

# Sakaide Oil Refinery

Address: 1-1 Bannosu Midori-machi, Sakaide-shi,  
Kagawa-ken

Start of operations: October 1972

Area: 847,943 m<sup>2</sup>

Employees: 223

Crude oil processing capacity: 120,000 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	190.0	58.0	39.0
	Sox (m3n/hour)	Municipal notification	Total pollutant load	164.0	74.7	56.0
	Particulate( boiler )(g/m3n)	Prefectural ordinance	Concentration	0.05	0.005	0.005

Water pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	COD (kg/day)	Prefectural ordinance	Total pollutant load	120.0	54.3	30.6
	COD (mg/l)	Prefectural ordinance	Concentration	15( 10 )	5.0	3.2
	SS (mg/l)	Prefectural ordinance	Concentration	15( 10 )	13.0	4.8
	Oil content (mg/l)	Prefectural ordinance	Concentration	2	Below measurement threshold	
	Nitrogen (mg/l)	Water Pollution Control Law	Concentration	12( 60 )	1.8	1.3
	Phosphorus (mg/l)	Water Pollution Control Law	Concentration	1( 8 )	0.05	0.03
	Phenol (mg/l)	Prefectural ordinance	Concentration	1	0.008	0.008

## Environmental performance

Figures in parentheses = daily average

	Amount	Amount per unit of production
Energy	351,116	9.46
CO <sub>2</sub>	1,005,332	27.08
SO <sub>x</sub>	1,401	37.7
NO <sub>x</sub>	702	18.9
COD	11.2	0.30
Industrial waste generated	14,740	
Industrial waste recycled	2,163	
Industrial waste sent to landfill	189	

PRTR Law designated chemical substance	Releases/transfers
Ethyl benzene (atmospheric releases)	500 kg/year
Xylene (atmospheric releases)	2,200 kg/year
1,3,5-trimethylbenzene (atmospheric releases)	44 kg/year
Toluene (atmospheric releases)	8,200 kg/year
Benzene (atmospheric releases)	2,500 kg/year
Nickel compounds (transfers)	35,000 kg/year
Molybdenum and its compounds (transfers)	39,000 kg/year
Dioxins (atmpsheric releases)	0.027 mg-TEQ/year
Dioxins (releases to water bodies)	0.15 mg-TEQ/year
Dioxins (transfers)	0.000053 mg-TEQ/year

## Environmental accounting

Item	Environmental costs (million yen)	
	Investments	Expenditures
1.Business area costs	17	1,067
Global environment costs	17	969
Pollution prevention costs	0	0
Resource circulation costs	0	98
2.Upstream/downstream costs	508	7,854
Green procurement costs	0	0
Product environmental impact reduction costs	508	7,854
Product sulfur reduction costs	393	5,435
Gasoline	129	1,787
Naphtha	11	151
Jet fuel	13	186
Kerosene	70	967
Diesel fuel	111	1,528
Heavy fuel oil A	42	588
Heavy fuel oil C	1	13
LPG	16	215
Cost of substituting toxic substances in gasoline	115	2,419
Cost of reducing aromatics in petrochemical products	0	0
3.Management activity costs	0	37
4.Research and development costs	0	0
5.Social activity costs	0	0
<b>Total</b>	<b>525</b>	<b>8,958</b>

Cost of purchasing recycled paper 1 (million yen)

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	0.06	-858
Water input	( kg/kL ) ( thousand t )	
Water input	10	177
Effects of reduction in emissions and waste generation		
Releases to the atmosphere	( kg-CO <sub>2</sub> /kL ) ( thousand-CO <sub>2</sub> )	
CO <sub>2</sub>	0.59	-46
SO <sub>x</sub>	( g/kL ) ( t )	
SO <sub>x</sub>	-5.2	-273
NO <sub>x</sub>	-1.8	-108
Benzene	-0.01	-0.30
Releases to water bodies	( g/kL ) ( t )	
COD	0.01	-0.5
Industrial waste emissions	( g/kL ) ( t )	
Generated	36	281
Recycled	10	189
Sent to landfill	5	145
2.Upstream/downstream effects		
Effects of reducing environmental impacts of products		
Reduction of sulfur in products	( potential SO <sub>x</sub> emissions, t )	( potential SO <sub>x</sub> emissions, t )
High octane gasoline	0.0001	0
Regular gasoline	0.0001	-6
Naphtha	-0.0011	21
Jet fuel	0.0012	2
Kerosene	0.0019	23
Diesel	0.0219	351
Heavy fuel oil A	0.0072	88
Heavy fuel oil C	-0.1194	-1,511
LPG	0.0000	-1
Total	0.0030	-1,033
(% by weight)		( t )
Reducing benzene in gasoline	-0.0879	-1,851
Effects of reducing aromatics in petrochemical products	0	0
CO <sub>2</sub> emissions from product use	( t-CO <sub>2</sub> /kL ) ( thousand-CO <sub>2</sub> )	
CO <sub>2</sub> emissions from product use	0.0121	-330

## Economic effects( 0million yen )

Cost savings through energy conservation (cogeneration) : 0

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

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