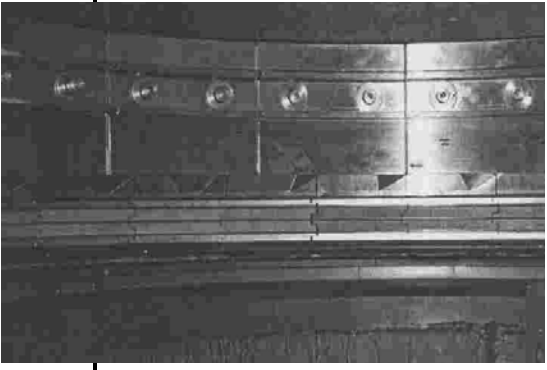



Energy Conservation Measure implemented in 2006-2007

Annexure B

(To be filled up separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of the measure Fuel consumption reduction with implementation of Honeycomb shrouds	Sector : General				
Year to be filled by BEE		Technology :				
Description of the energy conservation measure						
<p>We have 2 nos. of Frame -3 Gas Turbines (G.T), being used as driving source for Lean Gas Compressor (LGC). These turbines are running continuously & are having no standby unit. Tripping of any Turbine leads to Plant shut down & hence Production Losses. OEM has recommended for major inspection at every 40000 to 48000 machine running hours. However recommended running of honeycomb shrouds is 96000 hrs.</p> <p>Honey comb shrouds are one of the critical hot gas path component meant to restrict the leak of hot gas between 2nd stage buckets (moving part) & 2nd stage shrouds (stationary part) by maintaining minimum clearances, which in turn causes more flow of gas to LGC, which in turn increases machine efficiency.</p> <p>Original shrouds are Labyrinth type, which will cost around 15 Lakhs, were replaced with Honeycomb shrouds, whose cost is about 20 Lakhs. 5 Lakhs extra investment saved energy as mentioned below.</p>						
<p>Calculation of Energy consumption: Flow of gas to a single G.T in a year = 2900 m³ / hr * 24 * 355 = 2,47,08,000 m³ (10 days are excluded because of shut down)</p> <p>Cost of Gas flow in a year (in Rs.) = 2,47,08,000 m³ * 10 = 24,70,80,000 Rs.</p> <p>Since, (If cal value of Gas is 10,000 kCal / m³, then it will cost 10 Rs/m³)</p> <p>Efficiency increase & Energy Savings = 0.4 % (as based on actual readings)</p> <p>Therefore, Annual Savings = 24,708,000 * 0.004 = 9,88,32 m³ / annum & 9,88,320Rs/annum.</p> <p>Cumulative Saving = 9,88,320 * 11 = Rs. 1,08,71,520 (as machine life has increased by 11 more years), which is substantial over the difference obtained</p>						
Picture/sketch/drawing before modification (if available)			Picture/sketch/drawing after modification (if available)			
						
Agency that executed the project (with complete address and email):						
Total Investment, Rs. Nil		Year of implementation : 2006 - 2007				
First year energy cost savings, Rs. 9.88 Lacs.						
First year other savings, Rs. Nil						
On annual basis		KWh 000	Coal(Tons)	Gas(Nm3)	Oil(KL)	Other
Energy consumption before				24708000 m3		
Energy consumption after				23719680.m3		
Energy tariff, Rs/Kwh/Ton/Nm3/KL...				Rs. 10871520		
Company complete address : GAIL(INDIA)LTD. GAIL COMPLEX VIJAIPUR-473112 DIST.GUNA M.P. Tel.No.07544-274444				We authorise Bureau to use this information for dissemination		
Contact person who could be contacted for more information: Mr.S.C.Sharma , C.M(M) , GAIL Com[plex Vijaipur				Signature		
				Date		

NOTE :Please submit this sheet separately for each Energy Conservation Measure Implemented in 2006-2007

Legend:

GT : Gas Turbine

OEM : Operating Equipment manufacturer

LGC: Lean gas Compressor

Energy Conservation Measure implemented in 2006-2007
(To be filled up separately for each Energy Conservation Measure)

Annexure B

ID to be filled by BEE	Title of the measure Reduction in Contract demand of 132 kV supply from 5500 kVA to 3500 kVA	Sector : General																											
Year to be filled by BEE		Technology : Conventional																											
Description of the energy conservation measure																													
<p>Earlier, Vijaipur Complex has Contract Demand of 5500 KVA from 132KV supply of MPSEB, which has been reduced to 3500 kVA in pursuit of excellence in energy conservation and enhancement of plant gas processing capacity. The main reasons were:</p> <p>(i) Installation of two nos of Light End Fractionate (LEF) compressors driven by gas turbine of 3 MW each (i.e. total of 6 MW capacity) in year 2000, which has increased gas processing capacity of our plant by 2MMSCMD and made 4 nos of RG compressors driven by electrical motors each of 665 kW each redundant. Subsequently these motors were shifted to our other LPG plant at Gandhar, Gujarat.</p> <p>(ii) Another electrical load of 275 kW was disconnected as Butane blending plant has become redundant due to change in market scenario in the country.</p> <p>So in totality there is a reduction of 2935 kW of continuous running electrical load. We have further installed three numbers of gas turbine driven compressors for RLNG gas. Auxiliary load of these 5 nos of additional gas turbine is approximately 500KW. So there is a net reduction in load of approx 2435 kW. We also have captive power plant of 2 X 2.7 MW out of which one is running and all the critical and turbine auxiliary load are connect with our captive plant. The average demand registered for the year 2005-06 is only 3378.81KVA. In most of the month MD registered is only approx 3000KVA. Graph of MD registered between June-05 to April-06 is given below for reference. Furthermore due to change in billing pattern now MD is charged on full contract demand in place of 75% of CD.</p>																													
Picture/sketch/drawing before modification			Picture/sketch/drawing after modification																										
<p>Graph shows trend of max Demand , which compelled to brought down it by 2000kW, from 5500 kW to 3500 kW</p>																													
<table border="1"> <thead> <tr> <th>Month</th> <th>Max Demand Registered</th> </tr> </thead> <tbody> <tr><td>Jun-05</td><td>3700</td></tr> <tr><td>Jul-05</td><td>3900</td></tr> <tr><td>Aug-05</td><td>3000</td></tr> <tr><td>Sep-05</td><td>2900</td></tr> <tr><td>Oct-05</td><td>2900</td></tr> <tr><td>Nov-05</td><td>2700</td></tr> <tr><td>Dec-05</td><td>3900</td></tr> <tr><td>Jan-06</td><td>3483</td></tr> <tr><td>Feb-06</td><td>3167</td></tr> <tr><td>Mar-06</td><td>4317</td></tr> <tr><td>Apr-06</td><td>3200</td></tr> </tbody> </table>						Month	Max Demand Registered	Jun-05	3700	Jul-05	3900	Aug-05	3000	Sep-05	2900	Oct-05	2900	Nov-05	2700	Dec-05	3900	Jan-06	3483	Feb-06	3167	Mar-06	4317	Apr-06	3200
Month	Max Demand Registered																												
Jun-05	3700																												
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Jan-06	3483																												
Feb-06	3167																												
Mar-06	4317																												
Apr-06	3200																												
Agency that executed the project (with complete address and email):																													
Total Investment, Rs. Nil		Year of implementation : 2006 - 2007																											
First year energy cost savings, Rs.																													
First year other savings, Rs. Nil																													
On annual basis		KWh 000	Coal(Tons)	Gas(Nm3)	Oil(KL)																								
Energy consumption before		0																											
Energy consumption after																													
Energy tariff, Rs/Kwh/Ton/Nm3/KL...					76 Lakhs																								
Company complete address : GAIL(INDIA)LTD. GAIL COMPLEX VIJAIPUR-473112 DIST.GUNA M.P. Tel.No.07544-274444			We authorise Bureau to use this information for dissemination																										
Contact person who could be contacted for more information : Mr.Mukesh.Kumar Tiwari Sr. Mgr(Elect)			Signature																										
			Date																										

NOTE :Please submit this sheet separately for each Energy Conservation Measure Implemented in 2006-2007

Energy Conservation Measure implemented in 2006-2007

Annexure B

(To be filled up seperately for each Energy Conservation Measure)

ID to be filled by BEE	Title of the measure Fuel consumption by using non metallic wearing rings in cooling water pump	Sector : General
Year to be filled by BEE		Technology Conventional
Description of the energy conservation measure		
Cooling Water pump-C was suffered from heavy seal leakage & large clearances (beyond 10 mm dia), which has resulted in Gas losses. Oppurtunity maintenance was taken to rectify leak & modify wear ring. Upon opening of seal , both the side seal faces were found cracked & accordingly seals were replaced with newer one, & in house modification was carried out by by fixing additional spacer wear ring inside the original CI. Also, clearances were kept @ 0.15 mm dia & 0.2 mm dia, on both DE & NDE side respectively, by machining of rider band of RG compressor (graphite coated teflon material) to come upto required dimension of of ID & OD of wear ring. Trial run taken & found Okay with improvement of 130 m3/hr .		
Picture/sketch/drawing before modification (if available)		Picture/sketch/drawing after modification (if available)
CWCP-C :CT-2 BEFORE MODIFICATION		CWCP-C :CT-2 AFTER MODIFICATION

DIS PR	FLOW (M3/HR)			AMP	DIS PR	FLOW (M3/HR)			AMP
	MIN	MAX	AVG			MIN	MAX	AVG	
3.4	4490	4608	4551.6	26	3.4	4600	4716	4680	26.1
Savings resulted = 4680-4551=129m3 / hr.									

Agency that executed the project (with complete address and email):						
Total Investment, Rs. Nil		Year of implementation : 2006 - 2007				
First year energy cost savings, Rs.		11540340 (115 lakhs)				
First year other savings, Rs.		Nil				
On annual basis		KWh 000	Coal(Tons)	Gas(Nm3)	Oil(KL)	Other
Energy consumption before						
Energy consumption after						
Energy tariff, Rs/Kwh/Ton/Nm3/KL...				1099080		
Company complete address : GAIL(INDIA)LTD. GAIL COMPLEX VIJAIPUR-473112 DIST.GUNA M.P. Tel.No.07544-274444				We authorise Bureau to use this information for dissemination		
Contact person who could be contacted for more information: Mr.S.C.Sharma ,C.M(M) , GAIL Complex Vijapur				Signature		
				Date		

NOTE :Please submit this sheet seperately for each Energy Conservation Measure Implemented in 2006-2007

Legend:

GT : Gas Turbine

RG: Regeneration Compressor

LGC: Lean gas Compressor

OEM : Operating Equipment manufacturer

Energy Conservation Measure implemented in 2006-2007

Annexure B

(To be filled up separately for each Energy Conservation Measure)

ID to be filled by BEE	Title of the measure Replacement of 75 kW motor in place of 90 kW in IA Compressor	Sector : General
Year to be filled by BEE		Technology : Conventional
Description of the energy conservation measure		
<p>In LPG plant , we are having 4 no. of IA compressors . Out of four, two compressors runs round the clock . Two compressors are sufficient to cater all air requirement of plant as well as Instrumentation system. Rating of each compressor motor is 90 kW. Methodological study on efficient use of electricity concluded that 75 kW motor of same rpm can be used instead of 90 kW motor . This 75 kW motor was made available from Propane loading pump motor, as it was not in use.</p> <p>Intended Benefits: 64800 kWh/yr /motor energy saving & Rs 3.2 Lakh /yr /motor financial savings.</p>		

Agency that executed the project (with complete address and email):					
Total Investment, Rs.	Nil	Year of implementation :		2006 -	2007
First year energy cost savings, Rs.	3.2 Lacs/yr/motor.				
First year other savings, Rs.	Nil				
On annual basis	KWh 000	Coal(Tons)	Gas(Nm3)	Oil(KL)	Other
Energy consumption before					
Energy consumption after					
Energy tariff, Rs/Kwh/Ton/Nm3/KL...			64800kWh/yr/motor		
Company complete address : GAIL(INDIA)LTD. GAIL COMPLEX VIJAIPUR-473112 DIST.GUNA M.P. Tel.No.07544-274444			We authorise Bureau to use this information for dissemination		
Contact person who could be contacted for more information: Mr. Mukesh Kumar Tiwari , Sr.Mgr(E) , GAIL Com[plex Vijaipur			Signature		
			Date		

NOTE :Please submit this sheet separately for each Energy Conservation Measure Implemented in 2006-2007

Legend:

IA : Instrument air Compressor

Energy Conservation Measure implemented in 2006-2007
(To be filled up separately for each Energy Conservation Measure)

Annexure B-5

ID to be filled by BEE	Title of the measure Improvement in Cooling Tower Performance	Sector : General													
Year to be filled by BEE		Technology : Conventional													
Description of the energy conservation measure															
<p>To improve Cooling tower effectiveness, thorough analysis of Cooling Tower operations have been carried out , which conclude its revamping. After completion of the revamp jobs, Blade angle adjustments, Installation of Booster Pump for E122 and other modifications in Cooling tower configurations in Cooling water system following improvements were observed.</p> <p>CT-1 was able to take entire Phase-1 Load and all the plant parameters were well within the desired limits. Supply temperature of cooling water was reduced by approximately 3 Deg C as compared to the earlier performance in similar ambient condition.</p> <p>The condenser outlet temp on the process side got reduced. (Eg. Propane condenser E122 reduced from approx 46 to 42 Deg). Overall effectiveness of the cooling tower also increased. From Physical observation downpour of water through fill packs has become very consistent and uniform and good draft of air is also observed inside the open section of the tower.</p> <p>Due to better efficiency of CT-1 the Operational flexibility for selective running and modifying cooling water configurations with varying ambient conditions and varying loads will also increase. By increasing the ID Fan Blade angles the counter flow air draft through the fill packs has increased substantially with increase in load and amperes drawn by the ID Fan motors, which has increased effectiveness of Cooling Water pumps assembly, & in turn allowed one CT pump of rating 275 kW to be kept OFF, & cooling can be achieved with running of remaining pumps only.</p>															
Picture/sketch/drawing before modification			Picture/sketch/drawing after modification												
<p align="center">CT Effectiveness before Modification</p> <table border="1"> <tr> <td>CT Effectiveness</td> <td>32</td> <td>31.5</td> <td>31.7</td> </tr> </table>			CT Effectiveness	32	31.5	31.7	<p align="center">CT Effectiveness after Modification</p> <table border="1"> <tr> <td>CT Effectiveness</td> <td>45.7</td> <td>57.1</td> <td>48</td> <td>41.4</td> <td>44</td> </tr> </table>			CT Effectiveness	45.7	57.1	48	41.4	44
CT Effectiveness	32	31.5	31.7												
CT Effectiveness	45.7	57.1	48	41.4	44										
Agency that executed the project (with complete address and email):															
Total Investment, Rs. Nil		Year of implementation : 2006 - 2007													
First year energy cost savings, Rs. 49.5 Lakhs															
First year other savings, Rs. Nil															
On annual basis	KWh/yr	Coal(Tons)	Gas(Nm3)	Oil(KL)	Other										
Energy consumption before															
Energy consumption after															
Energy tariff, Rs/KWh/Ton/Nm3/KL...	990000														
Company complete address : GAIL(INDIA)LTD. GAIL COMPLEX VIJAIPUR-473112 DIST.GUNA M.P. Tel.No.07544-274444			We authorise Bureau to use this information for dissemination Signature												
Contact person who could be contacted for more information: Mr.Vimal Kumar , D.G.M(O)															
			Date												

NOTE :Please submit this sheet separately for each Energy Conservation Measure Implemented in 2006-2007

Legend:

CT : Cooling Tower

ID Fans: Induced Draft Fans

LGC: Lean gas Compressor

OEM : Operating Equipment manufacturer