



IndianOil

KANDLA-BHATINDA PIPELINE

(AN ISO 9001 AND 14001 ACCREDITED)

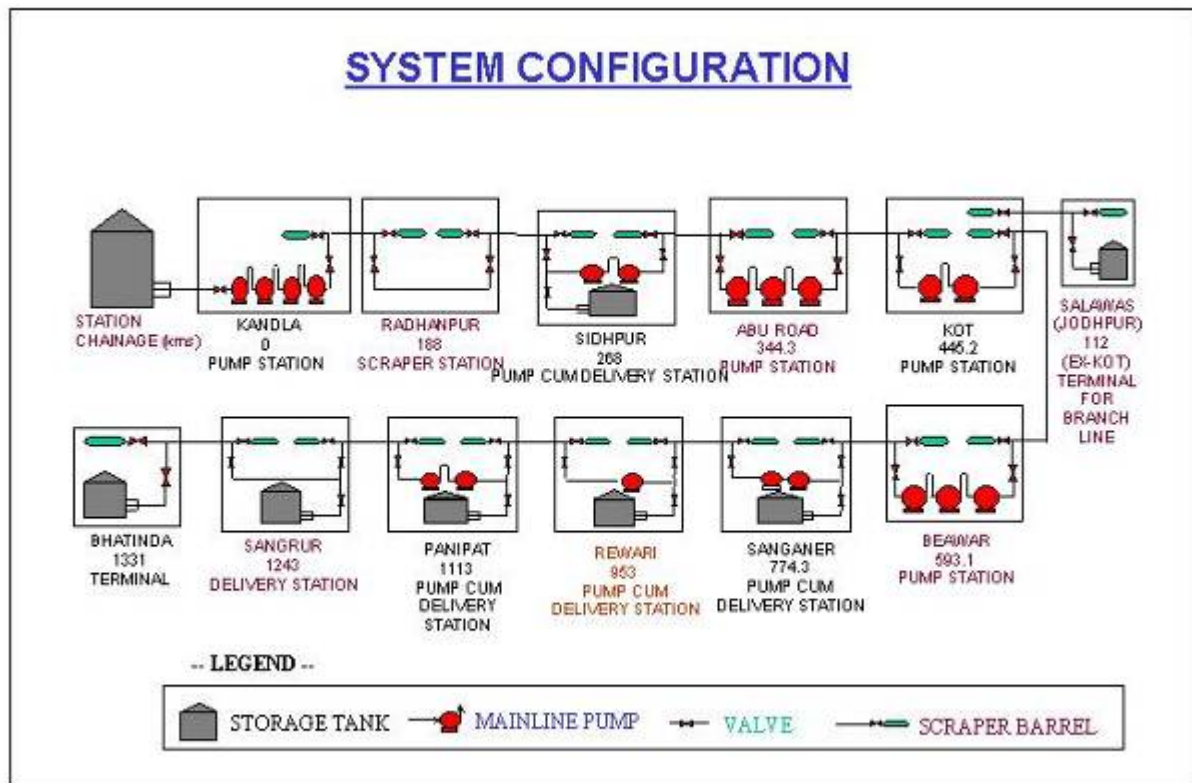
UNIT PROFILE

Kandla Bhatinda Pipeline (KBPL), the longest (1443 Kms) multi-product cross-country pipeline in India, was constructed in 1996 as a lifeline to supply petroleum products to the industrially and agriculturally rich regions of Gujarat, Rajasthan, West Uttar Pradesh, Delhi, Haryana, Punjab, Himachal Pradesh and also Jammu & Kashmir, which apart from being mostly land locked, command a unique importance due to strategic reasons.

Based on techno-economic feasibility, this mega petroleum product pipeline project was planned and implemented with an initial capacity of 6 MMTPA (million metric tonne per annum) expandable to 11.5 MMTPA as a logistic support to maintain uninterrupted supply of petroleum products to this vibrant economic corridor of India, in pursuit of IOCL's vision of becoming a *"major integrated energy company with national leadership and strong environment conscience, playing a national role in oil Security and public distribution."*

KBPL's journey from Kandla to Bhatinda: Kandla Bhatinda Pipeline is presently having the originating pump station at Kandla, three intermediate pump stations at Abu Road, Kot and Beawar, four intermediate pumping-cum-delivery stations at Sidhpur, Sanganer, Rewari and Panipat and one scrapper station at Radhanpur. There is one delivery station at Sangrur in Panipat-Bhatinda section and one terminal station each at Salawas (Jodhpur) in the spur line and at Bhatinda in the Panipat-Bhatinda section. Besides this KBPL is hooked up with Mathura Jalandhar Pipeline (MJPL) at Panipat, for injecting products to Ambala /Jalandhar.

Starting from the foreshore terminal at Kandla, the Pipeline traverses through the states of Gujarat, Rajasthan, Haryana and Punjab, which includes spur branch line from intermediate pump station at Kot to Salawas (Jodhpur in the state of Rajasthan). Beginning with the marshy areas at Kandla, the Pipeline route encounters the nature's drama of changing terrain on its long journey to Bhatinda. Dry zones, marshy land and sand dunes, undulating agricultural fields, hilly and rocky region, forestland and series of streams, canals, rivers, railways and highways. KBPL gives company to the existing Salaya Mathura Crude Oil Pipeline in the common Right of Way running to a stretch of 465 Kms. In its journey of 1443 Kms, KBPL passes through more than 1400 small and major crossings that include 10 perennial canals.



ENERGY CONSUMPTION:

It is evident from the data given that there has been substantial reduction in fuel & power consumption in many of the stations of Kandla-Bhatinda Pipeline due to the implementation of various energy conservation measures.

HSD CONSUMPTION:

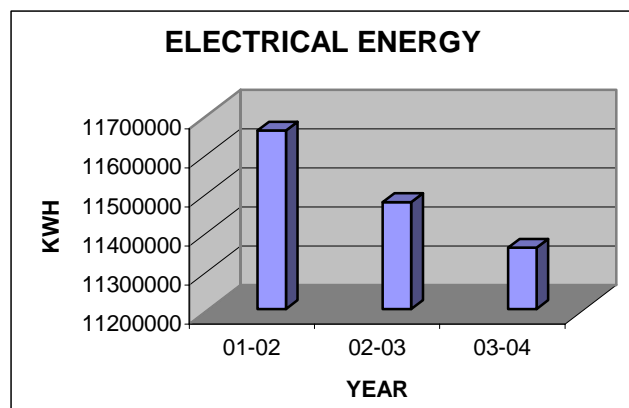
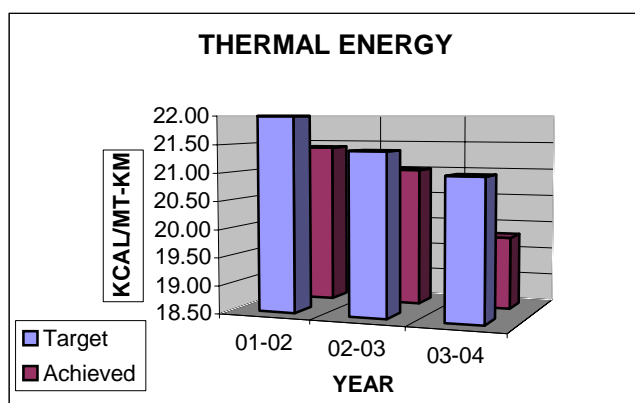
SL. NO.	STATION	HSD CONSUMED IN KL (2003-04)	HSD CONSUMED IN KL (2002-03)	HSD CONSUMED IN KL (2001-02)
1	Kandla	3487.90	3841.350	4288.00
2	Sidhpur	1387.69	1459.214	1382.00
3	Abu Road	1912.70	2717.179	3383.00
4	Kot	1294.80	478.154	160.00
5	Beawar	704.94	1631.323	2359.00
6	Salawas	2.38	4.385	7.47
7	Sanganer	267.43	557.796	694.00
8	Rewari	67.59	142.608	65.00
9	Panipat	4.93	5.746	4.10
10	Sangrur	5.779	4.882	6.10
11	Bhatinda	5.852	12.221	14.20
	Total	9142.02	10854.85	12362.00

ENERGY TARGET:

Year	Thermal Energy (Kcal/MT-KM)			Electrical Energy Consumed in (KWH)		Transportation / Production of product in MMT
	Target	Achieved	Percentage Reduction over 01- 02	Achieved Consumed in KWH	Percentage Reduction over 01- 02	
2001-02	22.00	21.40	-	11656908	-	5.069
2002-03	21.40	21.00	1.87	11473733	1.57	5.091
2003-04	21.00	19.80	7.47	11356897	2.57	5.039

POWER CONSUMPTION

SL. NO.	Station	Electrical Energy Consumed KWH (2003-04)	Electrical Energy Consumed KWH (2002-03)	Electrical Energy Consumed KWH (2001-02)
1	Kandla	836767	928409.5	1155302
2	Sidhpur	345852.	364737	340785
3	Abu Road	486343	628760	742800
4	Kot	272423	211526	100000
5	Beawar	355682	475943	636254
6	Salawas	143465	171180	197364
7	Sanganer	269651	337515	361084
8	Rewari	242650	256479	237745
9	Panipat	8105729	7841670	7696210
10	Sangrur	139150	148221.98	139415
11	Bhatinda	159185	109392	49950
Total		11356897	11473833.48	11656908



ANNUAL ENERGY COST

Year	Actual Annual Energy Cost Rs. in lacs	Annual Savings w.r.to 2001-02 achieved (Rs. lacs)	% of Annual Energy cost in (Base year 2001-02)
2002-03	2153.23	84.26	3.76
2003-04	1852.13	385.36	17.22

* Annual Energy Cost in 2001-02 (Rs. In Lakhs)= 2237.49

ENERGY CONSERVATION MEASURES TAKEN FROM 2001-04:

a) **Optimizing Pumping combination to achieve desired throughput**

Optimum pumping combination for achieving the desired throughput has been resorted to ensure optimum consumption. It is worthwhile to mention that the optimum combination is being resorted to since previous year based on operational requirement. However, this is being monitored on day-to-day basis for its compliance.

b) **Monitoring Specific Fuel Consumption (SFC) of individual engines**

SFC of the individual engines at each pumping station is being monitored on monthly basis.

c) **Review of running of auxiliary units and engine auxiliaries**

At KBPL energy saving study on running of radiator fan motor has been done. Two radiators are run in place of three per engine for eight months in a year. Auto operation through thermostat tested and system kept in auto at Abu Road and Kandla station.

d) **Review of contract demand**

The contract demand has been reviewed. Action already initiated for reduction of contract demand in the stations where power supply is given by State Electricity Board directly to pipeline terminal. The contract demand has been reduced at four locations of KBPL resulting in the savings of approx. 04 lacs per annum. The details are as under: -

Station	Contract Demand	Remarks
Kandla (Gandhidham Colony)	200 KVA	Contract demand reduced to 100 KVA. Savings is Rs 1.6 lakhs per year
Radhanpur	200 KVA	Contract demand reduced to 125 KVA. Savings is Rs. 1.0 lakhs per year.
Abu Road	350 KVA	Max contract demand being reduced up to 300 KVA. Application submitted to State Electricity Board. Savings is Rs 4500/month.
Beawar	350 KVA	Max contract demand being reduced up to 300 KVA. Application submitted to State Electricity Board. Savings is Rs 4500/month.

e) **Reduction in Electric energy consumption**

Following additional measures have been taken to reduce electric energy consumption in the stations.

- Switching of additional floodlights in the stations without affecting the required illumination level.
- Inculcating the habits of switching off lights when not required.

f) Conducting energy audit

Electrical installations inspection carried out in all stations of KBPL by CEA. No major points observed. PCRA energy audit was carried out during 2001-02 and the recommendations are being implemented in the successive years.

g) Comparison with International Benchmarks

M/s Cap Gemini Ernst & Young carried out Bench marking study of KBP w.r.t. other Indian and International pipelines. As per the study, based on 1999-2000 data, KBPL's fuel & power cost (Rs 19.9/Thousand Cubic Meter-Kilometer) fall within the lowest (best) quartile (Rs 27.25/Thousand Cubic Meter- Kilometers) of all the participating systems.

h) Award

It may be worthwhile to mention that KBPL has won "GREENTECH SILVER AWARD FOR YEAR 2003-04" from GreenTech Foundation, New Delhi.

i) Studies focusing on Energy Conservation resulting in tangible benefits

- Set point of compressor reduced in various stations resulting in less running of compressor. Estimated savings of Rs. 1.50 Lakhs/ year.
- Energy saving tube lights of Asean e+ (Approx. 600 Nos.- 70 Nos. at Kandla, 50 Nos. at Sanganer, Rewari, Bhatinda & Sangrur each, 40 Nos. at Sidhpur, Salawas & Abu Road each, 30 Nos. at Kot & Beawar each and balance at Panipat) procured at a cost of approx. Rs. 5 lakhs and fitted in Control room, MCC rooms in all stations. Due to reduction in voltage from 40 W to 28 W, improved power factor from 0.50 to 0.97 and 20 % approx. extra illumination level the estimated savings are of the order of Rs. 5 lakhs per year i.e. pay back period is one year. Retrieved tube lights are already used at other rooms, whenever required.
- Control Room Tube light fixtures group switching circuits have been modified to individual T/L fixture switching facility, towards energy conservation measure.
- Avoiding the operation of the identified street lights and platform lights which ever falls under tower lights. The anticipated projected savings in term of KWH is 52765 units and anticipated monetary gain is Rs 2.65 Lacs /annum.
- Switching off the unnecessary lights during night hours in identified areas. The projected anticipated savings in term of KWH is 11000units and anticipated monetary gain is Rs. . 0.55 Lacs/annum.
- Refund of Rs. 49.62 Lakhs from UHVBNL upon surrendering of UHVPN power connection of Panipat station.
- Savings of Rs. 30.00 Lakhs accrued upon use of the surplus equipment of 33 KV substation in SSPL Kot project

j) Other initiatives.

- Conventionally, whenever the product is being pumped to Panipat-Ambala-Jalandhar (P-A-J) and Panipat-Bhatinda (P-B) section, separate booster and M/L pump is used for individual section. The innovative mode of operation was for

- simultaneous pumping to Jalandhar and Bhatinda with one MDAJ pump and a Booster from Panipat, **thereby reducing the net energy consumption corresponding to one mainline pumping unit (510 KW) of KBPL**. This mode is resorted to whenever same product is required in P-A-J and P-B section.
- Modification of lube oil pipe from engine driven gear pump for glacier filter (lube oil by pass filter) thereby removing motor driven pump. This has resulted in estimated savings in energy per year i.e. 70000 KWH per year approx Rs. 4.75 lakhs per year.
- Reduction in compressor settings has saved an amount of Rs 1.50 lakhs.

ENERGY CONSERVATION PROJECT:

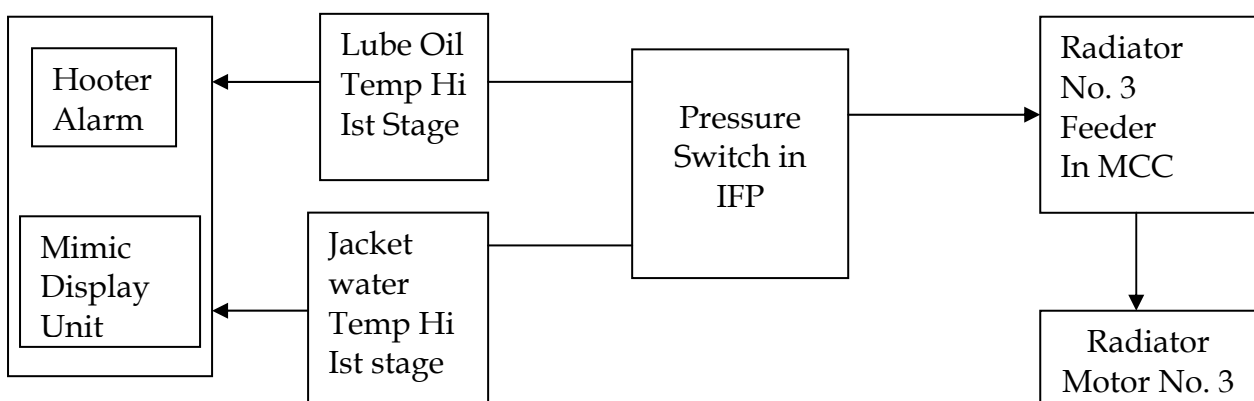
“Savings due to modifications made for auto operation of Radiator Motor three of mainline pumping unit”

Background

1. The mainline pumping unit engines when they are operated all the three Radiator motors as an auxiliary to the engines where running automatically to carry out the cooling of the engine this is monitored and regulated with the help of jacket water temperature.
2. This normal operation of radiator motor No.3 was modified to operate on auto. In this case the radiator motor No.3 starts only when the lube oil temperature exceeds 75.7 deg. C (First stage fault-Lube oil temperature high) or Jacket water temperature exceeds 86.2 deg. C (first stage fault-Jacket water temperature high)
3. Any of the above temperatures rise to the above settings, radiator fan motor will run for one hour automatically (as per present setting of the timer). If the temperature persists, the radiator fan motor will once again run for another hour and this cycle will continue till the temperature falls below the above setting of temperature.

Modifications:

The two numbers of temperature valves installed for keeping the third radiator in auto mode. One of the temperature valves used for sensing jacket water outlet temperature in jacket water line and other valve for lube oil temperature sensing at the outlet of the lube oil line. This contact is extended to MCC panel through a pressure switch (in IFP previously used for engine locked) and is used for radiator motor to start.



Remarks:

1. The radiator motor No.3 starts only when the temperature rises a value of 75.7 deg. C instead of continuous running.
2. The operation of the above modified auto system has been found working satisfactorily thereby reducing running hours of Radiator No.3.

Savings Calculations:

Two radiators are run in place of three per engine for 08 months in a year.

Energy consumed by one radiator is	= 15 kWh
Energy consumed by two radiators for two engine	= 30 kWh
Total yearly running hours of engine at Kandla	= 10274 hours
Total yearly running hours of engine at Abu Road	= 8253 hours
Total yearly running hours of engine at Beawar	= 4647 hours

Total for three Stations	= 23174 hours in a year

Assuming 50% of the time (in a year), the engine has run without the third radiator motor. (Normally, 02 (two) mainline pumping units are operated at above stations while pumping the products)

Hence, Saving in energy = $0.50 \times 23174 \times 30$ = **347610 KWH**

Therefore, Savings per year
(Assuming @ Rs.4.30/- per KWH) = **3,47,610 KWH x @Rs. 4.30**
= **Rs. 14.94 lakhs/Year**

