PS/PO/NOTE 84-5
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LEAR AREAS POWER SUPPLY CONSOLIDATION

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In the LEAR complex the motor generator sets in the South Generator Building (SGB) are used to power the transfer line magnets (Siemens Generators) and the spectrometers (Oerlikon generators). This equipment dates from 1961, is inefficient, space consuming, maintenance costly, requires a high degree of supervision, and spare parts are no longer available. Additionally it is foreseeable that within the next few years the manufacturer will cease to supply a maintenance service.

These limitations coupled with the following factors lead to the conviction that a major power supply consolidation - replacement of all motor generator sets by static rectifiers - should be considered for LEAR.

a) The shut-down of antiproton facilities in 1986 will give sufficient time to make major modifications without affecting operation.

b) The ISR closure will liberate equipment - power supplies and low-voltage distribution panels.

c) In order to create space in the South hall for LEAR electronics, it was proposed to build another small rectifier building in the area between the South Hall and building 264. This building would house low power units presently in the South hall. In the event of replacement of the motor generator sets in the SGB by static rectifiers, sufficient space would be created to include those smaller units in the SGB and the extra building could be saved.

d) SPS main ring rectifier transformers (replaced in a SPS improvement program) have been reserved (PS/PO/NOTE 82-14 of 14.12.1982).

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with a view to using them for high power spectrometer-type power supplies. Suitable thyristor racks become available at the end of 1984 from the Booster (thyristors replaced in Booster consolidation program). Power supplies composed of these elements along with passive filter units (new) will replace the Oerlikon generators.

e) As of 1986 there will be no shift work in the PO Group. With static supplies this is less critical.

f) If it is foreseen to lower the momentum of the LEAR extracted beams, then the generators in the ejection lines will no longer be usable. Smaller power supplies will be necessary and these cannot be placed in the SGB (generators and static supplies cannot be installed in the same building due to problems of carbon dust from the generator collector brushes).

g) The interest in LEAR is such that the continued operation for many years of this equipment is assured.

It should be noted that the transformation of the South Generator Building will require careful planning (but we already have the experience of a similar transformation of the East Generator Building), and an extended shut-down of the order of 6 months. It is not an operation which can be carried out in several steps. As it is required to reduce this shut-down for LEAR, rectifiers in SRB1 will be used to replace generators in order to power the Linac 1 to LEAR transfer line - the LEAR main ring supplies are unaffected by this project.

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An estimate of costs is attached.

Two other prices are of interest :

i) The energy saving by eliminating the rotational losses and by allowing a zero-current economy mode for short machine stops.

- Annual saving : ∿ 5'000 hours at 1 MW = ∿ 400 kSF

ii) Without the equipment recuperated from the ISR and the SPS the consolidation envisaged would cost ∿ 4 MSF.

Distribution :

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C O S T S

1. Spectrometer supplies (filters + installation)

   4 x 150 kSF ..... 600 kSF

2. ISR rectifier modification

   34 x 25 kSF ..... 850 kSF

3. South Generator Building modification ..... 400 kSF

4. Low voltage distribution ..... 250 kSF

5. Transfer of small rectifiers from South hall .. 100 kSF

~ 2,2 MSF

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over next 4 years