Project Title: Optimum design of external dumps of 120m height and internal dump upto ultimate pit limit at PakriBarwadih Coal Mining Project of NTPC Ltd. Project No.: CNP/4901/2019-20	Executive Summary: PakriBarwadih Coal Mining Project is prestigious opencast coal mine of NTPC Ltd. with a planned capacity of 18MTPA. Mine has been previously designed with maximum height of external dump of 90m. But, due to land constraints mine management is interested for scientific study to assess the feasibility of increasing the height of external dumps to 120m to accommodate more overburden within a given dump area. M/s NTPC Ltd. entrusted CSIR-CIMFR, Dhanbad, for optimum design of external dumps of 120m height and internal dump upto ultimate pit limit at PakriBarwadih Coal Mining Project of NTPC Ltd. Pakri - Barwadih Coal Mining Project of M/s NTPC Ltd. is located in the north-eastern part of North Karanpura Coalfield in Hazaribagh district of Jharkhand state. PakriBarwadihcoal block comprises of Talchir, Karharbari, Barakar, Barren Measures and Raniganjformations. Five persistent coal seams have been established in the coalfield. The waste rock is primarily fine to coarse grained sandstone, shale and thin uneconomic coal seams. Based on the geo-technical study and slope stability analysis using GALENA software, various possible combinations of slope height, width, overall angle etc. were worked out to find out the optimum combination as follows: *Optimum design of external dumps - A & B* • Maximum overall height of dump = 120 m • Maximum height of single lift of dump = 30 m • Minimum exposed bench width after each lift of 30 m height = 30m • Angle of repose for one lift of 30 m height = 37 degree • Minimum exposed width between dump toe of lowermost lift and pit crest = 100 m *Optimum design of external dump - C* • Maximum overall height of dump = 120 m • Maximum height of single lift of dump = 30 m • Angle of repose for one lift of 30 m height = 37 degree • Minimum exposed bench width after 1st lift and 2nd lift from bottom = 27 m • Minimum exposed bench width after 3rd lift (i.e. after reaching 90m height) = 35 m • Minimum exposed width between dump toe of lowermost lift and pit crest = 100 m *Optimum design of internal dump* • Maximum overall height of dump = 420m (from 140 mRL to 560 mRL) (To be reviewed after reaching initially 90m and at every stage of addition of 90m height i.e. after 180m. 270m, 360m). • Maximum height of single lift of dump = 30 m • Minimum exposed bench of each lift of 30 m height = 30m • Safety berms of minimum 90 m exposed width at every 90m depth from top dump level i.e. at 470mRL, 380mRL, 290mRL • Safety berm of minimum 60 m exposed width at 200 mRL • Angle of repose for one lift of 30 m height = 37 degree • Minimum gap between the toe of the lowermost level of internal dump and the toe of active mine slope = 100 m As the dump-C has already been formed upto 90m height, design of dump-C has been made differently than the dump A& B. Internal dump of 420m RL difference

	designed under this project is one of the highest internal dump in the Indian coal mines. Suitable recommendations were also provided for slope safety monitoring and slope drainage system. Increasing the dump height from earlier designed 90m height to 120m height and internal dump of 420m RL difference will provide additional dumping capacity within specified dumping area.