UNIT SHUTDOWN REPORT

UNIT No: 1 STATION: NTPL, TUTICORIN.

OUTAGE: NO. 75

REPORT NO: 75

1.Date of tripping :22.05.2023

2.Time of tripping :05:16 hrs

3.Status before tripping :

a) Unit Load : 400MW (Load Restricted from 18.05.2023 to improve ash evacuation)
b) Coal flow : 260 T/hr.
c) Mills in service : 6 Mills (A,B,D,E,F,G)
d) ESP available fields : 51/64 (ALI: B1-1, C1-1, C2-1) (U/V: D1-(1, 2, 3), B2-1, B2-2, C2-2, B1-2, C2-2, D2-2)
e) Ash Evacuation Cycle status : Nil in all pass.
f) Unit-1 Silo Level : 1.80,0.52,3.31
g) Vacuum pumps : A2, B1, C1, D1, E2 (All running normal)
h) Conveying Air compressor : 1,2,3 (All running normal)
i) No of Hoppers Empty : 51 out of 128 Any

4. Analysis of Shutdown :

On 22/05/2023 at 02:25 hrs Unit was running at 400 MW ,suddenly the furnace pressure went positive (+60mmwc) , both ID fans got fully loaded. Load was reduced immediately to Technical minimum. The reason for positive furnace pressure was found to be due to air ingress via hopper opening in ESP C pass. The C pass was isolated and boiler parameters got normalised. At 05:16 hrs ,the unit was shut down to attend to the problems in ESP.

5.Root cause:

- Ash accumulation in 1C1, 1C2, 2C1, 2C2 casings over 5 Meters above the maximum hopper level. This had resulted in the non-availability of the 1C1 & 2C1 fields and collapse of ESP Field 1C2 with the hopper getting dislodged from its position and spilling of the collected ash on the floor.

- In NLC Tamilnadu Power Ltd, the Ash Handling System was designed by envisaging the design coal for Steam Generators as below.

Type of Coal	GCV Kcal/kg	Average Ash%
Indigenous washed coal from MCL 70 to 85%	3700	36
Imported coal 15 to 30%	5900	5

- The design data given for capacity of Fly Ash removal system considering 8 hours of ash collection to be evacuated in 6 hours is 180 T/hr/unit.
- Ash to be evacuated per shift (180 T/hr/unit x 6 hrs) is 1080 T/unit
- Ash conveying capacity per unit – 3240 T/day
- Ash conveying capacity for two units – 6480 T/day
- Vacuum conveying system and Pressure Conveying System are so designed that ash collected in 8 hrs is evacuated by Vacuum System (From ESP to ISH) in 4 hrs and by Pressure Conveying System in 6 hrs (From ISH to Main Silo) allowing 4 hrs for maintenance work in Vacuum conveying System & 2 hrs for Pressure conveying system in a shift.

- The Project contractor M/s EEPL had failed to prove the above ash conveying capacity and the PG test was not completed successfully. By experience, it observed that Ash Handling System of NTPL could convey 5000 T/day for two units.

- Consequent to allocation of Coal Block at Talabira Coal Mine, Odissa to NLCIL, coal input to NTPL boilers included Talabira coal, MCL coal and Import coal. Ash % in Talabira coal is as high as 46% and the GCV is 3200 Kcal/kg against the design value as stated above.

- In the above situation, import coal stock also got exhausted and import coal blending ceased from 18.03.2023 caused increase in blending of MCL and Talabira coal to maintain power generation. This resulted in more ash input to ESP over and above the handling capacity of Ash Handling capacity. Though Ash Handling System is conveying ash to its max capacity, ash accumulation in ESP was experienced due to high ash content of Talabira coal. Hence, ash unloading had to be carried out through emergency drain on continuous basis .

- As ash generated due to high PLF was more than the handling capacity of Ash Handling System, accumulation of ash in ESP hoppers started despite ash conveyed by the system was normal and hence emergency unloading of ash from ESP hoppers were resorted to safe guard ESP. The ash unloading activity had to be continued as PLF was high continuously.

- Some difficulties were faced in the ESP hopper emergency unloading due to inadequate transport logistics which resulted in accumulation of ash in hoppers.

6.Remedial measures taken/to be taken :

- The arrival of Import coal in the first week of June/23 and its subsequent usage has reduced the overall ash generation and improved the ash evacuation system.
- The ash evacuation problem can be partly mitigated on commissioning of 2 Nos of additional Air Compressors for conveying ISH to Transport silos. This was the part of process improvement by AHS division and is under progress.
- In the event of excessive ash generation for the station and the ash conveying cycle not completed, ash accumulation in the ESP hopper should be unloaded through emergency drain. Further, the dumped and accumulated Ash at ESP bottom and surrounding area to be cleared immediately by transporting to bottom Bin area / Ash Pond.
- Under any circumstances ash level in the ESP hoppers (including hoppers of fields which are not available due to ALI/UV)should not be more than the maximum design level and if necessary, generation to be adjusted till the situation is normalized.
- Isolation of ESP Pass should be carried out if three or more Fields are found Ash Level High / Under Voltage problem
- Load on the Unit may be reduced depending upon the number of pass isolated for inspection/repair.

7.Time / Date of boiler light up and synchronization :

Unit was taken into service after satisfactorily clearing ash load in A, B and D pass isolating C pass for repair on 31/05/2023 at 16:52 hrs with load restricted to 350 MW.

Unit light up :31.05.2023 @ 11:59hrs.

8. Recommendation / Action plan

Sl.No.	Recommendations/Action plan	Responsibility	Time line
1	Ash level indicator has to be monitored regularly and action taken to be informed to concern division.	AHS Operation	Regularly
2	Working of ash level indicator to be ensured in hoppers	C&I	Regularly
3	In case of ash level high indication comes, the particular hopper has to be evacuated immediately or dumped from the hopper without any delay.	AHS	Immediate

4	Dumped ash at the ESP area has to be cleared immediately	Civil/AHS	Immediate
5	Considering the future challenges in the usage of indigenous coal a study on capacity addition in ash handling system to be conducted as soon as possible.	AHS	3 months
6	Structural study / analysis to be conducted for all mechanical structures which is carrying ASH load.	BM	Immediate
7	Feasibility of Load cell provision to monitor the load in the first-row of the hopper to be studied.	C&I/BM/AHS	3 months
8	All Hoppers to Main Duct welding joints are to inspected periodically	BMD	Major overhaul

14/6/23

EE / OS ACM/BOS CM/Civil

DGM/ ELECT DGM/BM

DGM/AHS DGM / C&I DGM /MTP DGM/OS

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