# Affectionately known

at the Stanford Linear Accelerator Center (SLAC) as simply "The Blue Book," *The Stanford Two-Mile Accelerator* has been a classic on site since the day it was published in 1968. Shepherded into existence by an editorial committee of four SLAC staff members led by Richard B. Neal, the massive 1169-page, more-than-ninety-author treatise thoroughly documents all facets of the two-mile-long linear accelerator, or linac, operated by Stanford University.

The blue clothbound book was conceived upon the realization that the staff working long and hard on the project would inevitably disperse upon the linac's completion. As a means of preservation, the volume was created to provide a systematic presentation of the knowledge and experience gained in the linac's design and construction.

The editorial committee divided the material into 27 chapters covering all aspects of the site, including buildings and utilities, as well as the components and systems of the accelerator and the beam switchyard. The SLAC linac is the longest linear accelerator in the world, and aspects of its design continue to be of interest not only to SLAC staff, but also to a wide range of accelerator designers, users, and builders.

The page reproduced here is from an author's proof of the book, currently being held in the collections of the SLAC Archives and History Office. Since the excerpt is from a true "blue-line" proof, this particular copy is blue both inside and out.

**Jean Deken, SLAC archivist**

*Image courtesy of SLAC*



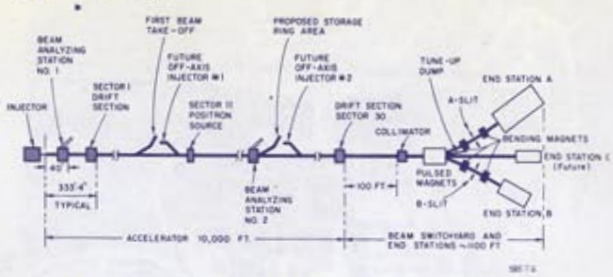


**Figure 5-4 Overall layout of the two-mile accelerator.**

The accelerator comprises 960, 10-ft sections of 10.5-cm disk-loaded cylindrical waveguide. Just 40 ft downstream from the injector at the west end is a beam-analyzing station (No. 1) which is used to set up the injected beam and to make precise measurements of its characteristics. An instrumentation section is located in a 9-ft drift space at the end of each 333-ft

**Table 5-1 General accelerator specifications**

| *Parameters* | *Stage I* | *Stage II* |
|---|---|---|
| Accelerator length | 10,000 ft | 10,000 ft |
| Length between feeds | 10 ft | 10 ft |
| Number of accelerator sections | 960 | 960 |
| Number of klystrons | 245 | 960 |
| Peak power per klystron | 6–24 MW | 6–24 MW |
| Beam pulse repetition rate | 1–360 pulses/sec | 1–360 pulses/sec |
| RF pulse length | 2.5 $\mu$sec | 2.5 $\mu$sec |
| Filling time | 0.83 $\mu$sec | 0.83 $\mu$sec |
| Electron energy, unloaded | 11.1–22.2 GeV | 22.2–44.4 GeV |
| Electron energy, loaded | 10–20 GeV | 20–40 GeV |
| Electron peak beam current | 25–50 mA | 50–100 mA |
| Electron average beam current | 15–30 $\mu$A | 30–60 $\mu$A |
| Electron average beam power | 0.15–0.6 MW | 0.6–2.4 MW |
| Electron beam pulse length | 0.01–2.1 $\mu$sec | 0.01–2.1 $\mu$sec |
| Electron beam energy spread (max) | 0.5% | 0.5% |
| Positron energy | 7.4–14.8 GeV | 14.8–29.6 GeV |
| Positron average beam current* | 0.45 $\mu$A | 0.45 $\mu$A |
| Multiple beam capability | 3 interlaced beams with independently adjustable pulse length and current | |
| Operating frequency | 2856 MHz | 2856 MHz |