

Sakai Oil Refinery

Address: 3-16Chikko-Shinmachi, Sakai-shi,
Osaka-fu

Start of operations: October 1968

Area: 1,254,603 m²

Employees: 198

Crude oil processing capacity: 80,000 barrels/day
(as of March 2003)



Regulated pollutants

Air pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	Nox (m3n/hour)	Municipal notification	Total pollutant load	48.82	16.9	10.2
	Sox (m3n/hour)	Municipal notification	Total pollutant load	45.6	0.9	0.5
	Particulate(boiler)(g/m3n)	Prefectural ordinance	Concentration	0.05	Below measurement threshold	

Water pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	COD (kg/day)	Water Pollution Control Law	Total pollutant load	186.8	86.7	50.2
	COD (mg/l)	Prefectural ordinance	Concentration	15(10)	9.8	7.1
	SS (mg/l)	Prefectural ordinance	Concentration	40(30)	Below measurement threshold	
	Oil content (mg/l)	Prefectural ordinance	Concentration	2	Below measurement threshold	
	Nitrogen (mg/l)	Prefectural directive	Concentration	35	4.0	3.0
	Phosphorus (mg/l)	Prefectural directive	Concentration	1.5	0.443	0.133
	Phenol (mg/l)	Prefectural ordinance	Concentration	2	Below measurement threshold	

Environmental performance

Figures in parentheses = daily average

	Amount	Amount per unit of production
Energy	251,051 kl-crude oil/year	8.94kl-crude oil/thousand kl
CO ₂	699,747 t-CO ₂ /year	24.93kg-CO ₂ /kl
SO _x	14 t/year	0.5g/kl
NO _x	183 t/year	6.5g/kl
COD	18.3 t/year	0.65g/kl
Industrial waste generated	4,158 t/year	
Industrial waste recycled	918 t/year	
Industrial waste sent to landfill	307 t/year	

PRTR Law designated chemical substance	Releases/transfers
Ethyl benzene (atmospheric releases)	140 kg/year
Xylene (atmospheric releases)	600 kg/year
1,3,5-trimethylbenzene (atmospheric releases)	20 kg/year
Toluene (atmospheric releases)	1,700 kg/year
Benzene (atmospheric releases)	720 kg/year
Nickel compounds (transfers)	1,500 kg/year

Environmental accounting

Item	Environmental costs (million yen)	
	Investments	Expenditures
1.Business area costs	0	3,213
Global environment costs	0	603
Pollution prevention costs	0	2,550
Resource circulation costs	0	60
2.Upstream/downstream costs	3	4,173
Green procurement costs	0	0
Product environmental impact reduction costs	3	4,173
Product sulfur reduction costs	0	2,216
Gasoline	0	758
Naphtha	0	134
Jet fuel	0	183
Kerosene	0	304
Diesel fuel	0	563
Heavy fuel oil A	0	241
Heavy fuel oil C	0	0
LPG	0	33
Cost of substituting toxic substances in gasoline	3	1,957
Cost of reducing aromatics in petrochemical products	0	0
3.Management activity costs	0	63
4.Research and development costs	0	0
5.Social activity costs	0	0
Total	3	7,449

Cost of purchasing recycled paper 2 (million yen)

Economic effects(936million yen)

Cost savings through energy conservation (cogeneration) : 936

Cost savings from recycling of catalyst (reduction in disposal costs, etc.) : 0

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	-0.26	212
Water input	(kg/L) (thousand t)	
Water input	-4	183
Effects of reduction in emissions and waste generation		
Releases to the atmosphere	(kg-CO ₂ /kL) (thousand-CO ₂)	
CO ₂	-0.56	21
SO _x	(g/kL) (t)	
SO _x	-0.1	-2
NO _x	-0.4	-3
Benzene	0.00	0.03
Releases to water bodies	(g/kL) (t)	
COD	0.03	1.8
Industrial waste emissions	(g/kL) (t)	
Generated	22	878
Recycled	2	110
Sent to landfill	0	16
2.Upstream/downstream effects		
Effects of reducing environmental impacts of products		
Reduction of sulfur in products	(potential SO _x emissions, t)	(potential SO _x emissions, t)
High octane gasoline	0.0001	0
Regular gasoline	0.0003	5
Naphtha	-0.0079	-14
Jet fuel	-0.0095	-6
Kerosene	-0.0006	0
Diesel	0.0158	270
Heavy fuel oil A	0.0291	-6
Heavy fuel oil C	-0.0504	-2,336
LPG	-0.0002	0
Total	-0.0651	-2,087
(% by weight)		(t)
Reducing benzene in gasoline	-0.0809	-455
Effects of reducing aromatics in petrochemical products	(kL) (kL)	
in petrochemical products	0	0
CO ₂ emissions from product use	(t-CO ₂ /kL) (thousand-CO ₂)	
CO ₂ emissions from product use	-0.0061	655