

CASE STUDY-EXPANSION OF NSL, KOPPA FROM 4250 TCD TO 6000 TCD



NSL SUGARS LIMITED, UNIT-I, KOPPA VILLAGE, KARNATAKA.

PLANT BACKGROUND

The Plant was commissioned during 2004-05 season with capacity of 3500 TCD, designed for steam consumption of 46% and an expansion was carried out from 3500 to 4250 TCD with a reduction in steam consumption from 46 to 39% on cane.



HIGHLIGHTS OF EXPANSION BY SEDL

- From a capacity of 4250 TCD, the plant was expanded by Spray Engineering Devices Ltd. (SEDL) with minimum CAPEX & OPEX, installing equipment which is compact, modular and easy to operate requiring less footprint area and manpower. The expansion was carried out in two phases as follows:

Phase I : 4250 to 5000 TCD in Crushing Season 2010-11

Phase II : 5000 to 6000 TCD in Crushing Season 2011-12

- In both phases of expansion, thrust was given to bring down the steam % cane by installing new energy saving equipment including Vertical SCP, Falling Film Evaporators & Direct Contact type juice heaters.
- During the first phase of expansion plant was designed for steam consumption of less than 34% on cane.
- In the second phase of expansion from 5000 to 6000 TCD capacity, boiling house was designed by SEDL for 30% of steam on cane.
- No capacity addition/modification was done in steam & power generation section.

TABLE 1. BOILING HOUSE CONFIGURATION BEFORE EXPANSION

Description	INITIAL CONFIGURATION	FIRST EXPANSION BY NSL, KOPPA
Capacity	3500 TCD	3500-4250 TCD
Designed Steam % on Cane	46 %	39 %
Evaporator Set Configuration	DEVC+ QUADRUPLE	QUINTUPLE SET

TABLE 2. BOILING HOUSE CONFIGURATION AFTER EXPANSION BY SEDL

Description	PHASE I (SEDL) in 2010-11	PHASE II (SEDL) in 2011-12
Capacity	4250- 5000 TCD	5000- 6000 TCD
Designed Steam % on Cane	36 %	30 %
Evaporator Set Configuration	Quintuple set with Pre- evaporator	Quintuple Set with All FFEs

TABLE 3. VAPOR BLEEDING ARRANGEMENT BEFORE EXPANSION

Description	INITIAL CONFIGURATION	FIRST EXPANSION BY NSL, KOPPA
Raw Juice 1 st heating	4 th Body Vapor	5 th Body Vapor
Raw Juice 2 nd heating	3 rd Body Vapor	Condensate
Raw Juice 3 rd heating	-	4 th body Vapor
Sulphited Juice 1 st heating	2 nd DEVC	2 nd Body Vapor
Sulphited Juice 2 nd heating	1 st DEVC	1 st Body Vapor
Clear Juice 1 st Heating	1 st DEVC	2 nd Body Vapor
Clea Juice 2 nd heating	Exhaust	1 st Body Vapor
Pan Boiling	Batch pans with DEVC II vapors, Continuous pans with DEVC I vapors	All Pans shifted on 2 nd Body Vapors

TABLE 4. VAPOR BLEEDING ARRANGEMENT IN PHASE I & II OF EXPANSION BY SEDL

Description	PHASE I (SEDL) in 2010-11	PHASE II (SEDL) in 2011-12
Raw Juice 1 st heating	5 th Body Vapor	5 th body Vapor
Raw Juice 2 nd heating	Condensate	4 th body Vapor
Raw Juice 3 rd heating	4 th Body Vapor	-
Sulphited Juice 1 st heating	2 nd Body Vapor	4 th body Vapor
Sulphited Juice 2 nd heating	1 st Body Vapor	3 rd body Vapor
Clear Juice 1 st Heating	2 nd Body Vapor	3 rd body Vapor
Clea Juice 2 nd heating	1 st Body Vapor	2 nd body Vapor
Pan Boiling	Installation of Vertical A- SCP, operating on Pre Evaporator Vapors Shifting of A- Batch pans and B, C pans on 2 nd body Vapors	Shifting of Vertical A- SCP on 4 th body Va-pors Installation of Vertical B- SCP Pan operating on 4 th body Vapors

PHASE I – EXPANSION FROM 4250 TO 5000 TCD

Equipment Addition

- * 1 No. x 2000 m² Pre- Evaporator before main evaporator set
- * 1 No. x 65 t/h capacity 9 Chamber A- Vertical continuous pan operating on Pre-evaporator vapors

Guaranteed Performance

- * Capacity : 5000 TCD on 24 hrs basis
- * Steam % cane : Less than 34 % on cane

PHASE II – EXPANSION FROM 5000 TO 6000 TCD

Equipment Addition

- * 1 No. 25 t/h capacity, 5 Chamber B-Vertical Spray Continuous Pan (SCP) operating on 4th vapors
- * All Tubular juice heating systems replaced by Direct Contact Heaters
- * 1 No. Cigar for condensate flash waste heat recovery
- * 6 No. Falling Film evaporators (4 No. x 3650 m² & 2 No. x 3000 m²)
- * New Updated Automation System with DCS Control for all SED equipment

Guaranteed Performance

- * Capacity : 6000 TCD on 22 hrs basis
- * Steam % cane : Less than 28% on cane

RESULTS

Phase	Achieved Crushing Capacity	Achieved Steam % on Cane
Phase I	5000 TCD	34 %
Phase II	5500 TCD	31 %

- ◆ After installation of FFE in Phase II of expansion the complete evaporator set was used only for 25-30% of crushing days, due to shortage of cane supply against the rated capacity of 6000 TCD.
- ◆ Hence the designed steam % cane of 28% could not be achieved.
- ◆ Lowest steam % cane reached in the 2013-14 season is 31% at a crushing of 5500 TCD.

CONCLUSION

The unit is operating smoothly crushing 5500-6000 TCD on an average with a steam consumption of 31 % on cane without any significant CAPEX & OPEX.

SPRAY ENGINEERING DEVICES LIMITED

...Energy Efficient Engineering

