THE SINGARENI COLLIERIES COMPANY LIMITED

Power Projects Division

500 MW Medapalli Opencast Coal Mine Pumped Storage Project (MOCP PSP)

Technical Brief for Prospective Developers

Expression of Interest – Development on Revenue Sharing Basis

This brief gives prospective developers an overview of the site and the scheme as conceived in SCCL's Pre-Feasibility Report (PFR, Aug 2024). All parameters are indicative. The developer is expected to verify them through its own surveys, investigations and DPR studies.

1. Project at a Glance

Location	De-coaled Medapalli Opencast Project (MOCP), Medapalli village, Ramagundam Mandal, Peddapalli District, Telangana; on the right (south) bank of River Godavari
Coordinates	Upper reservoir: 18°47'56.5" N, 79°28'28.8" E | Lower reservoir (pit): 18°48'10.4" N, 79°28'55.7" E
Access	Ramagundam railway station ~7 km; Ramagundam town ~10 km; Hyderabad airport ~270 km. All-weather roads and existing mine haul roads up to the pit bottom
Scheme type	Off-stream, closed-loop PSP. The existing de-coaled pit serves as the lower reservoir; a new upper reservoir is to be built on the adjoining mine land
Capacity / storage	500 MW (4 × 125 MW indicative); about 6 h generation daily, single cycle (~3,000 MWh). About 9 h daily with 1.5 cycles
Gross head	About 157 m
Land	Entirely within SCCL leased/owned mine land. No private land, forest land or habitation is involved, so there is no R&R
Water	Mine seepage (groundwater) already stored in the pit covers initial filling and make-up. Pedda Vagu is an alternative source
Seismic zone	Zone III, IS 1893 (Part 1): 2016 (Z = 0.16)

2. Project Layout

The upper reservoir lies south-west of the pit on the mine land and is formed partly by excavation and partly by an earthen embankment. A short water conductor system runs north-east from the upper intake. Surface penstocks are laid down the pit benches to a pit-type (surface) powerhouse on the pit floor. Short tailrace tunnels then discharge into the lower reservoir. The lower reservoir is the water-filled pit, separated from the powerhouse area by a lower embankment.

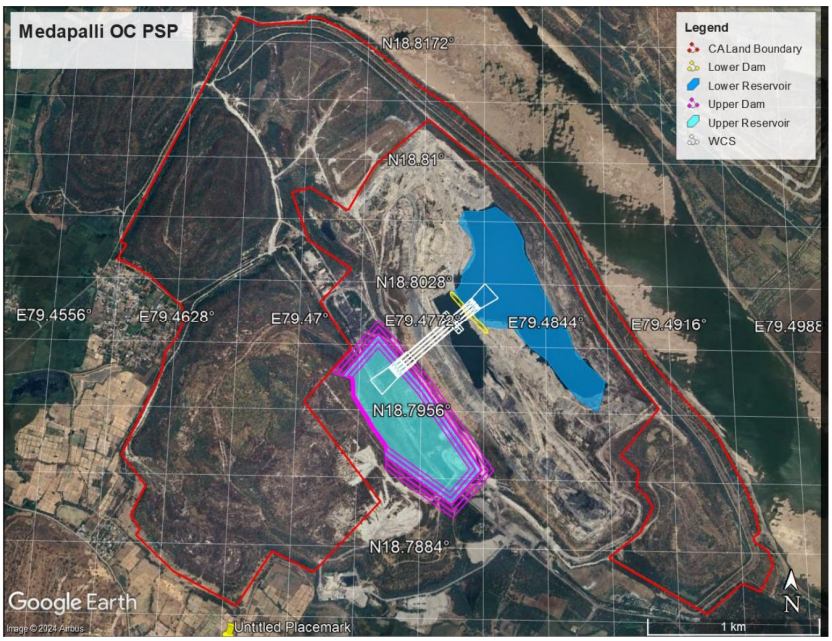

Figure 1: Project layout on satellite imagery (upper reservoir, WCS and lower reservoir within SCCL land boundary)

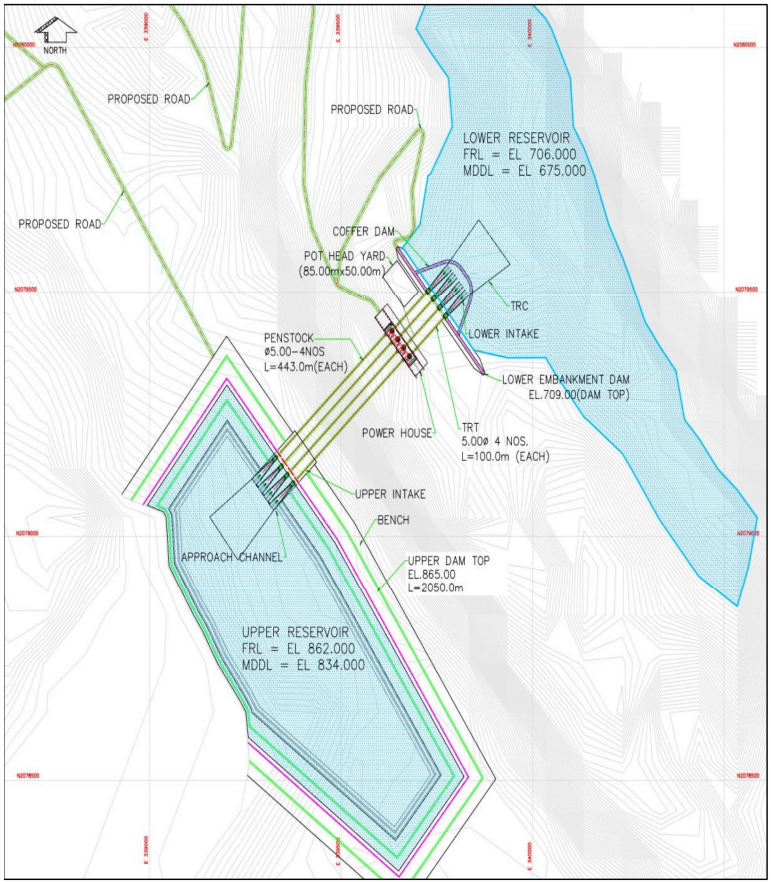

Figure 2: Proposed general layout plan showing project components

3. Salient Features (Indicative, as per PFR)

Item	Upper Reservoir	Lower Reservoir (De-coaled Pit)
Reservoirs (levels in mine datum, see note in Section 6)		
Full Reservoir Level (FRL)	RL 862.00 m	RL 706.00 m
Min. Draw-Down Level (MDDL)	RL 834.00 m	RL 675.00 m
Gross storage	9.06 Mm³	11.76 Mm³

Item	Upper Reservoir	Lower Reservoir (De-coaled Pit)
Live storage for 6 h generation	~8.0 Mm³	~8.0 Mm³
Dam / bund	Clay-core earthen dam; crest 2,050 m long, top RL 865.00 m, max. height ~25 m; bed excavated to RL 830 m	Existing pit; lower embankment, top RL 709.00 m
Intake / outlet	4 nos. horizontal; 2 trash-rack bays each, 6.0 m W × 12.0 m H	4 nos. horizontal; 2 trash-rack bays each, 5.5 m W × 12.0 m H

Component	Particulars
Penstocks	4 nos., surface, steel-lined, 5.0 m dia., ~443 m long each
Powerhouse	Pit (surface) type on pit floor; 160 m (L) × 43 m (W) × 44 m (H); unit C/L RL 642.00 m; service bay RL 656.00 m; founded on sandstone (~70 m excavation to draft-tube bottom)
Tailrace	4 nos. tunnels, steel-lined, 5.0 m dia., ~100 m long each
Pot-head yard	Surface, 85 m × 50 m; 4 generator transformers
Units	Vertical reversible Francis pump-turbines, 4 × 125 MW (variable speed considered). 3 units and fixed-speed machines to be evaluated at DPR
Rated head / discharge	Generation: 154 m, 92.5 m³/s per unit | Pumping: 160 m, 83.6 m³/s per unit
Head ratio; L/H ratio	~1.46; ~4.1
Operation	Generation 6 h / pumping ~6.64 h (single cycle); 9 h / ~9.96 h (1.5 cycles); cycle efficiency ~78.6%
Power evacuation	15 kV generation voltage, stepped up to 400 kV GIS
Access road	Strengthening of ~10 km of existing mine roads

4. L-Section of the Scheme

The L-section along the water conductor system (Figure 3) shows the upper reservoir (FRL 862 / MDDL 834) and the upper intake. The surface penstock descends the pit benches to the powerhouse (unit C/L RL 642). The tailrace tunnel and lower intake follow, then the lower reservoir in the pit (FRL 706 / MDDL 675).

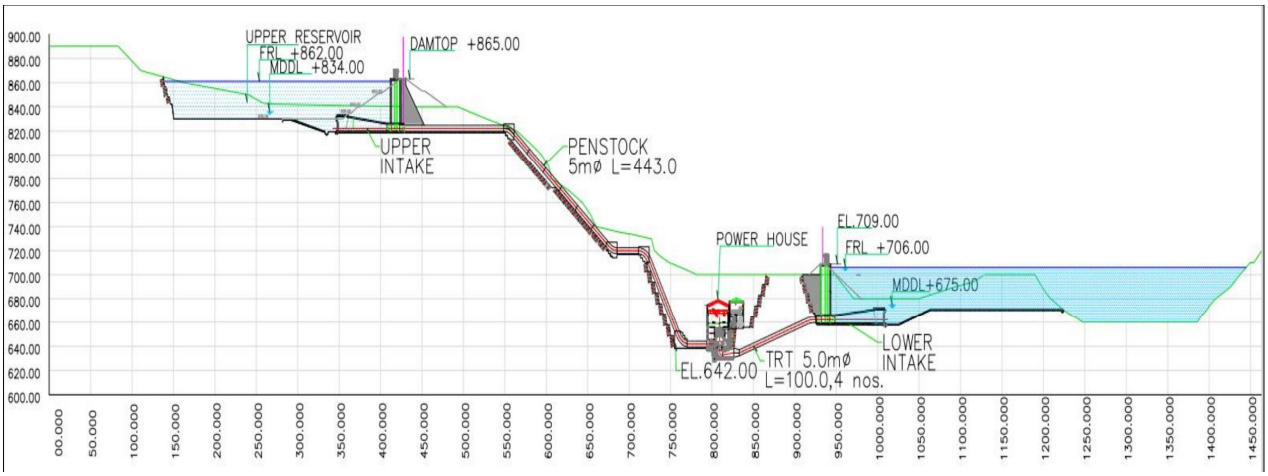

Figure 3: Longitudinal section along water conductor system (levels in mine datum)

5. Mine Pit: Geometry, Geology and Closure Status

5.1 Pit geometry

Mine block area	~3.86 km²; mining lease ~1,643 ha (~1,145 ha used for mining and allied activities)
Quarry area	~383 ha. De-coaled pit and void area designated as a water body under the closure plan: ~272 ha
Depth	18 m to 220 m below natural ground level

Levels (mine datum)	Natural ground RL 830–845 m; OB dump tops RL 850–910 m; pit floor ~RL 610 m (deepest)
Pit walls	Excavated in benches during mining to guard against slope failure. Highwall mining was also carried out in parts of the highwall faces
Water in pit	Seepage and rain accumulation; level rose from RL 675 m (Feb 2022) to ~RL 702 m (Jul 2024), i.e. ~9.8 Mm³ stored. Pit to be allowed to fill to RL 706 m
Flood protection	7.03 km bund along the Godavari, top RL 142 m (MSL)

5.2 Geology and geotechnical aspects

- **Setting:** Ramagundam coal belt, Godavari Valley Coalfield (Lower Gondwana). The pit (lower reservoir) lies in the Barakar Formation. The upper reservoir lies near the faulted Talchir–Barakar contact.
- **Lithology:** Barakar sandstones: medium to very coarse, pebbly, feldspathic and cross-bedded, alternating with siltstone, shale, carbonaceous clay and 8 coal seams (I to V). Sandstones are locally friable or kaolinised, with soft-rock bands. Talchir below: fine to medium greenish sandstone and shale.
- **Structure:** Strike NW–SE; gentle NE dips of 1 in 5 to 1 in 10 (about 6°–12°). 15 faults are delineated, with throws from 5 m to more than 600 m. Boundary faults F2–F2 and F2A–F2A lie on the W and NW.
- **Upper reservoir foundation:** Alluvium, colluvium and OB material 15–18 m thick (to be confirmed). The upper dam is founded on overburden material.
- **Key geotechnical considerations:** Penstock alignment needs anchorage and slope protection on the pit benches. Soft-rock bands may call for heavy support for the tailrace and excavations. Seepage or ingress from the water-filled pit, and from possible cavities and highwall-mining voids, must be addressed. Permeability tests are needed for upper reservoir watertightness.
- **Investigations:** The PFR used limited topographic and spot-level data. Detailed topographic survey, drilling, rock-mechanics testing, slope-stability analysis of the pit walls and site-specific seismic studies are to be carried out at DPR stage.

5.3 Mining and closure status

- Mined from Oct 1994 to 2023 by shovel–dumper and highwall mining. About 61 MT of coal and ~342 Mm³ of overburden were removed.
- Coal reserves fully exhausted in 2023. The mine is de-coaled and no mining activity is ongoing. There are no underground workings in the project area.
- Final Mine Closure Plan approved by the Ministry of Coal, GoI (12.09.2019). Under the plan, the de-coaled pit and voids are to be retained as a water body. The PSP is proposed as a hydro-reclamation use of this void.

6. Notes

- All RLs are in the mine datum, which is about 700 m above MSL (adopted by SCCL to avoid negative pit levels). The flood bund level is in MSL.
- Layout, unit configuration and levels are indicative, as conceived in the PFR. The developer may optimise them at the DPR stage.