

## 230 kV TRANSMISSION LINE

1. The problems encountered by the transmission line contractor during construction were mainly due to his inadequate mobilization of the necessary equipment and planning and, to some extent, his lack of financial resources. Another difficulty was due to a number of unexploded ordnance encountered in the survey work in Nam Hai valley in May 1995. This discovery was inconvenient for the contractor, but it was resolved through shifting his resources to the other side of the limestone ridge until the area was cleared. He therefore did not lose any time. For the works on the limestone ridge, the serious delay was mainly due to lack of work experience under similar conditions. The result was that the work, which if properly planned with sufficient resources and carried out in a professional way could have been performed under favorable conditions in the dry seasons, was extended inefficiently through three rainy seasons with reduced outcome and at additional costs to the contractor.
2. The contractor's resurvey across the limestone ridge scheduled before the rainy season in 1995 was not completed before February 1996. The resurvey necessitated correction of the alignment shown on the tender drawings and increasing the number of towers on the ridge from six to eight. The contractor was very reluctant to proceed with the works on the ridge, insisting the work was "impossible" and claiming "not foreseeable physical obstructions." He then started, on his own account, a survey of an alternative 18 kilometer longer route from the Nam Hai valley through the Nam Hinboun gorge and further along Nam Hinboun toward Ban Hinboun. The Engineer, however, rejected the alternative route as it required multiple river crossings with narrow gorges subject to slides and did not meet the technical specifications. The Engineer thus urged the contractor to start the work on the ridge crossing. By the end of 1996, it became clear that the contractor would not be able to perform the work across the ridge without support from others. THPC decided to invite new contractors to bid for the foundation work across the ridge. In April 1997, the T2 Contract for foundations for four towers, with option for two or four more, was signed. Foundation works for all tower sites on the ridge were completed in August/September 1997.
3. Progress of work on the flatland suffered as well for various reasons. Unsatisfactory housing caused very high rates of malaria among the crews during the rainy seasons. Because of that, and combined with poor planning, foundations for six towers on the northern section between Nam Hinboun and the limestone ridge, and for four towers in a swampy area in Pathen Valley had to be constructed under difficult circumstances during flood periods in 1997. The works on the northern section were completed only after assistance by the T2 contractor.
4. Caused by breach of approved stringing procedures, two accidents occurred during stringing across the limestone ridge section. Parts of the pulling equipment broke, and twice one of the phase conductors fell down and was destroyed. This caused a critical lack of spare conductors, and one drum required to complete the work was brought in by air freight from Norway within two weeks. The contractor eventually supplied new spares from Thailand.
5. Despite lack of progress by the T1 Contractor, the transmission line was completed in time for energizing by the end of December 1997 because THPC mobilized the T2 Contractor at the right moment. The 1997 date was six months later than the contractual schedule, but it permitted the T1 Contractor to comply with the revised overall implementation schedule based on the program of the Power Purchase Agreement.