. The most obvious benefit of GIC with regard to the environment is that, like synthetic cables, they can be buried and their visual impact is then practically zero.

However this is not the only advantage GIC can offer with regard to protection of the environment.

Indeed, firstly it is possible, by careful selection of the materials used, to prevent any risk of pollution of the atmosphere, water and the ground. For example, for the dielectric gas this is achieved by choosing nitrogen, which constitutes 80% of the atmosphere.

Secondly, the prospects for completely recycling GIC links are good, as they can be dismantled and they consist of 95% metal by weight (aluminium or aluminium/steel). Suitable methods of construction can allow the cost of dismantling to be offset by the value of the materials recovered.

Finally it should be noted that the electromagnetic disturbances emitted by GIC are very low, on account of the regular interconnection of their enclosures.

For the above reasons, it is apparent that GIC present advantages from the environmental point of view.

Optimum technical characteristics for use at 400 kV

400 kV transmission lines are generally fairly long