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ITC Limited

11th May 2007

UNFCCC Secretariat
Martin-Luther-King-Strasse 8
D-53153 Bonn
Germany

Att: CDM Executive Board

Re: Response to request for review "Efficient use of Industrial Biomass Residue for Thermal Generation at ITC PSPD, Bhadrachalam, India" (0890)

Dear Members of the CDM Executive Board,

We refer to the requests for review raised by three Board members concerning project's request for registration of the Efficient use of Industrial Biomass Residue for Thermal Generation at ITC PSPD, Bhadrachalam, India" (0890) and would like to provide an initial response to these requests for review herewith in the next section of this mail.

Reasons for Request:
1. The DOE failed to complete tasks aimed at validation while undergoing steps 0, 2 and 3 of the "additionality tool."

1.a Project activity 0890 is a prompt start project. It is thus necessary to demonstrate that consideration of CDM was made at the project outset. Although the DOE validation report states that this was verified (pg. 6), specific information given on pg. A-20 of the validation report suggests otherwise, indicating that the information provided by the PPs to the DOE was merely the documentation of a 2002 purchase order of a new soda recovery boiler, without any explicit reference to CDM consideration whatsoever.

Response: -
We have taken this up with the DoE, who have accepted that we had submitted the relevant documents at the time of validation to show that we had considered potential CDM benefits for the project before investment decision was taken. We understand that the DoE will amend their validation report accordingly. Copies of the relevant documents listed below that were submitted to DoE, are attached herewith as ***Annexure #1***.

1. Minutes of the meeting of Project Committee of the Board of Directors dated 18th January 2001, minutes the reference on the justification note considered for placement of order for Soda Recovery Boiler, the risk to the project implementation and CDM benefits to the project.

2. Further, CDM benefits to the project have also been highlighted by the project consultant in the Rapid Environmental Impact Assessment report submitted to the Project Committee of the Board of Directors, at its meeting held on 24th March 2001.

1.b Despite a statement of the DOE that IRR computations in step 2 (financial barriers) were verified, details within the excel spreadsheet attached to the PDD, show that the IRR calculations might be possibly incomplete. In the PPs computations validated by the DOE, the only positive cash flow amounts considered arise from reduced use of coal in the project cogeneration facility. However, it is noted here that additional positive cash flow from the project activity would likely include savings from increased recycling of chemicals for pulp processing (made possible by the project's more efficient soda recovery boiler), as well as savings from reduced grid electricity imports. Hence it appears that financial barriers were not sufficiently checked by the DOE.

Response

Estimation of revenue from increased recycling of chemicals

The soda recovery boiler (SRB) is mainly used to burn the organic contents in the waste black liquor solids and thus produce steam as by-product and recover the inorganic contents as recovered chemical and thus contributes to marginal incremental recycling of one of the chemicals used in white liquor, i.e. Sodium Sulphate (Na_2SO4). The other chemical used in white liquor is Caustic Soda. The overall incremental recycling of chemicals to the extent of 2% as mentioned in the PDD occurs at various stages of pulp processing as stated below: -

Stage - 1 Two stage oxygen de-lignification process wherein black liquor of higher concentration is recovered.

Stage – 2 The black liquor is subjected to evaporation to produce high solid contents

Stage – 3 And soda recovery boiler wherein only marginal incremental recycling of Na2SO4.

And thus the overall chemical recovery cannot be solely attributable to SRB. The calculations in ***Annexure #2*** provide estimate of reduction in Na_2SO4 quantity and thus savings in terms of monetary benefits. These savings are now included as additional cash-flow in the revised IRR calculation in ***Annexure #3***. It may be noted that the inclusion of chemical savings impacts the IRR only marginally and hence was not considered in the original calculation.

Estimation of revenue from reduction of grid drawl

As stated in Section "A.2, Description of the project activity", of the PDD "The improvement in efficiency of steam generation has led to generation of additional steam and thereby additional electricity and avoids usage of fossil fuel, i.e. coal at the coal fired boilers (CFBs) to generate equivalent amount of steam, located in adjacent to the project site." There is surplus generation capacity at the coal based cogeneration unit (a part of in-house cogeneration unit) which would be sufficient to meet any additional electricity requirements and thus the scenario of drawing power from grid does not arise therefore not included in the IRR calculation of the project.

1.c The technological barriers indicated in the PDD appear not to have been analyzed in depth in the validation report. It is claimed that substitution of two soda recovery boilers with only one boiler (though a more efficient one) increased production risk, due to possible malfunction of the latter. CDM income is claimed to be useful to reduce the financial cost of such technical risk. However, it is not clear why the old boilers (still functional in terms of remaining available lifetime, as per the PDD), could not be kept as stand-by units, to be used only in case of malfunction of the new boiler. Such an option, which is allowed by the methodology considered, might have significantly lessened financial costs due to this technological barrier, and thus the DOE should have investigated this possibility further.

Response

Decision to remove the old boilers was taken on the following consideration:

1. The technical consultant to the project had recommended dismantling the old soda recovery boilers due to Corrosion Effect that would have rendered the boiler unsafe to operate after prolong period of standby. Quote unquote from the letter of recommendation - "Soda recovery boiler is meant for firing concentrated black liquor solids. Black liquor used at ITC plant at Bhadrachalam consists of organics and inorganics around in the ratio of 37:63. Typical composition of inorganics in black liquor fired at ITC is: -

Carbon as C	w/w	: 33%
Sodium as Na	w/w	: 20%
ChlorideCl	w/w	: 02%
Hydrogen as H	w/w	: 03%
Potassium as K	w/w	: 07%
Silica as SiO2	w/w	: 0.3%
Sulphur as S	w/w	: 3.5%
Calorific value	cal/gram	: 3000

Practices are available to protect the boiler against internal corrosion. However in case of chemical recovery boiler external corrosion or fire side corrosion is significant due to composition of black liquor. The water side corrosion of a chemical recovery boiler can be minimised by conserving the boiler by using anti corrosive chemicals. As the new SRB is able to be run continuously for four to five months, long outage of the old boilers will result in considerable corrosion of the fire side. Further the auxiliaries of the boiler like electrostatic precipitator, combustion fans, flue gas fans and the ducting and the casing of the boiler too will be subjected to corrosion. Furthermore, as heavy soot formation is formed over the entire boiler system starting from the furnace, to evaporator tubes, super heater tubes and to the economiser bundle and the degree of soot formation increases along the boiler path. On stopping the boiler, the traces of elements present in the soot over the boiler tubes create corrosive environment. Sulphur combines with moisture to form sulphuric acid and sodium combines with chloride to form salts creating corrosion over the tubes. Presence of potassium in the flue gas reduces the fusion temperature of the flue gas, which forms hard soot over the super heater tubes creating pitting corrosion underneath the soot. Corrosion leads to high chances of pressure parts failure during operation and also may lead to un-safe operations."

Please refer ***Annexure #4*** for the confirmation letter from the Project Consultant wherein they confirm their recommendation.

2. Further, the option of retaining the old boilers was not found to be a feasible option in view of the recommendation of The Black Liquor Recovery Boiler Advisory Committee (BLRBAC), USA, (Recommended Good Practice Safe Firing Of Black Liquor In Black Liquor Recovery Boilers) which requires extensive, time consuming and expensive procedures to be followed prior to re-start of the SRB boilers.

3. It should be noted that due to space constrains at the project site, as the mill is undergoing continuous up-gradation and expansion, the space wherein the old boilers were installed, had to be cleared for upcoming mill expansion works. The mill has undergone expansion seven times higher than its initial capacity since start-up in 1979. There are current projects underway at the site which would further increase the present capacity by 30%.

2.Among seventeen possible scenarios, available within ACM0006vs4, it appears that 0890 chose an incorrect one, i.e., scenario 14, "energy efficiency projects". As a result, most sections of the PDD would need to be re-written. Specifically, it is noted that project activity 0890 involves the substitution (and not the retrofitting, as claimed) of a biomass-fired cogeneration unit (and not a plant) with a new unit, consisting of a biomass fired boiler of higher capacity. Furthermore, it is noted that the biomass-fired units are operating within an overall cogeneration plant –located at the premises of the paper mill that includes generation of steam and power from both fossil fuel and biomass residue units. As such, scenario 14 cannot be correctly applied to 0890, because scenario 14: a) does not allow for a baseline scenario where fossil fuels provide for the amounts of heat and power displaced by the project activity; and b) involves upgrades of entire power plants, rather than of its sub-units.

Response

We have proposed the use of methodology ACM0006 for the proposed project activity and are happy to note that the above comment concurs that it is the appropriate methodology for the proposed project activity.

Regarding the issue of use of Scenario 14 being in error on account of three instances as noted in the comment above, namely, (a) substitution (and not retrofit), (b) unit (and not a plant) and (c) existing steam and power generation from both fossil fuel and biomass residue units, which are not allowed under Scenario 14.

We would like to respond to the query as follows:
(a) The scenario 14 of the methodology AC0006 version 04, includes "**retrofit**" projects. The term retrofit as defined by "Chambers concise 20th century dictionary" is "**to modify some time after construction by incorporating or substituting more up-to-date *parts* etc**". The SRB project, a ***part*** of the cogeneration system, is of retrofit nature and therefore covered under the definition scenario 14.

(b) The text of the methodology refers to the project activity involves "retrofit or replacement" of the "existing biomass residue fired power plant". Based on the above-mentioned meaning of "retrofit", the proposed project activity involves "retrofitting" of the existing biomass residue fired power "plant".

(c) We have considered the Scenario 14 because it includes "energy efficiency projects at biomass fired power plant" which is also the "primary objective of our proposed project activity". While calculating the emission reduction of the project, we have applied the equations as provided in the methodology for the projects applying Scenario 14.

Base on the above we would like to submit that the scenario 14 was chosen as it best fitted the project concept. The SRB project has achieved significant carbon-dioxide emission reductions which are real, measurable and attributable to the project activity and have been arrived at in a transparent and conservative manner. Since there is sufficient "in-house" capacity to generate steam and power, the emission reduction calculation has been based on actual savings of emission at the project site.

We shall be pleased to provide any further details and clarifications if required.

We look forward to an early registration of the project.

Thanking you,
Yours' sincerely,

Pradeep ~~Dhobale~~
Divisional Chief Executive

ANNEXURE-1

EXTRACT FROM THE MINUTES OF THE MEETING OF THE PROJECT REVIEW COMMITTEE OF THE BOARD OF DIRECTORS OF ITC BHADRACHALAM PAPERBOARDS LIMITED HELD ON 18TH JANUARY, 2001

PROJECT FOR MODERNISATION AND UPGRADATION OF THE PULP MILL

a) Procurement of Chemical Recovery Boiler (625 tons solids per day)

Sri S.K.Singh, Resident Director (Bhadrachalam Operations) apprised the Committee of a justification note, circulated to the Members, regarding the proposal for placement of an order on Andritz Ahlstrom Corporation, Finland for a Chemical Recovery Boiler (625 tons solids per day), at a total cost of Rs.31 crores.

He stated that a bid enquiry was sent to the following short-listed vendors, for i) supply of Chemical Recovery Boiler with Electrostatic Precipitator and auxiliaries, ii) supervisory services for erection, start-up and commissioning; and iii) demonstration of guaranteed performance of the system:

i. ABB Alstrom Power (India) Ltd., New Delhi
ii. Bharat Heavy Electricals Limited, New Delhi
iii. Babcock Industrial Boilers GmbH, Germany
iv. Andritz Ahlstrom Corporation, Finland
v. Elof Hansson (India) Ltd., Chennai
vi. Kvaerner Chemtec AB, Sweden
vii. Mitsubishi Corporation, Chennai
viii. JAL-Energy Service Inc., Finland

In response to the above, two parties submitted their offers viz., Bharat Heavy Electricals Limited (BHEL) and Andritz Ahlstrom Corporation (AHLSTROM). AHLSTROM submitted its commercial offer and submitted the technical offer through its Joint Venture Company in India viz. Enmas Ahlstrom, Chennai. The other parties had not quoted as they had no indigenous manufacturing facility and hence concluded that they would not be competitive vis-à-vis BHEL and Ahlstrom/Enmas.

After preliminary technical evaluation and after obtaining clarifications, technical and commercial evaluation of the offers were made. Sri Singh apprised the Committee of the details of technical evaluation and stated that commercial comparison of the two offers was as under:

Rs.in lakhs

	BHEL		AHLSTROM		
	Initial qouted price	Final price offered after negotiations	Initial qouted price	Final price offered after negotiations	Final agreed price
Supply	2895.00	2415.00	2772.00	2497.00	2356.00
Duties and taxes	526.00	477.00	503.00	401.00	387.50
Freight	61.00	70.00	47.00	included	
Erection and Commissioning	318.00	268.00	357.00	255.00	250.00

Works Contract Tax	8.75	8.00	10.00	7.00	6.50
Total	3808.75	3238.00	3689.00	3160.00	3000.00
Bonus for completion in 16 months					+100.00

Technical and commercial discussions were held by the Company with BHEL and AHLSTROM during 08.01.2001 to 11.01.2001. Whereas technical discussion was held at the Company's mill, in which a technical team from the mill took part, commercial discussion was held at Secunderabad in which following were present:

Sri P.Dhobale	Managing Director
Sri P.K.Talwar	Director-Finance
Sri S.K.Singh	Resident Director (Bhadrachalam Operations)
Sri K.T.R.Nambiar	Vice President (Finance & Accounts)
Sri A.V.Rao	Deputy General Manager (Projects)

Sri Singh stated that the boiler offered by BHEL had higher operating cost per ton of steam generation compared to the one offered by AHLSTROM, which required a capital cost loading of Rs.450 lakhs to the BHEL offer price.

After negotiation, both the parties submitted their revised and final offer as under:

i) BHEL- erected and commissioned cost of Rs.3238 lakhs (without considering the higher operating cost loading on the capital cost) with a commissioning period of 16 months from first advance receipt date (zero date), and with a grace period of 1 month for imposition of Liquidated Damages(LD); and

ii) AHLSTROM-erected and commissioned cost of Rs.3100 lakhs with a commissioning period of 16 months from first advance receipt date (zero date) and with a grace period of 1 month for imposition of LD.

The Company gave its counter offer to AHLSTROM, which worked out to an erected cost of Rs.3000 lakhs, with an additional bonus of Rs.100 lakhs if the boiler was commissioned within 16 months from the zero date. Sri Singh stated that AHLSTROM agreed to this offer and sought that Committee's approval for the proposal and answered various queries raised by the Chairman of the Committee.

The Committee, after discussion, approved placement of order on AHLSTROM at a total value of Rs.30 crores, with an additional bonus of Rs.1 crore if the boiler was commissioned within 16 months from the zero date.

b) <u>Project Status</u>

Sri S.K.Singh, Resident Director (Bhadrachalam Operations) apprised the Committee of the current status of implementation of the project for modernization and upgradation of the Pulp Mill, as under:

ANNEXURE-1 (Contd)

Pulp Mill

Plant/Equipment	Offer from suppliers	Completion of evaluation	Placement of Order
Brown Stock Washing, Oxygen Delignification & Screening Equipment	Received	In progress. Technical clarifications were sought from bidders; replies expected by end-Jan,2001	Target: End-Feb,2001
Chlorine Dioxide Generation Plant	Received	-Do-	Target : Mid-Feb,2001
Oxygen Generation Plant	Received	In progress	Target: End-Mar,2001
Digesters	Few more offers yet to be received. Target: End-Jan,2001	Target-End-Feb,2001	Target: End-Mar,2001
Bleach Plant	Yet to receive offers. Target : End-Feb,2001	Target-End-Feb,2001	Target: End-Mar,2001

Chemical Recovery

Plant/Equipment	Offer from suppliers	Completion of evaluation	Placement of Order
Evaporator Plant	Offers yet to be received Target : 15th Feb, 2001	Target : End-Feb,2001	Target Mid-Mar,2001
Chemical Recovery Boiler	Received	Completed	Ready
Retrofit of existing Recuasticising Plant	Received	In progress	Target End-Mar,2001
Lime Mud Reburning Kiln	Received	In progress	Target End-Mar,2001

Detailed engineering for the Chemical Recovery Boiler would take place in March, 2001.

Review of Project Report by Jaakko Poyry

Sri Singh recalled the discussion at the last Meeting whereat the Committee was apprised that Jaakko Poyry (JP), the Consultants was engaged for vetting the feasibility report of SPB Projects & Consultancy Limited (SPB-PC). He stated that JP, after studying SPB-PC's report, submitted their report. The Company's/SPB-PC's comments on the report were forwarded to JP. Final report from JP was expected shortly. Sri Singh stated that JP had not suggested any major concept changes. However, their suggestions on layout for future expansion, had been taken into consideration.

Overseas visit

A team from the Company visited large pulp and paper mills in Indonesia and Thailand, mainly, to observe the performance of Chlorine Dioxide plant supplied by Chemetics, Canada and Cellchem, Sweden.

Environmental clearance

Rapid Environmental Impact Assessment (REIA) study by SPB-PC and Vimta Labs was progressing as per the schedule and field study would be completed by end-January,

2001; report from SPB-PC would be ready by end-February, 2001. Application for environmental clearance would be submitted to the Ministry of Environment and Forests in March, 2001 and clearance from the Ministry was expected by mid-April, 2001.

Chemical Recovery Boiler (625 tons solids per day)

Sri Singh stated that following approval by the Company, order would be placed on Andritz Ahlstrom Corporation, Finland for 625 tons solids per day Recovery Boiler. An initialising Meeting with the supplier had been planned on 24th and 25th January, 2001 at SPB-PC's office at Chennai.

Engineering Standards for Project Implementation

The Company would discuss the Engineering Standards prepared for civil, electrical, mechanical and instrumentation, with SPB-PC on 22nd and 23rd January, 2001.

Sri Singh answered various queries raised by the Chairman of the Committee.

The Committee, after discussion, took note of the status of the project execution.

V.Radhakrishnan
Deputy Company Secretary

Annexure-I (Contd)

PULP MILL PROJECT

JUSTIFICATION FOR ORDERING
625 TONS SOLIDS PER DAY RECOVERY BOILER.

A Bid Enquiry inviting Bids for supply of one (1) Chemical Recovery Boiler with Electrostatic Precipitator and Auxiliaries, Supervisory Services for Erection Start-up and Commissioning; and demonstration of Guaranteed Performance of the system; was sent to the following short-listed vendors:

1.	ABB Alstom Power (India) Ltd, New Delhi	(ABB ALSTOM)
2.	Bharat Heavy Electricals Limited, New Delhi	(BHEL)
3.	Babcock Industrial Boilers GmbH, Germany	(BABCOCK)
4.	Andritz Ahlstrom Corporation, Finland	(AHLSTROM)
5.	Elof Hansson (India) Ltd	(ELOF HANSSON)
6.	Kvaerner Chemtec AB, Sweden	
7.	Mitsubishi Corporation, Chennai	(MITSUBISHI)
8.	JAL- Energy Service Inc., Finland	(JAL–ENERGY)

In response to the Bid Enquiry, we received two (2) offers, from BHEL and AHLSTROM. AHLSTROM has submitted the commercial offer and submitted the technical offer through Enmas Ahlstrom, Chennai, which is its Indian Joint Venture Company. The other parties have replied expressing their inability to offer the boiler in view of the competition from indian bidders.
After a preliminary technical evaluation and subsequent clarifications from the above two parties, the technical and commercial comparison statements have been prepared, as per the enclosures.

Subsequently technical and commercial discussions have been held with each party from 8-01-2001 to 11-01-2001. The technical discussions were held at mill with mill technical team. The commercial discussions were held at H.O. and following members from ITC BPL were present during the discussions.

Mr.Pradeep Dhobale	M.D.
Mr.P.K Talwar	DIR(Fin)
Mr. Sanjay Singh	R.D.
Mr.K.T.R Nambiar	V.P.(Fin)
Mr.A.V.Rao	Dy.G.M. (Prj)

ANNEXURE-1 (Contd)

Boiler offered by BHEL has higher operating cost per ton of steam generation compared to the boiler offered by ANDRITZ AHLSTROM, which works out to a capital cost loading of Rs. 450 lacs on the BHEL offer price. (as detailed in enclosure)

After various negotiations both the parties have offered their last price, below which they are prepared to lose the order.

The last BHEL offer price works out to an erected and commissioned cost of Rs.3238 lacs (without considering the higher operating cost loading on the capital) with a commissioning period of 16 months from first advance receipt date (ZERO DATE), with a grace period of 1 month for imposition of LD.

The last ANDRITZ AHLSTROM offer price works out to an erected and commissioned cost of Rs. 3100 lacs with a commissioning period of 16 months from first advance receipt date (ZERO DATE) and with a grace period of 1 month for imposition of LD.

ANDRITZ AHLSTROM has been offered by ITC BPL a price which works out to an erected cost of Rs.3000 lacs, with an additional bonus of Rs 100 lacs if the boiler is commissioned within 16 months from zero date.

ANDRITZ AHLSTROM agreed to this offer and it has been decided to release the order on ANDRITZ AHLSTROM CORPORATION subject to clearance by the Project Committee of the Board.

S.K. SINGH RESIDENT DIRECTOR	P.K. TALWAR DIRECTOR-FINANCE	15/1/2001 PRADEEP DHOBALE MANAGING DIRECTOR

ANNEXURE-1 (Contd)

13.01.2001

Enclosures for JUSTIFICATION for SRB and evaluation of technical parameters

1 EVALUATION OF TECHNICAL PARAMETERS

1.1 Comparative Merits

Description	BHEL	AHLSTROM
Technology and latest know how - clean	-	Better
Boiler design	-	Better
Combustion system design	-	Better
ESP design (both are BHEL ESP)	Equal	Equal
Higher steam generation	-	Better
Lower power consumption	-	Better
Quality of bought-out components	-	Better
Quality of supply (fabricated components)	Better	-
Delivery period	Equal	Equal
*Organizational capability (specific to chemical recovery boilers) - subject to technological risks	Equal	Equal

1.2 Operating Cost Impact on Capital Cost

Cost loading for lower steam generation and higher power consumption is worked out and is presented below

Description	Unit	BHEL	ENMAS
Net steam generation	tph	67.52	71
Shortage of steam w.r.t maximum	tph	3.53	0
Unit cost of steam	Rs/t	330	330
Operating days	Days	340	340
Price loading for (1) year due to less steam generation	Rs. lacs	95.06	0
Price loading for twelve (12) years due to less steam generation	Rs. lacs	437.46	0
Power consumption per hour	KWH	960	940
Power consumption per annum	MWH	7603	7445

*The SRB boilers deploys the latest technology which is for the first time in India and therefore new to our business. The steam generation efficiency of the new boiler is superior to the existing

boilers and designed to efficiently combust the high concentration black liquor solids. However there are inherent technological and vendor support risk associated with this project. It may also be noted that it would not be possible to revert to the old boilers since they will be dismantled and scrapped.

Furthermore, it may be noted that since the steam efficiency of this technology would lead to coal savings and thus CO2 savings from coal combustion, the project can be structured as clean development mechanism under the Kyoto Protocol. The benefits from sale of carbon credits if realised would yield substantial economic benefits and mitigate economic risk.

ENCLOSURE FOR JUSTIFICATION FOR ORDERING SRB

2.0 Commercial Comparison for SRB

in Rs. Lacs

BHEL	Initial Quoted Price	Final Price Offered after negotiations	Final agreed Price
Supply	2895	2415	
Duties & Taxes	526	477	
Freight	61	70	
Erection & commissioning	318	268	
Works Contract tax	8.75	8	
Total	3809	3238	
ANDRITZ AHLSTROM			
Supply	2772	2497	2356
Duties & Taxes	503	401	387.5
Freight	47	included	
Erection & commissioning	357	255	250
Works Contract tax	10	7	6.5
Total	3689	3160	3000
	Bonus for completion in 16 months		100

1 US $ = Rs.46.61
1 EURO = Rs.43.93
(as on 10-01-2001)

A. V. Rao
DGM (Projects)

ANNEXURE-1 (Contd)

EXTRACT FROM THE MINUTES OF THE MEETING OF THE PROJECT REVIEW COMMITTEE OF THE BOARD OF DIRECTORS OF ITC BHADRACHALAM PAPERBOARDS LIMITED HELD ON 24TH MARCH, 2001.

Project Status

Sri A. V. Rao, Deputy General Manager (Projects) appraised the Committee of the current status of implementation of the project for modernization and upgradation of the Pulp Mill, as under:

Pulp Mill

Plant/Equipment	Offer from suppliers	Completion of evaluation	Placement of order
Brown Stock Washing, Oxygen Delignification and Screening Equipment	Received	Completed	Vendor selected
Chlorine Dioxide Generation Plant	Received	Completed	Ordered on Sterling Chemicals
Oxygen Generation Plant	Received	In progress	Target : End April 2001
Digesters	Received	In progress	Target : End April 2001
Bleach Plant	Received	Completed	Vendor selected

Chemical Recovery:

Plant/Equipment	Offer from suppliers	Completion of evaluation	Placement of order
Evaporator Plant	Received	Completed	Vendor selected
Chemical Recovery Boiler	Received	Completed	Ordered on Andritz Ahlstrom
Retrofit of existing Recausticising Plant	Received	In progress	Target : End April 2001
Lime Mud Reburning Kiln	Received	In progress	Target : End April 2001

Environmental Clearance:

Rapid Environmental Impact Assessment (REIA) study by SPB Projects & Consultancy Limited (SPB-PC) was completed. The final report received from them was under scrutiny. Application for environmental clearance would be submitted to the Ministry of Environment and Forests by end-March, 2001

1,00,000 tpa Capacity Fibre Line

Sri Rao stated that following approval by the Committee, order would be placed on Valmet Fibretech AB, Sweden for 1,00,000 tpa capacity Fibre Line.

ANNEXURE - 1 (Contd)

Black Liquor Evaporation Plant

Sri Rao stated that following approval by the Committee, order would be placed on Alfa Laval (India) Limited, Pune for Black Liquor Evaporation Plant.

Project Outlay	Rs.crores
Projected outlay	227.00
Projected installed value	200.00
Total value of orders released	47.89

Sri Rao answered various queries raised by the Chairman of the Committee.

The Committee, after discussion, took note of the status of the project execution.

V.Radhakrishnan
Deputy Company Secretary

The emission rates have been calculated on the basis of emissions monitored at the existing plant.

Control of Pollutants

Electrostatic precipitators are provided in Coal Fired Boilers CFB #4 and #5 and CFB #1 and #2 are provided with mechanical dust collectors. CFBs #1 and #2 will not be used in the post modernisation-cum-expansion scenario and will be discontinued. Similarly, the stack attached to CFB#3 will be provided with Electrostatic Precipitator during the modernisation-cum-expansion scheme to reduce the dust emissions.

SPM emissions from the stack are well within the limits of 115 mg/Nm^3 specified by APPCB. Adequate stack height has been provided for SO_2 dispersion into the atmosphere.

2.10.2.2 Emission from Chemical Recovery Boiler

Characterisation of Emissions

The air pollutants in the flue gases resulting from black liquor combustion will be suspended particulate matter, sulphur dioxide and traces of nitrogen oxide. The black liquor consists of lignin dissolved out from the cellulose in the pulp and the spent cooking chemicals. The details of stack emissions are given in the following table.

TABLE 2.12
DETAILS OF STACKS AT SODA RECOVERY BOILERS
(EXISTING/PROPOSED)
(At full load operation and with Electro static precipitator)

S No.	Parameters	Stack #1 (SRB #1)	Stack #2 (SRB #2)	Stack #3 (Proposed) (SRB #3)
1.	Stack Height (m)	61.0	70.0	70.0
2.	Diameter (m)	2.13	1.2	2.6
3.	Flue gas Velocity (m/s)	15.7	20.2	9.1
4.	Flue gas Temperature (°C)	139	128	170
5.	BL solids firing rate (tph)	8.3	6.25	26.0
6.	Emission Rate (g/s)			
	SO_2 (g/s)	1.69	0.81	4.14
	SPM (g/s)	3.84	1.56	3.73

The emission rates for SRB #1 & 2 are based on monitored values, while the emissions rates for SRB #3 (new boiler stack) are based on designed parameters.

ANNEXURE - 1 (Contd)

The recovery boilers SRB #1 and #2 will be dismantle and only the new recovery boiler (SRB #3) with new Electrostatic precipitator will be operated continuously after the proposed modernisation-cum-expansion scheme. The new recovery boiler will also produce extra steam which will lead to coal savings at Coal Fired Boilers. The CO2 savings from coal can be claimed as incentive under clean development mechanism of Kyoto Protocol.

Control of Pollutants

Electrostatic precipitators are provided in all the three chemical recovery boilers. SRBs #1 and #2 will not be used in the post modernisation-cum-expansion scenario and will be shut.

SPM emissions from the stack at recovery boiler are well within the limits of 115 mg/Nm^3 specified by APPCB. Adequate stack height has been provided to each boiler as per the statutory requirements for wider dispersion of pollutants.

2.10.2.3 *Emission from Rotary Lime Kiln*

Characterisation of Emissions

The air pollutants in the flue gases resulting from furnace oil combustion will be suspended particulate matter, sulphur dioxide and traces of nitrogen oxide. Furnace oil with 4.5% of sulphur will be used but the sulphur dioxide emission levels shall be less due to the reaction with calcium oxide available at a purity of 76%. A reduction of 50% in SO_2 emission level is anticipated. The details of stack emissions are given in the following table.

TABLE 2.13
DETAILS OF PROPOSED STACK AT NEW LIME KILN
(At full load operation and with Electrostatic precipitator)

S No.	Parameters	Lime Kiln Stack
1	Stack Height (m)	54.0
2	Diameter (m)	0.93
3	Flue gas Velocity (m/s)	15.83
4	Flue gas Temperature (°C)	170
5	Rate of Furnace oil burning (tph)	0.935
6	Emission rate	
	SO_2 (g/s)	13.88
	SPM (g/s)	1.08

The emission rates for lime kiln (new stack) is based on design parameters.

Annexure # 2

Efficient use of industrial biomass residue for thermal energy generation at ITC PSPD, Bhadrachalam, India (0890)

CHEMICAL SAVING THROUGH SRB3

	2000 -01			2003-04		
	BLS fired	Na2SO4 make up	Makeup/BLS fired	BLS fired	Na2SO4 make up	Makeup/BLS fired
	MT	Kg	kg/MT	MT	Kg	kg/MT
April		240		12495	10	0.001
May		247		15606	115	0.007
June		290		15409	150	0.010
July		211		16865	54	0.003
August		217		15900	217	0.014
September		293		15821	224	0.014
October		306		19040	348	0.018
November		282		18459	302	0.016
December		256		19843	288	0.015
January		315		19923	340	0.017
February		279		17793	261	0.015
March		253		19172	368	0.019
TOTAL	119800	3189	0.027	206326	2677	0.013

Reduction in makeup consumption	kg/MT	0.014
Reduction in makeup consumption @ 625dTPD firing	kg	8.5
Annual reduction in chemical consumption (350d/yr)	kg	2985
Annual savings @ Rs.7000/MT	Rs.	20894

Annexure # 3

IRR-Efficient use of industrial biomass residue for thermal energy generation at ITC PSPD, Bhadrachalam, India (0890)

(Reflecting IRR with and without CDM benefits	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
Cash Inflow (INR. 10 Million)											
Savings in Coal 4816 / T p.a	0	0.7	0.74	0.77	0.81	0.85	0.89	0.94	0.98	1.03	1.09
CDM Inflow (@20 USD at Rs.47.40/TCO2e for 9611 T/yr) (Rupee is expected to depreciate @ 2.5%pa.)		0.91	0.93	0.96	0.98	1.01	1.03	1.06	1.08	1.11	1.14
Savings in chemicals		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
TOTAL	0.00	1.61	1.67	1.73	1.79	1.86	1.93	2.00	2.07	2.15	2.23
Cash Outflow											
Cash Outflow- Revenue	0	0	0	0	0	0	0	0	0	0	0
Cash Outflow- Capital	4.77										
TOTAL	4.77	0	0	0	0	0	0	0	0	0	0
Net Cash flow	-4.77	1.61	1.67	1.73	1.79	1.86	1.93	2.00	2.07	2.15	2.23
Tax @ 38.5% (35%+10%)	0.00	0.62	0.64	0.61	0.63	0.65	0.67	0.70	0.72	0.75	0.78
Post Tax Cashflow (before depn.)	-4.77	0.99	1.03	1.12	1.17	1.21	1.25	1.30	1.35	1.39	1.45
Depreciation (@ 25 % WDV)		1.19	0.89	0.67	0.50	0.38	0.28	0.21	0.16	0.12	0.09
Tax Shield on Depreciation (25% of Capex on wdv*38.5% from yr 3 at 35%)	0.00	0.46	0.34	0.23	0.18	0.13	0.10	0.07	0.06	0.04	0.03
Post Tax Net Cash flow	-4.77	1.45	1.37	1.36	1.34	1.34	1.35	1.37	1.40	1.44	1.48
Post Tax Net Cash flow Cum	-4.77	-3.32	-1.95	-0.59	0.75	2.09	3.44	4.82	6.22	7.65	9.13
NPV of Post tax Net Cashflow	**Rs.1**										
(discount @ 20.0%)											
IRR post Tax net cash flows 10 years (with CDM benefits)	**26.25%**										
IRR post Tax net cash flows 10 years (without CDM benefits)	**9.02%**										
Internal Benckmark	**20.00%**										

It will be evident from the above that the contemplated CDM benefits were crucial to the investment decision

Annexure # 4

SPB-PC
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PC/1319 2007-05-12

M/s ITC Limited
Paperboards & Speciality Papers Division
Unit: Bhadrachalam
Sarapaka – 507 128
Khammam District
Andhra Pradesh

Kind Attn: Mr A V Rao
Vice President

Dear Sirs,

Sub: Stoppage of Old Chemical Recovery Boilers (CRB #1 & #2)

Chemical recovery boiler is meant for firing concentrated black liquor solids. Generally, black liquor consists of organics and inorganics in the ratio of around 35:65. Typical composition of black liquor is as below:

Description	Unit	
Carbon as C	w/w	33.9%
Sodium as Na	w/w	18.8%
Chloride Cl	w/w	1.8%
Hydrogen as H	w/w	3.4%
Oxygen	w/w	33.32
Potassium as K	w/w	5.4%
Silica as SiO2	w/w	0.38%
Sulphur as S	w/w	3.0%
Calorific value	cal/gram	3000

After the installation of the high capacity new recovery boiler at ITC-PSPD, the existing two small boilers were proposed to be taken out of service and remain shut.

Practices are available to protect the boiler against internal corrosion. However in case of chemical recovery boiler external corrosion or fire side corrosion is significant due to composition of black liquor. The water side corrosion of a chemical recovery boiler can be minimised by conserving the boiler by using anti corrosive chemicals. As the new SRB is able to be run continuously for four to five months, long outage of the old boilers will result in considerable corrosion of the fire side.

Further the auxiliaries of the boiler like electrostatic precipitator, combustion fans, flue gas fans and the ducting and the casing of the boiler too will be subjected to

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corrosion. Furthermore, as heavy soot formation is formed over the entire boiler system starting from the furnace, to evaporator tubes, super heater tubes and to the economiser bundle and the degree of soot formation increases along the boiler path. On stopping of the boiler, the traces of elements present in the soot over the boiler tubes create corrosive environment. Sulphur combines with moisture to form suplhuric acid and sodium combines with chloride to form salts creating corrosion over the tubes. Presence of potassium in the flue gas reduces the fusion temperature of the flue gas, which forms hard soot over the super heater tubes creating pitting corrosion underneath the soot. Corrosion leads to high chances of pressure parts failure during operation and also may lead to un-safe operations.

To avoid this, it was not recommended to retain the two (2) old chemical recovery boilers as stand by boilers after the installation of new single recovery boiler at ITC-PSPD.

The above concept was considered by us while preparing the project report.

Thanking you,

Yours faithfully
for SPB PROJECTS AND CONSULTANCY LIMITED

U G BHAT
DIRECTOR (Projects)