

PUNJAB STATE ELECTRICITY REGULATORY COMMISSION
SCO NO. 220-221, SECTOR 34-A, CHANDIGARH

Petition No. 42 of 2012 (Suo-motu)
Date of Order: 08.10.2012

In the matter of: Fuel Audit of various Thermal Plants of Punjab State Power Corporation Limited.

AND

In the matter of: Punjab State Power Corporation Limited.....Respondent.

Present: Smt. Romila Dubey, Chairperson
Shri Virinder Singh, Member
Shri Gurinderjit Singh, Member

ORDER:

Background:

The Punjab State Electricity Regulatory Commission (Commission) in its Conduct of Business Regulations, 2005 has provided for the Fuel Cost Adjustment on account of change in fuel cost for PSPCL's Thermal Stations and Central Generating Stations which is due to reasons beyond the control of the utility.

Fuel cost is a major item of expense. As such, the actual calorific value & price of coal and oil alongwith transit losses of coal are got verified and compared with the data filed in the ARR of the utility at the time of processing of the ARR. However, there are many factors which remain unchecked in determination of ARR and Tariff of the utility.

In order to check more precisely the methodology regarding computation of cost of fuel being passed on to the consumers as an uncontrollable element, the Commission considered it proper and fair to get the Fuel Audit of all the thermal plants of PSPCL carried out as per international practices. This job was assigned to CPRI, Bangalore vide Commission's Work Order No. PSERC/Tariff/T/152/8792 dated 10.1.2012.

2. Preliminary Report:

CPRI submitted its preliminary report, on Fuel Audit of thermal plants of PSPCL, to the Commission vide letter dated 14.5.2012. A copy of the report was sent to PSPCL for furnishing its comments. The PSPCL conveyed its comments on the Fuel Audit Report vide letter no. 2418 dated 6.6.2012. A copy of the comments furnished by PSPCL was also supplied to CPRI for their perusal.

Thereafter, a joint meeting with CPRI and PSPCL was held by the Commission on 20.7.2012 to discuss various issues brought out in CPRI report and response of PSPCL. This joint meeting was attended by the Commission, Sh. Siddhartha Bhatt, Additional Director and Sh. N. Rajkumar, Engineering Officer from CPRI and CMD, Director/Generation and Chief Engineers of GGSSTP, GHTP & GNDTP of PSPCL.

3. Final Report:

On the basis of this Fuel Audit study carried out by CPRI at the three thermal plants of PSPCL and taking cognizance of various observations made by PSPCL during the aforesaid discussions in the joint meeting on 20.7.2012, the CPRI submitted its final report on Fuel Audit vide its letter dated 14.8.2012.

The fuel audit conducted by CPRI covers the complete study of coal and fuel oil including the fuel supply contract agreements. The salient areas of fuel saving and cost reduction as per the Report are as follows:

- Review of the measuring methods and points of measurement of Gross Calorific Value (GCV) of coal.
- Reduction in the drop of GCV of bunkered coal vis-à-vis receipt coal.
- Reduction in transit loss between the mine and the Thermal Power Station (TPS).
- Reduction in demurrages through improvement in unloading infrastructure.
- Reduction in quantities of stones received through more vigilance at the loading end.
- Review of contract with washeries regarding the quantity and quality of coal inputs and outputs.
- Achievable station heat rate.

The investment and savings as indicated in the CPRI Report are as under:

Sl. No.	Type of measure	Investment (Rs. In lakhs)	Savings (Rs. Lakhs)		Pay back period
01	Improvement in coal quality and quantity measurement processes; measurement of both receipt and bunkered coal at the TPS.	309	GGSSSTP	20670	1 month
			GNDTP	5410	
			GHTP	4530	
			Total	30610	
02	Improvement in unloading infrastructure, coal management at the coal yard and reduction of demurrages	489	GGSSSTP	162.71	29.8 months (2.5 years)
			GNDTP	27.15	
			GHTP	7.29	
			Total	197.15	
03	Improvement in Transit Loss.	60	GGSSSTP	170.54	2 months
			GNDTP	No TL	
			GHTP	196.15	
			Total	366.69	
04	Reduction in stones in receipt coal	nil	GGSSSTP	368.62	Not applicable since no investment
			GNDTP	Stones within limits	
			GHTP	177.13	
			Total	545.75	
05	Total investment and saving	858	GGSSSTP	21371.87	1 month
			GNDTP	5437.15	
			GHTP	4910.57	
			Grand total	31719.59	

4. Institution of Suo-motu Petition:

For taking further necessary action in the matter, this suo-motu Petition was instituted by the Commission and notices to all concerned for soliciting their comments/objections on the CPRI report placed on the website of the Commission were issued.

In response to the public notice, only one set of objections from PSPCL was received and was passed on to the CPRI for comments. The objections made by PSPCL and reply thereof by CPRI are as under:

PSPCL objection: The drop in GCV is not due to actual reduction but it is because of comparison by CPRI in two different conditions of coal samples and drop in GCV due to surface moisture was not accounted for, which has led to exaggerated reflection of the drop in GCV and projected savings of worth Rs. 317 Crore as projected in report, are not in order and are based upon imaginary loss of calorific value.

CPRI reply: PSPCL has brought out in the meeting on 20.07.2012 that the drop in GCV is due to surface moisture and is not being considered in UHV values for which payments are being made to collieries as per the Fuel supply agreement. Since PSPCL is paying to the collieries based on equilibrated basis (considering only inherent moisture) and not considering the surface moisture in the coal, they are obtaining a large difference between the GCV of coal paid for, coal actually obtained at the TPS and coal finally fed into the boilers. The reason for this has been attributed mainly to the Fuel supply agreement (FSA). The most logical solution suggested to overcome this state of affairs is to introduce the uniform process of measurement of GCV, as follows:

1. Determination of GCV at the TPS receiving end (before wagon tippler)
EITHER:

(A) on equilibrated basis (inherent moisture basis) and minus the effect of surface moisture at the rate of 145 kCal/kg for every 1 % moisture OR

(B) on as received basis considering the effect of inherent moisture +surface moisture.

The GCV so obtained at the receiving end of TPS will represent the true picture of the heating value of the coal received by the TPS. At the present point of time this GCV cannot be used for payment purposes because of the clauses in the FSA but can still be measured and data base can be created.

2. Determination of GCV at the firing end or bunker end EITHER:

(A) on equilibrated basis (inherent moisture basis) and minus the effect of surface moisture at the rate of 145 kCal/kg for every 1 % moisture OR

(B) on as received basis considering the effect of inherent moisture + surface moisture.

The GCV so obtained at the bunker end (before coal is fed into boiler hoppers) will represent the true picture of the heating value of the coal fired into the boilers.

3. The difference between the GCV so obtained at (1) and (2) may be minimized to within 150 kCal/kg.

PSPCL objection: The perusal of tables reveals that savings of Rs. 306 crores can be made by investing Rs. 3.09 Crores on account of reducing the drop of GCV, which actually does not exist as actual drop of GCV is almost matching with the theoretical calculation of drop in GCV in final fuel audit report after accounting for drop in GCV due to surface moisture at PSPCL thermal power plants.

CPRI reply: The savings refer to the difference between the GCV (heating value of coal) which has been paid for to the collieries and GCV (heating value of coal) of fired coal. The drop does very much exist in reality. The GCV of coal entering and finally utilized in the TPS has to be the same except for minor loss of heat due to handling of coal. These savings are therefore real and can be achieved by two fold approach:

1. Bringing in consensus to make changes in the FSA with CIL so that the payments are made for realistic GCV based on inherent cum surface moisture and not on inherent moisture alone. PSPCL efforts in bringing about changes in the conditions of FSA are highly appreciated and will benefit itself and all utilities in the long run. In the long term, if the changes in FSA are brought out in favour of the utilities, PSPCL will be a pioneer in this effort.

2. Minimizing drop at the TPS (wagon tippler/receipt point to the bunker/firing point in the boiler) to within 150 kCal/kg.

PSPCL objection: Drop in GCV at PSPCL thermal power stations is almost matching with the drop in GCV as envisaged by CPRI in its report after accounting for the drop in GCV of 145 kCal/Kg for every 1% surface moisture, which is around 5% in case of PSPCL power stations and comes out to be 725 kCal/Kg. So actual drop in GCV at PSPCL thermal power stations is in order as per theoretical calculations.

CPRI reply: PSPCL's frank agreement that the numbers in the CPRI fuel audit report are in order are appreciated.

PSPCL objection: GCV drops in other stations during 2010-2011.

CPRI reply: The drop in GCV is a problem which needs urgent attention and is to be addressed. Many good stations have reduced this to within 100-150

kCal/kg. Best practice stations must be looked at when we are looking for improvements.

PSPCL objection: CPRI has recommended to limit the stack loss to a value of 150 Kcal/Kg despite the fact that CPRI has itself quoted the NTPC R&D study in which maximum stack losses have been mentioned to be 600 kCal/kg in an year.

CPRI reply: This NTPC study refers only to coal stored in a coal yard. According to technical study if coal is stored in a coal yard for 1 whole year then the drop is 600 kCal/kg. There is drop in GCV only between onset of summer to end of monsoon period and there is a gain during the winter months due to continuous loss of moisture. For periods less than one year like 1, 2, 3 months, etc., the measured drop in GCV is as follows:

Period of storage of coal	Drop in GCV due to natural deterioration, kCal/kg
30 days	192
60 days	210
90 days	299
15-20 days	Expected drop is about 150

Hence the stacking loss based on NTPC study is in order. If the inventory level is maintained at 15-20 days of working stock then the drop is supposed to be about 150 kCal/kg. Other studies with good coal management in the coal yards have reported slightly lower values.

PSPCL objection: The recommendation of CPRI at page 176, regarding GCV correction for surface moisture at sending end, has the same effect as determination of GCV on 'As Received' basis and making the Payments to CIL subsidiaries accordingly. Presently, throughout the country, the practice of determination of GCV on equilibrated basis and making payments to CIL subsidiaries for GCV determined on equilibrated basis is in vogue. Accordingly, for implementing CPRI recommendation for correction of surface moisture, the existing provision of determining the GCV on equilibrated basis in the FSA's shall require amendment of FSA's which can only be done by mutual consent of the procurer and seller. A committee in this regard has also been constituted by the CEA and the issue was deliberated in the committee's meeting held on

11.09.2012 at New Delhi. Representatives from CEA, NTPC, Haryana, Maharashtra and Rajasthan are the members of the committee. PSPCL on its own cannot amend the provisions of Fuel Supply Agreements for determination of GCV on 'As Received' basis'.

The power utilities are requesting CEA to intervene in the matter and get issued necessary instructions to CIL subsidiaries through Union Ministry of Coal for changing the venue of coal testing to unloading end i.e. thermal power stations in the Fuel Supply Agreements against present provision in the Fuel Supply Agreement of determining the quality of coal at the loading end.

CPRI reply: PSPCL's proactive role in making FSA more balanced in favour of the TPS is appreciated and will be helpful to other utilities all over the country.

PSPCL objection: The report prepared by CPRI is not based on facts and is misleading especially on exaggerated drop in GCV of receipt and bunkered coal indicated in the report.

CPRI reply:

1) PSPCL has agreed that the actual drop in GCV is almost matching with drop envisaged in CPRI in its report after accounting for surface moisture. Further PSPCL has stated that actual drop in GCV is in order as per calculations.

2) CPRI has clearly brought out the non inclusion of surface moisture in measurement of GCV by collieries in the executive summary, main text and conclusions. The remedial measures for this issue are also suggested.

3) Considering (1) & (2), the report is based on facts and is not misleading. In fact we consider the study as one of the pioneering and path breaking efforts in fuel management in country and when implemented it will give long range benefits and relief to utilities in coal procurement.

5. Decision of the Commission:

The final Fuel Audit report of CPRI submitted vide its letter dated 14.8.2012, objections received from PSPCL and their reply by CPRI were discussed in the meeting of the Commission on 26.9.2012. The Commission holds that the objections filed by PSPCL have been adequately replied by CPRI as brought out above and therefore the Commission accepts the Fuel Audit carried out by CPRI as per its final Fuel Audit report (Annexure-A) and its replies to objection of PSPCL (para 4 above). Accordingly, the Commission directs PSPCL as under:

(a) To implement the various recommendations made in the CPRI report for fuel savings and cost reduction.

(b) To take up with appropriate authorities (MOP & Coal India Limited) regarding inclusion of surface moisture in computation of GCV (which at present is being computed on equilibrated basis which considers only inherent moisture) at the sending end. Put efforts to get the payment for coal received from CIL made, on 'As Received' basis at its thermal plants.

(c) To adopt a uniform method of GCV measurement for receipted and bunkered coal by adding the effect of surface moisture to the GCV at the rate of 145 kCal/kg per 1% of moisture.

(d) To bring down the drop in GCV between the receipted coal and bunkered coal within 150 kCal/kg.

(e) To conduct an independent third party validation of the washery energetics to map the yield as a function of the input raw coal quality and washed coal quality is required to be got carried out.

(f) To work out the monthly weighted average GCV of receipted coal (at the thermal plants) and bunkered coal and furnish the same quarterly and at the time of filing the ARR and Tariff Petition with the Commission.

In addition to the above, in the interest of consumers, PSPCL is directed to get the audit of its captive mine at Pachhara managed by PANEM carried out through a joint audit group of Fuel Research Institute Dhanbad and CAG to ascertain the quantum of coal extracted and coal supplied to PSPCL thermal plants till date & continue the mine audit annually and submit report to the Commission.

Sd/-
(Gurinderjit Singh)
Member

Sd/-
(Virinder Singh)
Member

Sd/-
(Romila Dubey)
Chairperson

Chandigarh.
Dated 08.10.2012

[DA/Fuel Audit Report of CPRI](#)
[\(Annexure-A\)](#)