As a part of life cycle analysis (LCA), risk based inspection (RBI) method was carried out to assess lifetime of boiler’s critical components at one of the thermal power plants owned by Electricity Generating Authority of Thailand (EGAT) and assisted by MPT-MATCOR Pte., Ltd. (MPT-MATCOR). Critical components were, for examples, hot reheat steam pipelines, steam drum, super heater outlet header, and water wall tubing. Inspection testing and characterization using such techniques: visual examination, magnetic particle and dye penetrant inspection, and diameter measurements were performed to analyze the data. Recommendations for life extension and inspection plans were provided for the year 2000 to 2011.