IndianOil

BARAUNI REFINERY

Date: 31st March 2018

Subject: MS / HSD Quality Upgradation / HS Crude Maximization Project EC Clearance Actionable Points

Ref: Ministry's clearance letter no J-1101/491/2007-IA II (I) dated 18.03.2008

SN	Point	Status
1.	The company shall comply with new standards/norms that are being proposed by the CPCB for petrochemical plants and refineries.	· Major facilities required for meeting treated effluent quality as per revised MoEF standard has been commissioned in Mar-14. · With the commissioning of desulphurization facilities (Amine treating unit) for fuel gas from old plants in Oct 2010, Barauni refinery now meets the revised SO_2 emission standards. H_2S content in FG is also within the revised standard. · 20 sets of SO_2, NO_x, CO & PM analyzer are installed for continuous monitoring of Sox, NOx, CO & PM. · SOx, NOx, CO & PM analysers are also being procured for 2 remaining stacks of smaller capacity. · Double seal has been provided in 23 nos. of floating roof tanks. · Please refer Annexure-1 for detailed status and action plan of Barauni refinery for compliance of revised MoEF standards.
2.	The process emissions (SO_2, NOx, HC, VOCs and Benzene) from various units shall conform to the standards prescribed by the Bihar State Pollution Control Board from time to time. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.	· SOx & NOx are monitored continuously in 20 nos. of stacks with online SOx/NOx analyzers. SOx, NOx, CO & PM analysers are also being procured for 2 remaining stacks of smaller capacity. · Process emissions from all units are monitored once in two months except SRU (which is monitored monthly) by M/s Envirotech East Pvt. Ltd and conform to revised MoEF 2008 standards. · Total SO_2 emissions from existing units and new facilities at BR are less than the stipulated limit of 815 kg/hr as per revised standard. · COMPLIED.
3.	Ambient air quality monitoring stations, [SPM, SO_2, NOx and NMHC, Benzene] shall be set up in the Refinery complex in consultation with SPCB, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs Continuous on-line stack monitoring equipment should be installed for measurement of SO_2 and NOx.	· Five nos. of offline ambient air quality monitoring stations (three in refinery, one in BTP and one in township) and three nos. of continuous ambient air quality monitoring station has been provided at strategic locations at BR for monitoring of ambient air quality. · Ambient air quality is checked twice in a week in four nos. of offline ambient air quality monitoring stations as per revised MoEF standards 2009. · COMPLIED.
		· Total 20 nos. of SOx,NOx, CO & PM analyzers have been provided at BR for continuous online stack monitoring.SOx, NOx, CO & PM analysers are also being procured for 2 remaining stacks of smaller capacity. · COMPLIED
4.	Quarterly monitoring of fugitive emissions shall be carried out as per the guidelines of CPCB by fugitive emission detectors and reports shall be submitted to the Ministry's regional office at Bhubaneswar. For control of fugitive emission all unsaturated hydro carbon will be routed to the flare system and the flare system shall be designed for smoke less burning.	· Quarterly monitoring of fugitive emission as per CPCB guidelines is carried out and report is submitted to regional office, Ranchi along with compliance report on six monthly basis. · COMPLIED
		· Smokeless flare system already exists at BR and all unsaturated hydrocarbons are routed to it. · COMPLIED

5.	Fugitive emissions of HC from product storage tank yards etc must be regularly monitored. Sensors for detecting HC leakage shall also be provided at strategic locations. The company shall use low sulphur fuel to minimize SO_2 emission.	· Quarterly monitoring of fugitive emission from tank farm area is carried out. · COMPLIED.
		· 394 nos of hydrocarbon detectors are installed in strategic locations in the various process units, tank farm, and other plausible locations. · COMPLIED
		· 'S' in fuel oil conforms to the revised MoEF standards 2008 (<1%Wt.). · H_2S in FG conforms to the revised MoEF standards 2008 (<150 mg/Nm3). · COMPLIED
6.	The effluent after treatment and conforming to the MINAS standards shall be discharged into the river Ganga. The company shall undertake measures for water conservation and treated effluent to the extent possible shall be used for fire water make up , coke cutting water, make up water for eco pond and irrigation of eco park etc.	· To reduce Raw water consumption, treated effluent is re-used as · Cooling Tower makeup water · Fire water make up · Coke cutting water · Make up water for Eco Ponds. · Horticulture in Eco park · After ETP modernization, reuse of treated effluent in refinery operations has increased significantly resulting in "Zero Discharge of Treated Effluent into River Ganga".
7.	M/s 1OCL shall investigate cause of odour problem in one of the wells as reported during the public hearing meeting held on 25.9.2007 and report submitted to the Ministry's Regional office at Bhubaneswar.	· Ground Water samples from hand pump of Keshawe village are tested once in a quarter by M/S Envirotech and found meeting potable water quality norms. · Water samples were also randomly taken from hand pumps and wells of the surrounding area of Keshawe village several times and tested by M/S PDIL. Found meeting potable water quality norms. The odor of water has been detected as a localized problem. · Further, in keeping with Indian Oil's motto "People before Profit", Barauni refinery lined up the M/S PDIL in 2009 for establishing the ground water quality and its movement in and around Barauni Refinery to investigate cause of odor problem in Keshawe village. PDIL submitted its report in Feb 2010 and it was concluded that "no ground water from the refinery flows beyond the refinery boundary. Hence, ground water contamination from the refinery beyond boundary can be ruled out. The ground water contamination due to refinery activities in the Keshawe village is not at all possible." Further it was also observed "that the poor sanitation around the hand pumps in Keshawe village around BTP area and the presence of Iron in the tube well water produces synergetic impact on the odour. Similarly, the installation of septic tanks and Khatals are responsible for poor quality w.r.t odour." · COMPLIED.
8.	The oily sludge shall be subjected to melting pit for oil recovery and the residues shall be bio-remediated. The sludge shall be stored in the HDPE lined pit along with proper leachate collection system.	· RCC pit for storage of hazardous solid waste (Oily Sludge) is in place and mechanized skid process has been deployed for better recovery of oil from oily sludge in place of melting pit. Presently M/s Balmer Lawrie is engaged for this job. · Residual oily sludge is bio-remediated. · COMPLIED.
9.	The company shall strictly follow all the recommendation mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP).	· All the recommendations mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP) are strictly followed. · Please refer Annexure-2 for detailed status on CREP. · COMPLIED.
10.	The Company shall take necessary measures to prevent fire hazards, containing oil spill and soil remediation as	· Fire protection facilities as required by OISD standards exist in refinery.

	needed. At place of ground flaring, the overhead flaring stack with knockout drums shall be installed to minimize gaseous emissions during flaring.	· Area within the units and around having the possibility of oil spillage has been paved. · All units, tank farm area and facilities are well connected with a closed underground OWS system to prevent any oil spill. · Knockout drums exist in overhead flaring stack to minimize gaseous emissions during flaring. · Fire protection facilities as required by OISD standards have been provided in new facilities and all the area within the units' battery limits have been paved. · To further prevent fire hazards, additional facilities as recommended by M B Lal committee on Jaipur Terminal Fire have been installed in the refinery. · COMPLIED
11.	To prevent fire and explosion at Oil and Gas facility, potential ignition sources should be kept to a minimum and adequate separation distance between potential ignition sources and flammable material shall be in place.	· Distances between various units / equipments including potential ignition sources are as per OISD standards. · OISD standards have been followed for the distances between various units / equipments including potential ignition sources in the new facilities. · COMPLIED
12.	Occupational health surveillance of worker shall be done on a regular basis and records maintained as per the Factory Act.	· A full fledged Occupational Health centre is established in the Refinery Hospital. Regular Occupational health monitoring of employees is carried out regularly as per the program. · Occupational health surveillance records are maintained by the refinery hospital as per the Factory Act. · COMPLIED
13.	Greenbelt shall be developed to mitigate the effect of fugitive emission all around the plant in a minimum 30% plant area in consultation with DFO as per CPCB guidelines.	· Spread over an area of 75 acres, Barauni Refinery has developed a beautiful Ecological Park (Eco Park) with sprawling lawns, flowers and ornamental plants, potted plants, diverse habitat of tress and the forest vegetation. The garden has more than 279 plant species under 81 families including some medicinal plants both indigenous and exotic. · More than 104,519 plants were planted during the period 1995 to 17-18 in a phased manner to develop green belt in & around refinery controlled area in consultation with forest department. · 250 nos. plants were planted in 2017-18. · Plantation in refinery is continuing. However, existing land of refinery is saturated with greenery. · COMPLIED
14.	Environment protection measures suggested in the EIA/ EMP risk assessment report and during the public hearing meeting shall be implemented.	· Environment protection measures suggested in the EIA/ EMP risk assessment report have been implemented / are being implemented. Public Hearing Points · Rise in Respiratory Ailments o Survey conducted by panel of doctors/paramedics from Government Hospital delegated by Civil Surgeon. No adverse effects / increase in respiratory ailments observed. · Stunted Growth of Papaya Plant o Issue referred to Rajendra Agricultural University, Pusa. In response booklet on "Technology for Growing Papayas in Bihar" received. It says, "viral disease is the major limiting factor in Papaya cultivation in all regions of Bihar and attempts are on to select papaya lines showing strong tolerance to viral diseases." · Few hand pump's water have odour in Keshawe Village o Please refer status of condition no. 7 above. · Water overflow from Borrow Pit inundating fields o With the increase in capacity/modernization of ETP, we

		have utilized all the rainy water in ETP & in water reservoir inside refinery this year (2017). We have not discharged any rainy water in Burrow pit this year. Also, Burrow pit did not overflow this year. · Medical Camps to be increased in surrounding area o Medical Camps are being conducted regularly. · COMPLIED
15.	The project authorities must strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government and any other statuary body.	· Stipulations being followed. · COMPLIED
16.	No further expansion or modification in the project shall be carried without prior approval of the Ministry of Environment and Forests. In case of deviations or alternations in the project proposal from those submitted to the Ministry for clearance, a fresh reference shall be made to the Ministry.	· Prior approval of ministry is always taken before carrying out any expansion or modification of the plant. · COMPLIED
17.	At no time, the emissions should go beyond the prescribed standards. In the event of failure of any pollution control system, the respective well site should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved. Provision of adequate height of stack attached to DG sets & flare is to be done.	· There is no well site at Barauni refinery. · Stacks and flare of adequate height have been provided in Barauni refinery to control emissions. · COMPLIED
18.	Wastewater shall be properly collected and treated so as to conform to the standards prescribed under EP Act & Rules and mentioned in the Consents provided by the relevant SPCB.	· Adequate waste water drainage and collection facilities exist in refinery. · Appropriate drainage and collection facilities have been provided in new facilities in the MSQ project and are connected with the existing drainage facilities of refinery. · Oily waste water is treated in ETP/BTP and conforms to the CPCB/SPCB standards. · Complied w.r.t MoEF standards.
19.	The overall noise levels in and around the premises shall be limited within the prescribed standards (75 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	· The ambient noise levels from existing facilities conform to the standards prescribed under EPA Rules, 1989 / Noise Pollution (Regulation and control) Rules 2000. · For personnel working in the proximity of high noise generating equipments, appropriate PPEs are used, and exposure is controlled through job rotation, education and awareness. · Adequate noise control measures have been taken in new facilities in the project. · No impact has been observed on plant boundary proximity area with the new facilities in the project, and ambient noise levels from new facilities conforms to the standards prescribed under EPA Rules, 1989 / Noise Pollution (Regulation and control) Rules 2000. · COMPLIED
20.	The project authorities must strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended in 2000 for handling of hazardous chemicals etc. Necessary approvals from Chief Controller- of Explosives must be obtained before commission of the expansion project, if required. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	· Provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended in 2000 for handling of hazardous chemicals etc are strictly complied in existing facilities of refinery, and same have also been strictly complied in the project. · Necessary approvals from Chief Controller- of Explosives, wherever required have been obtained before commission of the project. · Comprehensive On-site and Off-site Disaster Management Plans exist in refinery and are updated regularly. · On-site & Off-site mock drills are conducted quarterly and annually respectively. The Off-site drill is conducted with involvement of District Authority. · COMPLIED

21.	Disposal of hazardous wastes shall be as per the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the State Pollution Control Board must be obtained for collections/ treatment/storage disposal of hazardous wastes.	· Disposal of hazardous wastes is done as per the Hazardous Wastes (Management, Handling & Transboundary Movement) Rules 2008 under authorization from SPCB. · COMPLIED
22.	The project authorities will provide adequate funds as non-recurring and recurring expenditure to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	· Being complied. · In addition to one time investment in facilities for combating pollution, separate funds are allocated for specific activities such as bio-remediation of sludge, environment monitoring, and studies related to environment etc. · COMPLIED
23.	The company shall develop rain water harvesting structures to harvest the run off water for recharge of ground water.	· Rain water harvesting has been implemented at 18 buildings of Barauni Refinery in which water collected from roof top of the refinery is recharged to ground water. For year 2018-19, 6 nos of buildings have been planned for rain water harvesting. · COMPLIED
24.	The stipulated conditions will be monitored by the concerned Regional Office of this Ministry /Central Pollution Control Board/State Pollution Control Board. A six monthly compliance report and the monitored data should be submitted to them regularly. It will also be displayed on the Website of the Company.	· A six monthly compliance report and the monitored data are submitted regularly. · EC Compliance status of various projects is being hosted on https://www.iocl.com/Talktous/SNotices.aspx. Alternatively, one can reach IOCL home page at https://www.iocl.com and thereafter selecting “We’re Listening” tab followed by opening “Statutory Notices”. · COMPLIED
25.	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the concerned Regional office of this Ministry.	· Information published in Hindustan and Hindustan Times on 27th Mar 2008. · COMPLIED.
26.	A separate environment management cell with full fledged laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior Executive.	· BR has a full-fledged environment protection cell and a well equipped dedicated pollution control laboratory established back in 1975. · COMPLIED
27.	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project	Noted for compliance

Annexure-1

Status and Action Plan for Compliance of Revised Emission and Effluent Standards 2008 at Barauni Refinery

DATE: 31st March 2018

Scehdule -I: Petroluem Oil Refinery

A. Effluent Discharge

SN	Standard	BR status and action plan
1	Treated Effluent Quality	> COMPLIED.

B. Emissions

SN	Standard	BR status and action plan
2	H_2S in Fuel Gas	> COMPLIED.
3	SO_2 Emissions	> COMPLIED.
4	NO_x Emissions	> COMPLIED.
5	CO Emissions	> COMPLIED.
6	Particulate Matter (PM) Emissions	> Barauni Refinery processes more low sulphur crude in recent years. Only about 5% HS crude processing takes place. As a result internal fuel oil quality has been improved w.r.t emission of particulate matter. Further, particulate matter analyzers have been installed in all stacks of refinery and connected to CPCB server since June-16. The online analyzer data available now help us fine tuning fuel firing and optimization of gas mix amongst various furnaces and the controlling the PM parameters within the statutory limit. > COMPLIED.
7	Nickel and Vanadium (Ni+V) Emissions	> COMPLIED.
8	Sulphur Content in Liquid Fuel	> COMPLIED.

9	Continuous Monitoring System for SO_2 & NO_x emissions	> COMPLIED.
10	Opacity of Flue Gas ex FCCU Regenerators	> RFCCU was commissioned at Barauni Refinery along with flue gas scrubbing technology supplied by M/s Belco, USA. In the Belco unit, the flue gas is scrubbed with water & diluted caustic solution (<0.5 % concentration by wt.) to remove SOx and particulate matter. PM level in flue gas is less than 30 mg/Nm3. High volume of condensed water vapor generated during water scrubbing of flue gas escapes through the BELCO stack as whitish plume. Opacity meter under such condition is not considered relevant as it will not be effective due to high moisture content in flue gas. > Further, PM analyzers have been installed in RFCCU stack through which particulate matter ex- RFCCU stack is monitored, which is closely akin to monitoring of opacity in flue gas. Therefore opacity meter installation at RFCCU is not planned. > Complied.
11	Sulphur Recovery from SRU	>SRU at Barauni refinery meets the revised standard. COMPLIED.
12	H_2S emissions from SRU	>SRU at Barauni refinery meets the revised standard. COMPLIED.

C. Fugitive Emission

SN	Standard	BR status and action plan
13	Storage tanks with capacity between 4 to 75 m3 and TVP of more than 10 kpa	> Not Applicable.
14	Storage tanks with capacity between 75 to 500 m3 and TVP of 10 to 76 kpa	> Not Applicable.
15	Storage tanks with capacity of more than 500 m3 and TVP of 10 to 76 kpa	> Storage tanks of Crude, MS & SRN have TVP of 10 to 76 kpa. All such tanks are IFRT or EFRT. COMPLIED.

16	Storage tanks with capacity of more than 500 m3 and TVP of more than 76 kpa	> Not Applicable
17	Provision of secondary seals in floating roof tanks	> All such tanks at Barauni Refinery are equipped with double seal. COMPLIED.
18	Emission control in Rail Tank Wagon/ Road Tank Truck loading for Gasoline and naphtha for VOC reduction	> Barauni Refinery complies most of the revised standards for petroleum refineries as notified in Gazette of India on 18th March'08 except vapor recovery system in tank wagon/tank truck. For VOC reduction of 99.5% and emission control to 5 gm/m3 in case of Gasoline and Naphtha loading, VOC recovery system at Loading Gantry would be required. However, this would also call for implementation of necessary change in the design of railway tank wagons to facilitate bottom loading. > Accordingly, Barauni Refinery had earlier requested to CPCB vide letter dated 10.04.2009 & 22.01 .2010 (Sr. no. C 1.3 of Annexure-1.1) to exempt VOC recovery during rake loading in Barauni Refinery.
19	Equipments leak and LDAR programme	COMPLIED.

D. Emission Standards for VOC from Wastewater Collection and Treatment

20	VOC Collection & Treatment System	> VOC treatment system as a part of ETP modernization project has been installed and commissioned. >COMPLIED.

Scehdule -VI, Part C: Petroluem Oil Refinery

SN	Standard	BR status and action plan
21	Quantum limit for discharge of total effluemt	> COMPLIED.
22	Limit of quantity of effluent discharged	> COMPLIED.

Annexure-2

CHARTER ON CORPORATE RESPONSIBILITY FOR ENVIRONMENTAL PROTECTION (CREP)

STATUS OF IMPLEMENTATION OF CREP OBLIGATIONS AT BARAUNI REFINERY

SL. No	ACTIVITY	STATUS (As on 31.03.2018)
	Air Pollution Management	
1.	All the refineries located in the critically polluted areas, identified by CPCB, should submit an action plan for reduction of SO_2 emission from the present level.	· With the commissioning of desulphurization facilities (Amine Treating Unit) for fuel gas from old plants in Oct 2010, Barauni refinery now meets the revised SO_2 emission standards for all the furnaces, boilers and captive power plant including RFCCU regenerator and SRU. · The quantum of total SO_2 emissions from Barauni Refinery has further reduced by more than 150 Kg/hr after the commissioning of ATU in Oct 2010. · Complied.
2.	Future refineries should have Sulphur Recovery Unit (SRU) with minimum 99% efficiency.	· SRU with 99 % efficiency is in operation at BR. · Complied.
3.	For the SRUs in the existing refineries, an expert committee to be constituted to look into various aspects and suggest a road map within six months.	· Existing SRU at Barauni Refinery has 99 % efficiency. · Complied.
4.	(a) With regard to NOx emission, the new refineries/process units should install low NOx burners. (b) For retrofitting of low NOx burners in existing units the same expert committee will suggest the strategies and action plan within six months.	· Low NOx burners have been installed in all furnaces and boilers of Barauni Refinery except AVU-1 &-2, Coker-B and Boiler 1 & 2. · Engineering study in progress for installation in AVU-1, 2 and Boiler-1&2. Coker-B is idle.
5.	The flare losses should be minimized and monitored regularly.	Following actions are in practice : · Viewing through Closed Circuit TVs installed in RSM Office & DDCS- II C/R. · Monitoring through opening / closing of C/V of Fuel gas to flare. · Fuel Gas balance on daily basis. · Flare Gas Recovery Unit has been commissioned for use of flare gas as fuel gas in furnaces/boilers. Project has been registered by UNFCC under CDM projects on 04th May 2009. · CO2 emissions from BR have reduced by about 6000 MT per annum after

SL. No	ACTIVITY	STATUS (As on 31.03.2018)
		commissioning of this project. (Total CER in BR account = about 6000) · Complied.
6.	Refineries should install continuous emission monitoring system for SO_X and NO_X in major stacks.	· SOx & NOx are now monitored continuously in 20 nos. of stacks with SOx/NOx analyzers. · Complied.
7. (a) 7. (b)	Refineries should also monitor total HC and Benzene in the premises (particularly at loading/un-loading operations and ETP). The status and action plan to be submitted within 6 months. The expert committee will also suggest an action plan , within six months for control and monitoring of hydrocarbon loss & VOC emissions , leak detection and repair (LDAR) programme and vapour recovery systems (for loading & unloading operations within refineries only)	· HC & Benzene are monitored regularly in Tank wagon Gantries, ETP & QC lab. · VOC emissions monitored through Detection instrument and LDAR Program is in place. · Complied.
	Waste Water Management	
1.	Refineries will prepare action plan for conservation of water resources and maximizing reuse/recycling of treated effluent within six months. The treated effluent discharge quantity should be limited to 0.4 m3/per tonne (for 90% of time) except for the monsoon season.	· Treated liquid effluent is completely reused in refinery operations / horticulture / eco ponds make up / burrow pit make up completely except in rainy season after modernization of ETP/BTP.
2.	Oil spill response facilities at coastal refineries should be in position within 3 years.	· Not applicable.
	Solid Waste Management	
1.	Refineries will explore new technologies for reduction in the generation of oily sludge. Strategy and action plan for liquidation of existing sludge should be submitted within 6 months.	Following procedures are in place for minimization of oily sludge generation: · Operation of side entry mixers in crude oil tanks. · Hot Gas oil circulation in crude oil tanks before handing over for cleaning. · For better recovered of oil from oily sludge, Mechanized skid process by M/S Balmer Lawrie has been deployed. · Recovery of oil is excellent (95-98%) against only 40-50% in case of oil recovery from melting pit. · Quality of oil in residual sludge is much lower (less than 10%). · Quality of final residual is very less

SL. No	ACTIVITY	STATUS (As on 31.03.2018)
		(less than 5% of oily sludge processed). · The left over residual oily sludge is subjected to bio-degradation using Bio-remediation method developed by M/s TERI and IOCL (R&D). · Complied.
2.	The petroleum coke having high sulphur content should only be sold to/reused by organized industries, which have systems to control SO_2 emissions). This will be ensured by June 2003.	· RPC is being sold to reputed calciner. · Complied.