In some prostate cancer patients, the target volume has a concave shape at the rectum side, due to seminal vesicles which wrap around the rectum. To reduce the rectal-wall dose in these patients, a coplanar segmented five-field technique has been devised. Each field consists of an open segment (shaped in BEV to conform to the PTV) and segments in which the rectum is shielded. For each patient, the weights of all segments are optimized using the optimization algorithm developed at the University of Michigan. The cost function is based on dosevolume criteria for the PTV and the rectum wall. The optimization process results typically in two to four rectum-shielding segments in addition to the five open segments. For a patient with a typical concave-shaped PTV to which a dose of 78 Gy is prescribed, the rectal wall NTCP for the segmented five-field technique is 24%. This is significantly smaller than the value of 31% calculated for our conventional conformal three-field technique, for the same coverage and mean dose to the PTV. The dosimetric verification of the complete five-field technique is performed (i) by scans with an ionization chamber in a water phantom for all segments, which are combined to yield total dose profiles, and (ii) by delivering all segments to a film in a cylindrical polystyrene phantom. The total dose calculated for this segmented technique is within 0.5% of the measured dose at the ICRU Reference Point, while in the region of the PTV the difference is smaller than 3%.