

Sakai Refinery

as of 31 March, 2004

Address:	3-16 Chikko-Shin-machi, Sakai-shi, Osaka-fu
Start-up:	October 1968
Total area:	1,254,603m ²
Employees:	193
Capacity:	80,000 ballels/day
ISO 9001:	March 14 1997
ISO 14001:	March 20, 1998



■ About Sakai Refinery

Although its crude oil processing capacity of 80,000 barrels/day appears to be small in scale, Sakai Refinery assumes responsibility for a stable supply of products throughout the Kinki region, predominately to the Kyoto-Osaka-Kobe area. With the slogan of aiming to be a green factory, the refinery is actively engaged in reducing the environmental impact resulting from its business activities. This includes reducing emission of sulfur oxide and nitrogen oxide through the use of gaseous fuel within the site, reducing waste disposed from business activities through practices of highly developed 3Rs, and reducing emission of greenhouse gas through thorough practice of energy conservation. These practices have been highly evaluated externally, as illustrated by our being awarded the Director-General's Award from the Agency of Natural Resources and Energy.

As we value relationships with the local community, we have carried out a number of social contribution activities. This includes holding tennis schools coached by our employees, giving free access to our playground to the local boys' baseball team, and conducting clean-ups of surrounding public roads. In the local neighborhood associations' papers, we have announced our new project to distribute to children approximately 1,000 wild medaka fish (killifish) raised on the refinery site, on the occasion of the Bon Festival Dance held in the precincts of the historic Iwatsuta Shrine. We continue to make efforts so that our refinery can remain safe, environmentally-friendly, and loved by the local community, and so that we can maintain a stable supply of environmentally-friendly products.



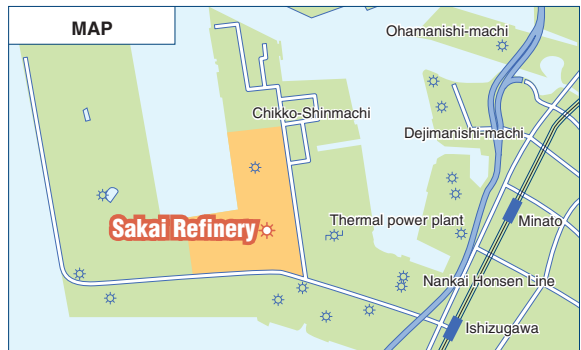
Hajime Marukawa
Director
Sakai Refinery

■ Communication activity

- Holds explanatory sessions on the refinery's new works for local community associations
- Holds information exchange sessions with other corporations in Sakai Rinkai industrial area
- Organizes tennis schools twice yearly
- Conducts the off-site clean-ups (e.g., in front of the Ishizugawa Station and the area surrounding site, etc.)

■ Award

- Received the Energy Conservation Center Chairman's Award at the national convention for successful energy-saving cases in FY 2003
- Commended by the Director-General of the Kansai Bureau of Economy, Trade and Industry as an excellent high-pressure gas business site.
- Sakai LPG base was commended by Mayor of Osaka as a good-standing high-pressure gas business establishment.



■ Number of staff holding environmental qualifications

Air pollution control manager	17
Water pollution control manager	13
Hazardous materials officer (Class A & B)	276
High-pressure gas production safety manager (Class A & B)	172
Qualified person for heat management	16
Qualified person for electricity management	4
Specially controlled industrial waste manager	2
Environmental Certified Measurer	4
Boiler operator (Special grade)	3
Boiler operator (1st & 2nd grade)	190

Number of refinery visitors in FY2003	32 times, 263 visitors
No accident record (total hours, as of Dec. 2003)	1,140,000 hours
PCB custody	High pressure condenser: 12 Others

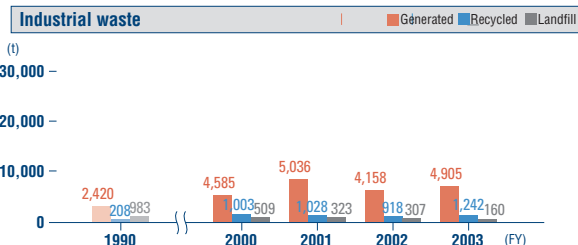
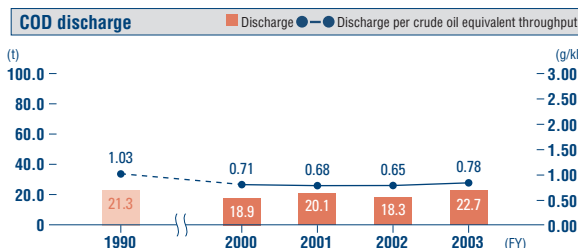
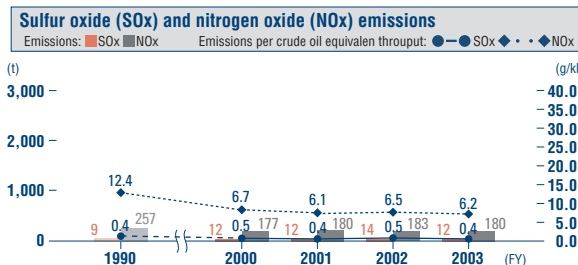
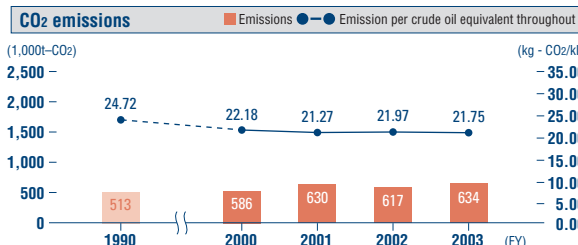
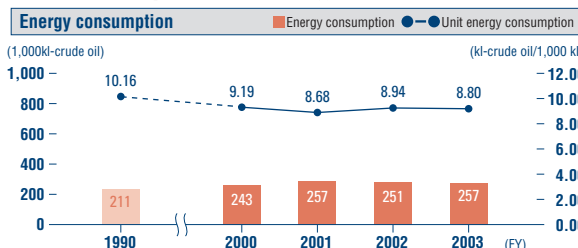
Regulated pollutants

Air pollutants	Pollutant	Standard	Actual Performance in FY 2003	
			Maximum	Average
	NOx (m³N/hour; total pollutant load control)	48.822	12.53	10.0
	SOx (m³N/hour; total pollutant load control)	45.639	12.68	0.4
	Particulate (boiler; g/m³N)	0.03	0.004	0.004

Water pollutants	Pollutant	Standard	Actual Performance in FY 2003	
			Maximum	Average
	COD (kg/day; total pollutant load control)	186.8	98.31	62.06
	COD (mg/L)	15(10)	9.9	7.5
	SS (mg/L)	40(30)	Below measurement threshold	
	Oil Content (mg/L)	2	Below measurement threshold	
	Nitrogen (mg/L)	35	4.0	3.0
	Phosphorus (mg/L)	1.5	0.167	0.070
	Phenols (mg/L)	2	Below measurement threshold	

Values in () are daily average.

Environmental performance (energy, etc.)



Environmental performance (PRTR)

PRTR listed substances		Releases				Transfers
		Air	Water	Soil	Total	
2-aminoethanol	kg/year	0	0	0	0	0
Ethyl benzene	kg/year	100	0	0	100	0
Xylene	kg/year	520	0	0	520	0
1,3,5-trimethyl benzene	kg/year	0.3	0	0	0.3	0
Toluene	kg/year	1,400	0	0	1,400	0
Nickel compounds	kg/year	0	0	0	0	1,300
Hydrazine	kg/year	0	0	0	0	0
Benzene	kg/year	560	0	0	560	0
Zinc compounds (water soluble)	kg/year	0	1,100	0	1,100	0
Antimony and its compounds	kg/year	0	0	0	0	1,200
Tetrachloroethylene	kg/year	0	0	0	0	0

Environmental accounting

Environmental costs (million yen)		FY 2003	
Item		Investment	Expenditure
Business area	Pollution prevention	33	589
	Global environmental conservation	0	2,137
	Resource recycling	0	88
Up/Down-stream	Green Purchasing	0	0
	Reduction of environmental impact of products	68	4,078
	Sulfur reduction of products	19	2,189
	Substitution of toxic substances in gasoline	49	1,889
Management activity		0	94
Research and development		0	0
Social activity		0	0
Total		101	6,986

Purchasing recycled paper: 1 million yen

Economic benefits (million yen)

Item	FY 2003
Costs saved through energy conservation (cogeneration)	779
Total	779

Environmental benefits

Item	FY 2003	
	Reduction (year-on-year)	
	Concentrations/unit value	Impact
Business area		
Reduced resources input into business activities		
Energy input	0.14 (kl-crude/1,000kl)	-214 (TJ)
Water input	4 (kg/kl)	-114 (1,000t)
Reduced emissions and waste generation		
Emissions to air:		
CO ₂	0.22 (kg-CO ₂ /kl)	-17 (1,000t-CO ₂)
SOx	0.1 (g/kl)	2 (t)
NOx	0.3 (g/kl)	3 (t)
Benzene	0.01 (g/kl)	0.16 (t)
Emissions to water:		
COD	-0.13 (g/kl)	-4.4 (t)
Industrial waste :		
Generation	-20 (g/kl)	-747 (t)
Recycled	-10 (g/kl)	-324 (t)
Landfill	6 (g/kl)	147 (t)
Up/Down-stream benefits		
Reduced environmental impact of products		
Reduced sulfur content in products	(sulfur content: mass %)	(potential SOx: t)
High octane gasoline	0.0001	1
Regular gasoline	0.0000	0
Naphtha	-0.0147	-25
Jet fuel oil	0.0111	48
Kerosene	0.0008	5
Diesel fuel	0.0233	281
Heavy fuel oil A	-0.0112	-114
Heavy fuel oil C	0.1142	3,449
LPG	0.0000	0
Total	0.0556	3,645
Reducing benzene in gasoline	0.0857 (vol%)	829 (t)
CO ₂ emissions from product use	0.0088 (t-CO ₂ /kl)	79 (1,000t-CO ₂)