

Draft Fuel Policy, Mizoram

Environment, Forest & Climate Change Department,
Government of Mizoram

Prepared in Consultation with Mizoram
State Pollution Control Board

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1.1 BACKGROUND

The Hon'ble Supreme Court in the matter titled as M.C. Mehta Versus Union of India & Ors. in Writ Petition (s) (Civil) No. 13029/1985 passed an order directing Governments of UP, Haryana

and Rajasthan to place a ban on use of Furnace Oil and Pet-Coke in their States and issue appropriate notification to take effect from 1st November, 2017.

In continuation, the CPCB's directed Chief Secretaries of all State Governments/Union Territories under section 5 of the Environment (Protection) Acts, 1986 vide letter No. B.33014/07/2019/IPC-II/5747-5778 Dt 23.08.2019 to formulate and enforce fuel policy regarding use of pet coke and to take strict actions against any industry violating the said fuel policy through respective State Pollution Control Boards /Pollution Control Committees using the powers conferred under environmental laws.

In compliance with the above direction, the State Government vide letter No. C. 18011/3/2011-FST Dt 11.11.2019 directed the Mizoram Pollution Control Board to prepare draft policy on use of pet coke and furnace oil and to submit the same to the State Government.

Accordingly, the Mizoram Pollution Control Board collected data on industries and related air pollution and arrived at the draft policy as provided below.

1.2 MIZORAM AT A GLANCE:

Mizoram is a mountainous state nestling in the southern tip of the north-east region of India. According to a 2011 census, the population of the State was 1,091,014 and is the 2nd least populous state in the country. Mizoram covers an area of approximately 21,087 square kilometers and became the 23rd state of the Indian Union in February 1987.

About 91% of the state is forested and about 60 per cent of the people of Mizoram are engaged in agricultural and its allied activities. The main pattern of agriculture followed is Jhum or Shifting cultivation.

However, due to the topographical and geographical disadvantage coupled with underdeveloped infrastructure and transport bottleneck, industrialisation has not gained momentum. With the opening up of border trade with Myanmar and Bangladesh, the Look East Policy of the Government of India and with the peaceful condition of the State, industrialization is expected to be expanding in the near future.

Small and cottage type industries dominate the industrial sector. The industrial estates set up by the State Government like Industrial Estate at Zuangtui, Aizawl, Industrial Growth Centre (IGI) at Luangmual, Aizawl, Export Promotion Industrial Park (EPIP) at Lengte, Integrated Infrastructural Development Centre (IIDC) at Pukpui, Lunglei and Food Park at Chhingchhip house mainly small type industries.

2. FUEL:

2.1 PET COKE (PC): Petroleum coke or pet coke is a byproduct of the Coker process in oil refining industry. It is extremely stable fuel and contains over 80 % carbon. High grade petcoke has low in sulfur contents while the lower Grade has high sulfur contents and heavy metals. The lower grade is commonly used for coal in furnaces and boilers.

2.2 FURNACE OIL (FO): Fuel oil is a dark viscous residual product of petroleum distillation. It is used as a fuel in different types of combustion equipment. It is one of the cheapest fuels

available for industrial use. It is made of long hydrocarbon chains, particularly alkanes, cyclo - alkanes and aromatics and is used chiefly in different furnaces of the steel plant, in power plant boilers for raising steam and for injection in the blast furnace.

3. INDUSTRIES USING PET COKE & FURNACE OIL IN MIZORAM

3.1 Notified Industrial area:

The Commerce & Industries Department has notified eleven (11) Industrial sites across the State as provided below

- 1) Industrial Growth Centre (IGC), Luangmual, Aizawl, Aizawl District
- 2) Industrial Estate, Zuangtui, Aizawl, Aizawl District
- 3) Export Promotion Industrial Park (EPIP), Lengte, Mamit District
- 4) Integrated Industrial Development Centre(IIDC), Pukpui, Lunglei
- 5) Integrated Industrial Development Centre (IIDC), Champhai, Champhai District
- 6) Industrial Estate, Bilkhawthlir, Kolasib District
- 7) Industrial Estate, Bairabi, Kolasib District
- 8) Industrial Estate, Pangbalkawn, Kolasib District
- 9) Industrial Estate, Lawngtlai, Lawngtlai District
- 10) Industrial Estate, Kolasib, Kolasib District
- 11) Industrial Estate, Serchhip, Srrchhip District

The Notified Estates/Areas do not house large or polluting industries except one rerolling mills at EPIP, Lengte, Mamit District.

3.2 Industries in Mizoram:

Industries are classified based on the pollution load into Red, Orange, Green and White categories each having different periods of validity. The industrial sector in the State comprises generally of small and cottage type industries which falls mostly under Orange and Green Category. Wood and charcoal are mostly fuel while coal and Diesel are also used to a certain extent. Presently, the records of the Mizoram Pollution Control Board show that there are about 800 industries operational in the State as on March 2020..

The category wise status of operational industries as on December 2020 is as provided below:

SI No	Category of industries	Validity of consents	Nos of units
1	Red	5	67
2	Orange	10	245
3.	Green	15	440
4.	White	Exempted	48
	TOTAL		800

Further from the records, there are only few medium scale units while majority are small and cottage type and that there are no operating industries in the State which are using Pet coke or **Furnace oil**. Further industrial boilers are rarely used in the State while there are about three agro based boilers for which SO₂ and NO₂ emissions are exempted.

4.0 Ambient Air Quality data of the State

Currently, under the Central Pollution Control Board's scheme of the National Ambient Air Monitoring Programme (NAMP), 11 ambient air monitoring stations have been set up in the State by the Mizoram Pollution Control Board in Aizawl (5 stations including continuous /real time data station), Lunglei, Kolasib and Champhai (2 stations) each and Lengpui Airport (1 station)

The ambient air quality as monitored from the above 11 stations for the past 5 years are provided below.

YEAR	AIZAWL DISTRICT							
	Station 1 (Khatla)				Station 2 (Laipuitlang)			
	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM
2015	2.00	6.03	67	140	2.00	4.50	27	46

2016	2.00	10.13	87	189	2.00	4.50	34	59
2017	2.00	10.25	60	162	2.00	4.50	23	40
2018	2.00	9.49	73	156	2.00	4.50	20	32
2019	2.00	9.89	84	164	2.00	4.50	20	32

YEAR	Station 3 (Bawngkawn)				Station 4 (Dawrpui)			
	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM
2015	2.00	7.70	32	70	2.00	16.67	59	144
2016	2.00	10.06	65	150	2.00	16.78	79	164
2017	2.00	9.32	64	150	2.00	15.86	75	134
2018	2.00	9.45	49	102	2.00	10.39	71	122
2019	2.00	4.50	46	104	2.00	11.46	58	109

YEAR	Station 3 (Bawngkawn)				Station 4 (Dawrpui)				Station 5 (Lengpui)			
	SO ₂ (Limit=50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM
2015	2.00	7.70	32	70	2.00	16.67	59	144	2.00	4.50	36	63
2016	2.00	10.06	65	150	2.00	16.78	79	164	2.00	4.50	38	70
2017	2.00	9.32	64	150	2.00	15.86	75	134	2.00	4.50	31	51
2018	2.00	9.45	49	102	2.00	10.39	71	122	2.00	4.50	36	51
2019	2.00	4.50	46	104	2.00	11.46	58	109	2.00	4.50	35	55

YEAR	LUNGLEI DISTRICT							
	Station 6 (Farm Veng)				Station 7(Chanmari-I)			
	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM
2015	2.00	4.50	34	58	2.00	4.50	44	75
2016	2.00	4.50	28	54	2.00	4.50	38	77
2017	2.00	4.50	18	32	2.00	4.50	32	64
2018	2.00	4.50	8	16	2.00	4.50	15	33
2019	2.00	4.50	7	15	2.00	4.50	10	24

YEAR	KOLASIB DISTRICT							
	Station 8 (Project Veng)				Station 9 (Diakkawn)			
	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM
2015	2.00	4.50	23	50	2.00	4.50	43	90
2016	2.00	4.50	22	46	2.00	4.50	39	82
2017	2.00	4.50	23	48	2.00	4.50	36	73
2018	2.00	4.50	17	36	2.00	4.50	32	64
2019	2.00	4.50	16	36	2.00	4.50	30	58

YEAR	CHAMPHAI DISTRICT							
	Station 10 (Kahrawt)				Station 11 (Vengthar)			
	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM	SO ₂ (Limit = 50 µg/m ³)	NO ₂ (Limit = 40 µg/m ³)	RSPM (Limit = 60 µg/m ³)	SPM

2015	2.00	4.50	22	52	2.00	4.50	45	93
2016	2.00	4.50	18	39	2.00	4.50	39	81
2017	2.00	4.50	19	43	2.00	4.50	33	65
2018	2.00	4.50	20	45	2.00	4.50	34	68
2019	2.00	4.50	22	46	2.00	4.50	29	63

4.1 CONCLUSIONS-EMMISSION RESULTS:

The ambient air quality results at the above NAMP stations indicate that levels of emission of SO₂ and NO₂ in all the four (4) districts are within the permissible limits and are very low. However, the emissions of Respirable Suspended Particulate Matters crossed permissible limits in three of the four stations in Aizawl by a small level in some point of time normally during winter. These areas are commercial areas with heavy road traffic and the higher than the prescribed limit could be attributed to this heavy vehicle traffic in the area. The ambient air quality in check in the four districts of the State probably could be due to non-existence of industries emitting air pollutants.

5.0 CPCB-Report of the Technical Expert Committee (TEC) to evaluate pollution load of Pet-Coke Vs Possible Alternatives:

Emission load for Industrial Boilers:

The estimated Particulate Matter (PM) and SO₂ emission loads for Pet-Coke, Coal, Natural Gas, FO, Low Sulphur Heavy Stock (LSHS) & Light Diesel Oil (LDO) from 2, 10, 15 and 40 Tonnes per hour steam generating capacity Boilers are given in Table-V below. The emission load in respect to PM (primary and secondary) and SO₂ is much less in industrial Boilers compared to Thermal Power Plants. However, reduction in pollution load using alternative fuels such as Coal, LSHS, LDO and Natural gas instead of Pet-Coke would be proportionately same as in case of Thermal Power Plants.

For a 40 TPH Boiler, the fuel consumption is calculated as follows;

$$FC = [SP * (hs - hw) / (BE \& VHI)]$$

Where,

$$FC = \text{Fuel consumption}$$

SP = Steam Produced (T/hr)

hs = Enthalpy of feed water @ required pressure (810.1 Kcal / kg at 67atm pressure & 490⁰ C)

hw = Enthalpy of feed water @ saturation temperature (132 k Cal/kg)

BE = Boiler efficiency (82% assumed)

VHI = Fuel Heating Valve (GCV)

Table-V

Boiler Capacity : 2 TPH						
Pollutant	Pet coke	Coal	Natural Gas	FO	LSHS	LDO
Fuel consumption	4.96	9.9	-	3.97	3.77	3.71
Uncontrolled Emission						
SO ₂ emission	0.66	0.09	NM	0.34	0.9	0.13
Secondary Particulate emission as NH ₄ 2SO ₂	1.36	0.19		0.698	0.18	0.26
Primary PM emission	0.04	3.17	NM	0.03	NM	NM
Total PM emission load (Primary+ Secondary)	1.40	3.36		0.728	0.18	0.26
Controlled emission						
Scenario 1: Assuming 50% removal efficiency of controlsystem for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	0.33	0.05	NM	0.36	0.9	0.13
Secondary Particulate emission as NH ₄ 2SO ₂	0.68	0.10	NM	0.74	0.19	0.27
PM emission	0.01	0.95	NM	0.01	NM	NM
Total PM emission load (Primary+ Secondary)	0.69	1.05	NM	0.75	0.19	0.27
Scenario 1: Assuming 90% removal efficiency of controlsystem for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	0.08	0.01	NM	0.3	0.9	0.1
Secondary Particulate emission as NH ₄ 2SO ₂	0.16	0.02	NM	0.6	0.18	0.2
Primary PM emission	0.01	0.95	NM	0.01		
Total PM emission load (Primary+ Secondary)	0.17	0.97	-	0.7	0.18	0.02

Boiler Capacity : 10 TPH						
Pollutant	Pet coke	Coal	Natural Gas	FO	LSHS	LDO
Fuel consumption	24.8	49.6	-	19.85	18.85	18.54
Uncontrolled Emission						
SO ₂ emission	3.30	0.47	NM	1.70	0.43	0.64
Secondary Particulate emission as	6.79	0.97	NM	3.49	0.90	1.32

NH ₄ SO ₂						
Primary PM emission	0.19	15.87	NM	0.13	0.005	0.004
Total PM emission load (Primary+Secondary)	6.98	16.84	NM	3.62	0.905	1.324
Controlled emission						
Scenario 1: Assuming 50% removal efficiency of control system for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	1.65	0.24	NM	0.85	0.22	0.32
Secondary Particulate emission as NH ₄ SO ₂	3.40	0.49	NM	1.75	0.45	0.66
PM emission	0.06	4.76	NM	0.04	0.002	0.001
Total PM emission load (Primary+Secondary)	3.46	5.25	NM	1.79	0.452	0.661
Scenario 1: Assuming 90% removal efficiency of control system for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	0.33	0.047	NM	0.17	0.043	0.064
Secondary Particulate emission as NH ₄ SO ₂	0.68	0.10	NM	0.35	0.09	0.13
Primary PM emission	0.06	4.76	NM	0.04	0.002	0.001
Total PM emission load (Primary+Secondary)	0.74	4.86	NM	0.39	0.092	0.131
Boiler Capacity : 15 TPH						
Pollutant	Pet coke	Coal	Natural Gas	FO	LSHS	LDO
Fuel consumption	37.2	74.4	-	29.78	28.28	27.32
Uncontrolled Emission						
SO ₂ emission	4.95	0.706	NM	2.54	0.65	0.96
Secondary Particulate emission as NH ₄ SO ₂	10.19	1.46	NM	5.23	1.34	1.98
Primary PM emission	0.30	23.81	NM	0.19	0.007	0.006
Total PM emission load (Primary+Secondary)	10.49	25.27	NM	5.42	1.347	1.986
Controlled emission						
Scenario :Assuming 50% removal efficiency of control system for SO ₂ and 70% for PM (Coal & Petcoke)						
SO ₂ emission	2.47	0.35	NM	1.27	0.33	0.48
Secondary Particulate emission as NH ₄ SO ₂	5.10	0.73	NM	2.62	0.68	0.99
PM emission	0.003	0.24	NM	0.002	NM	NM
Total PM emission load (Primary+Secondary)	5.103	0.97	NM	2.622	0.68	0.99

Secondary)						
Scenario 2: Assuming 90% removal efficiency of control system for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	0.50	0.07	NM	0.25	0.07	0.10
Secondary Particulate emission as NH ₄ 2SO ₂	1.03	0.14	NM	0.51	0.14	0.21
PM emission	0.003	0.24	NM	0.002	NM	NM
Total PM emission load (Primary+ Secondary)	1.033	0.38	NM	0.512	0.14	0.21

Boiler Capacity : 40 TPH						
Pollutant	Pet coke	Coal	Natural Gas	FO	LSHS	LDO
Fuel consumption	99.22	198.48	-	79.31	75.36	74.16
Uncontrolled Emission						
SO ₂ emission	13.2	1.89	NM	6.78	1.74	2.57
Secondary Particulate emission as NH ₄ 2SO ₂	27.18	3.89	NM	13.97	3.59	5.29
Primary PM emission	0.79	63.6	NM	0.51	0.018	0.017
Total PM emission load (Primary+ Secondary)	27.97	67.49	NM	14.48	3.608	5.307
Controlled emission						
Scenario 1: Assuming 50% removal efficiency of control system for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	6.6	0.95	NM	3.39	0.87	1.285
Secondary Particulate emission as NH ₄ 2SO ₂	13.6	1.96	NM	6.99	1.79	2.65
PM emission	0.08	0.63	NM	0.51	0.018	0.017
Total PM emission load (Primary+ Secondary)	13.68	2.59	NM	7.50	1.808	2.667
Scenario 2: Assuming 90% removal efficiency of control system for SO ₂ and 70% for PM (Coal &Petcoke)						
SO ₂ emission	1.32	0.19	NM	0.68	0.17	0.26
Secondary Particulate emission as NH ₄ 2SO ₂	2.72	0.39	NM	1.401	0.358	0.54
Primary PM emission	0.08	0.63	NM	0.51	0.018	0.017
Total PM emission load (Primary+ Secondary)	2.8	1.02	NM	1.911	0.368	0.557

Assuming 100% SO₂ conversion as Secondary particulates and scrubber.

6.0 RECOMMENDATION OF THE STATE BOARD

The major concern of Pet-Coke and Furnace Oil to be used as fuel in industry is high Sulphur concentration which leads to emission of SO₂ and NO_x. Though the SO₂ and NO_x level in the ambient air for the last five years are well below the prescribed limits, in compliance with the

direction of the Hon'ble Supreme Court and Hon'ble National Green Tribunal and also to maintain the ambient air quality of the State in check, the State Pollution Control Board recommended use of following fuels for various sectors in general.

6(A) FUEL FOR INDUSTRY:

- i) Liquefied Petroleum Gas (LPG)
- ii) Liquefied Natural Gas (LNG)
- iii) Piped Natural Gas (PNG)
- iv) High Speed Diesel (HSD)
- v) Bio Gas
- vi) Bio-fuel (Bio-Ethanol etc.)
- vii) Refuse Derived Fuel (RDF): To be used in Cement kiln & Waste to Energy plant or any other unit allowed by the Central Government/State Government.
- viii) Biomass as fuel (like Pine Needles, Briquettes/Pellets of Pine Needles and other Biomass (including Lantana etc.):
- ix) Pet Coke subject to Specific Conditions :
 - a) In units such as Cement Plant or Lime kiln, Calcium carbide and Gasification for use as feed stock or in the manufacturing process only on actual user basis or in process where Sulphur is completely absorbed as per Office Memorandum issued by Ministry of Environment Forest & Climate Change (MoEF&CC) vide no. Q-18011/54/2018-CPA Dt10-092018.
 - b) Units having Boiler with capacity of 20 TPH or less, Pet-coke as a fuel may be allowed with a condition that, unit shall install the system for 90% recovery of SO₂ emission.
 - c) Unit having Boiler more than 20 TPH, Pet-Coke as a fuel may be allowed with a condition that, unit shall install the system for 90% recovery of SO₂ emission and unit shall install the continuous online emission monitoring system.
 - d) For those Units having furnaces based upon Pet-Coke fuel may be allowed with a condition that Unit(s) shall install the system for 90% recovery of SO₂ emission and unit shall install the continuous online emission monitoring system.

6. (B) POLICY FOR FURNACE OIL:

Units which are using Furnace Oil as fuel shall shift to HSD or any other cleaner fuel mentioned at Sr. No. 6 A (i) to A (viii).

6. (C) FUEL FOR TRANSPORTATION

- (i) Bharat Stage VI compliant petrol and diesel with 10 ppm Sulphur.
- (ii) Liquid Petroleum Gas
- (iii) Natural gas/Compressed Natural Gas (CNG)
- (iv) Biofuels
- (v) Any other fuel notified/to be notified by the Central Government/State Government.

6. (D) FUEL FOR COMMERCIAL SECTOR

(Restaurants/ Dhabas/ Hotels/ Canteens/ Hostel Canteens etc.

- (i) Liquid Petroleum Gas
- (ii) Bio gas
- (iii) Bio-fuel
- (iv) Any other fuel notified/to be notified by the Central Government/State Government.

7. SPECIAL RECOMMENDATIONS:

- (i) In no case Furnace Oil shall be allowed as fuel with effect from notification of the policy.
- (ii) All existing units/under-construction/up-coming units shall have to follow this fuel policy or else shall close down the production.
- (ii) In no case tyre/pyrolysis oil and LDO shall be allowed as fuel in Mizoram.
- (iii) This Fuel Policy shall be subject to any direction/notification/modification/ guidelines issued/to be issued by the Supreme Court/ National Green Tribunal/any Court of Law/Central Govt./State Govt./CPCB/SPCB at any subsequent stage.

- (iv) Industrial units (if any)using Pet-Coke as fuel either have to comply Condition No. 6 (A) IX may also have to switch over to cleaner fuels by altering their plant & machinery alongwith necessary pollution control devices to comply the ambient air quality norms as specified in Environment (Protection) Act, 1986.
- (v) The Government of Mizoram shall review the Policy after the two years and may consider to revise the same in view of the results of the emission levels.
- (vi) Import of petcoke: Import of petcoke would be regulated following the guidelines notified by the MoEf & CC, GOI vide No. Q-18011/54/2018 – CPA Dt 10.09.2018 and other orders/guidelines on the subject as may be issued from time to time.