FINANCE COMMITTEE

Two-hundred-and-twenty-third meeting

Geneva - 22 June 1988

PROPOSAL FOR THE AWARD OF A CONTRACT, WITHOUT COMPETITIVE TENDERING,

FOR THE CONVERSION OF A HELIUM LIQUEFIER INTO A REFRIGERATION PLANT

This document concerns the conversion of a former ISR helium liquefier SULZER TCF 200 into a refrigeration plant, required for the pilot test of superconducting RF accelerating cavities for LEP.

For the reasons set out in this document the Finance Committee is invited to agree that, without competitive tendering, a contract be negotiated with SULZER for the conversion of its TCF 200 helium liquefier into a refrigeration plant, for an amount not exceeding 800 000 Swiss francs.
INTRODUCTION

1 In order to gain practical experience with the performance and operational requirements of superconducting RF cavities, it is intended to set up a pilot test, for which a helium refrigeration plant is required. The test will be carried out under true environmental conditions in the LEP accelerator, with cavities identical to those foreseen for the upgrading of LEP to energies above 55 GeV.

2 Originally, a test of two half-cells equipped with a total of 16 superconducting cavities had been envisaged, necessitating the purchase of a dedicated refrigeration plant with a cooling power of 6 kW at 4.5 K. For budgetary reasons, it was decided in 1985 to reduce the test scale and to install only four superconducting cavities for a first test, immediately after the LEP start up. On the grounds of the progress made in superconducting RF technology, it was expected that a meaningful test programme could then be carried out with a refrigeration power of 1 kW or even less at 4.5 K. It was supposed from the beginning that the ISR low-β helium liquefier could be converted, at reasonable cost, into a refrigeration plant of that capacity. The purchase of a dedicated large refrigerator, which would be needed for the final upgrading, could thus be postponed by a few years.

ANALYSIS OF THE SITUATION

3 In 1987/1988, the technical aspects of the conversion were discussed with SULZER, the manufacturer of the ISR low-β helium liquefier. This liquefier had been purchased in 1977 at a price of 1 630 000 Swiss francs.

4 In view of the specificity of the design, the impossibility of using components from various sources in crucial subsystems (e.g. turbine stages) and the importance of access to documentation on conceptual details of the original plant, in particular the control system, it had to be concluded that the manufacturer of the original plant was the only firm that could be considered for the conversion.
A price enquiry bearing the reference I-1764/EF and concerning the conversion of the liquefier was sent on 31 March 1988 to SULZER.

In response, SULZER submitted an offer defining a possible scenario for the conversion, for which engineering design, supplies and services provided by SULZER would amount to approximately 740,000 Swiss francs (figures for services and some supplies are estimated). CERN would have to provide part of the manpower required for the conversion, estimated in total to be about seven man-months.

The form of the offer is such that it gives CERN a number of choices between execution of specified work by SULZER, CERN, or a third party. An optimum scenario, based on the best use of CERN resources, has still to be worked out in final contractual negotiations between SULZER and CERN.

**PROPOSAL**

The total investment of approximately 800,000 Swiss francs, including the additional manpower to be supplied, will provide a refrigerating plant with a capacity of 950 W at 4.5 K. In comparison, the cost of each of the new refrigeration plants purchased recently for the LEP experimental facilities ALEPH and DELPHI is 2,000,000 Swiss francs for a cooling capacity of 800 W at 4.5 K. The economic advantage of the conversion is therefore obvious.

**RECOMMENDATION**

The Finance Committee is therefore invited to agree that, without competitive tendering, a contract be negotiated with SULZER for the conversion of its TCF 200 helium liquefier into a refrigeration plant, for an amount not exceeding 800,000 Swiss francs.