

# Yokkaichi Oil Refinery

Address: 1-1 Daikyo-cho, Yokkaichi-shi, Mie-ken

Start of operations: July 1943

Area: 1,188,075 m<sup>2</sup>

Employees: 335

Crude oil processing capacity: 155,000 barrels/day  
(as of March 2003)



## Regulated pollutants

Air pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	Nox (m3n/hour )	Pollution control agreement	Total pollutant load	78.4	61.1	34.8
	Sox (m3n/hour )	Pollution control agreement	Total pollutant load	108.21	58.0	28.9
	Particulate( boiler )(g/m3n)	Pollution control agreement	Concentration	0.049	0.037	0.028

  

Water pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	COD (kg/day)	Pollution control agreement	Total pollutant load	535	419.6	172.5
	COD (mg/l)	Water Pollution Control Law	Concentration	160( 120 )	5.4	4.0
	SS (mg/l)	Water Pollution Control Law	Concentration	200( 150 )	9.0	4.0
	Oil content (mg/l)	Prefectural ordinance	Concentration	1	Below measurement threshold	
	Nitrogen (mg/l)	Municipal guidance	Concentration	15	Below measurement threshold	
	Phosphorus (mg/l)	Municipal guidance	Concentration	1.5	0.11	0.06
	Phenol (mg/l)	Prefectural ordinance	Concentration	1	0.061	0.061

## Environmental performance

Figures in parentheses = daily average

	Amount	Amount per unit of production
Energy	424,782 kl-crude oil/year	10.58 kl-crude oil/thousand kl
CO2	1,112,417 t-CO2/year	27.69 kg-CO2/kl
SOx	718 t/year	17.9 g/kl
NOx	622 t/year	15.5 g/kl
COD	62.6 t/year	1.56 g/kl
Industrial waste generated	6,550 t/year	
Industrial waste recycled	2,556 t/year	
Industrial waste sent to landfill	494 t/year	

PRTR Law designated chemical substance	Releases/transfers
Ethyl benzene (atmospheric releases)	320 kg/year
Xylene (atmospheric releases)	1,300 kg/year
1,3,5-trimethylbenzene (atmospheric releases)	29 kg/year
Toluene (atmospheric releases)	4,400 kg/year
Benzene (atmospheric releases)	1,500 kg/year
Cobalt and its compounds (transfers)	7,600 kg/year
Nickel compounds (transfers)	1,000 kg/year
Molybdenum and its compounds (transfers)	32,000 kg/year

## Environmental accounting

Item	Environmental costs (million yen)	
	Investments	Expenditures
1.Business area costs	1	3,519
Global environment costs	1	1,244
Pollution prevention costs	0	2,095
Resource circulation costs	0	180
2.Upstream/downstream costs	1,459	4,223
Green procurement costs	0	0
Product environmental impact reduction costs	1,459	4,223
Product sulfur reduction costs	1,423	2,475
Gasoline	408	708
Naphtha	102	177
Jet fuel	14	25
Kerosene	233	405
Diesel fuel	320	557
Heavy fuel oil A	288	501
Heavy fuel oil C	0	0
LPG	58	102
Cost of substituting toxic substances in gasoline	36	1,748
Cost of reducing aromatics in petrochemical products	0	0
3.Management activity costs	0	98
4.Research and development costs	0	0
5.Social activity costs	0	1
<b>Total</b>	<b>1,460</b>	<b>7,841</b>

Cost of purchasing recycled paper 1 (million yen)

## Economic effects( 870 million yen )

Cost savings through energy conservation (cogeneration) : 397

Cost savings from recycling of catalyst (reduction in disposal costs, etc.) : 11

Effects of R&D (royalty revenues, etc.) : 0

Item	Environmental protection effects	
	Reduction of environmental impacts (2001 value minus 2002 value)	
	Intensity/unit	Environmental impact
1.Business area effects		
Effects of reduction in resource inputs	( kl-crude oil /thousand kl )	( TJ )
Energy input	0.05	164
Water input	( kg/kL ) ( thousand t )	
	-18	-632
Effects of reduction in emissions and waste generation		
Releases to the atmosphere ( kg-CO2/kl ) ( thousand-t-CO2 )		
CO2	0.67	35
SOx	( g/kL ) ( t )	
	0.8	38
NOx	2.9	123
Benzene	0.00	0.00
Releases to water bodies ( g/kL ) ( t )		
COD	0.14	6.1
Industrial waste emissions ( g/kL ) ( t )		
Generated	53	2,191
Recycled	-6	-193
Sent to landfill	3	129
2.Upstream/downstream effects		
Effects of reducing environmental impacts of products		
Reduction of sulfur in products ( % sulfur by weight ) ( potential SOx emissions, t )		
High octane gasoline	0.0000	0
Regular gasoline	-0.0002	-10
Naphtha	-0.0017	-6
Jet fuel	-0.0002	0
Kerosene	0.0013	15
Diesel	0.0142	265
Heavy fuel oil A	0.0338	-825
Heavy fuel oil C	0.1316	1,643
LPG	-0.0004	-1
Total	0.0383	1,080
( % by weight ) ( t )		
Reducing benzene in gasoline	-0.0169	-695
Effects of reducing aromatics in petrochemical products ( t-CO2/kl ) ( thousand-t-CO2 )		
	0	0
CO2 emissions from product use	-0.0110	-878