Yokkaichi Oil Refinery

Address: 1-1 Daikyo-cho, Yokkaichi-shi, Mie-ken
Start of operations: July, 1943
Area: 1,330,377 m²
Employees: 346
Crude oil processing capacity: 155,000 barrels/day (as of March, 2001)

■ Regulated materials

	Material	Regulation	Regulation contents	Regulation value	Actual results Maximum	Actual results Average
Air related	NOx (m^3_N/hour)	Pollution Prevention Agreement	Total volume regulation	80.8	66.9	36.1
	SOx (m^3_N/hour)	Pollution Prevention Agreement	Total volume regulation	109.48	62.0	26.0
	Dust (boiler) (g/m^3_N)	Pollution Prevention Agreement	Concentration regulation	0.049	0.044	0.025

	Material	Regulation	Regulation contents	Regulation value	Actual results Maximum	Actual results Average
Water related	COD (kg/day)	Pollution Prevention Agreement	Total volume regulation	535	428.7	223.1
	〃 (mg/L)	Water Pollution Control Law	Concentration regulation	160 (120)	7.8	4.7
	SS (mg/L)	Water Pollution Control Law	Concentration regulation	200 (150)	8.0	4.1
	Oil content (mg/L)	Prefectural regulation	Concentration regulation	1	Below lower measurement limit	
	Nitrogen (mg/L)	Municipal guideline	Concentration regulation	15	Below lower measurement limit	
	Phosphorus (mg/L)	Municipal guideline	Concentration regulation	1.5	0.11	0.05
	Phenol (mg/L)	Prefectural regulation	Concentration regulation	1	Below lower measurement limit	

Figures in parentheses = daily average

■ Environmental performance

	Volume used/volume discharged	Basic unit
Energy	424,961(crude oil kL/year)	10.81(crude oil kL/1,000kL)
CO_2	1,135,404(CO_2 tons/year)	28.88(CO_2 kg/kL)
SOx	647(tons/year)	16.46(g/kL)
NOx	645(tons/year)	16.41(g/kL)
COD	81(tons/year)	2.06(g/kL)

Quantity of industrial waste generated	10,350	(tons/year)
Quantity of industrial waste recycled	2,850	(tons/year)
Quantity of industrial waste disposed	899	(tons/year)
PRTR (atmospheric release) benzene	2.8	(tons/year)
PRTR (atmospheric release) toluene	3.0	(tons/year)
PRTR (atmospheric release) xylene	1.4	(tons/year)
PRTR (atmospheric release) ethyl benzene	0.4	(tons/year)
PRTR (recycling) volume of industrial waste recycled	40.5	(tons/year)

■ Environmental accounting

Item	Environmental protection cost Cost	Investment	Fiscal-year-end acquisition costs
0 Product environmental impact reduction costs	4,600	853	10,059
Heavy fuel oil sulfur reduction	2,074	791	3,306
Diesel fuel sulfur reduction	733	7	2,045
Removal of lead from gasoline	1,361	55	2,969
Benzene reduction in gasoline	432	—	1,739
1 Business area results	3,654	314	8,723
Pollution prevention costs	1,285	310	6,553
Global environmental protection costs	2,153	4	2,159
Resource recycling costs	216	—	11
2 Upstream/downstream costs	—	—	—
3 Administration activity costs	13	—	—
4 Research and development costs	—	—	—
5 Social activity costs	364	—	—
Total	8,631	1,167	18,782

Item	Environmental protection effect Reduction of environmental impact: Decrease of environmental impact	Concentration/basic unit
0 Effectiveness of reduction of product environmental impact		
Product sulfur reduction	(Latent SOx, tons)	(Sulfur content,%)
• Gasoline	155	0.0068
• Kerosene	59	0.0049
• Diesel fuel	2,767	0.1560
	(kL)	(%)
Benzene reduction in gasoline	67,450	4.3550
1 Effect within business area	(t)	(g/kL)
SOx emissions	23	1.17
NOx emissions	▲39	▲0.47
Benzene emissions	0.7	0.02
COD displacement	6.8	0.25
	(1,000 tons CO_2)	(kg-CO_2/kL)
CO_2 emissions	▲34.85	0.07
	(t)	
Industrial waste generated	▲1,316	—
Reused industrial waste	▲775	—
Industrial waste disposed	132	—

■ Economic Effect (million yen)

Savings through energy reductions (savings through cogeneration)	964
Saving through catalyst recycling (reduction of waste management cost)	19