

Sakai Refinery (as of March 31, 2005)

Address	3-16 Chikkoshin-machi, Sakai, Osaka
Start-up	October 1968
Total area	1,254,603 m ²
Company Staffs	187
Capacity	80,000 barrels/day
ISO 9001	March 14 1997
ISO 14001	March 20, 1998



About the Sakai Refinery

The Sakai Refinery, located in the Sakai/ Senboku Coastal Industrial Belt, produces such petroleum products as LPG, gasoline, naphtha, kerosene, jet fuel, diesel fuel, heavy fuel oil, and asphalt, and provides these products to customers mainly in the 4 prefectures that comprise the Kinki region. With the Keihanshin region being a major consumption region which the Sakai Refinery serves, this refinery is characterized by its positioning as a refinery with a high percentage of land deliveries, and as a jet fuel oil supply base to the Kansai International Airport.

- **Environmental activities:** Striving to become an environmentally advanced refinery, the Sakai Refinery strives to, of course, supply products that are environmentally friendly such as sulfur free automobile fuels, but it also strives to minimize NO_x and SO_x emissions by using environmentally friendly fuels within the site (exclusive use of gas), to actively reduce waste by promoting the 3Rs, to control CO₂ emission by reinforcing energy conservation measures, and engaging in other measures that help to reduce the environmental impact of the refinery's business activities. In addition, the Sakai Refinery actively promotes nurturing of environmental awareness among its company staffs by promoting, for example, the green office program.
- **Safety activities:** Maintenance and development of safe and stable operations is one of the most important goals of the Sakai Refinery. By operating the safety management system that reflects all of the knowledge and safety management structures of the entire company, this refinery constantly incorporates advances in safety management, and as a safety precaution, it also reinforces and conducts training of preventative strategies for a variety of possible accidents and disasters.
- **Activities for the regional community:** Through such activities as the monthly cleaning of local roads, providing of grounds to the local children's baseball team, and holding of the tennis school for local residents (twice yearly), the Sakai Refinery engages in exchanges with the local residents and contributes back to the community it serves, elementary school children, and encourages exchanges through a variety of other activities.



Hajime Marukawa
Director
Sakai Refinery

Environmental Activities

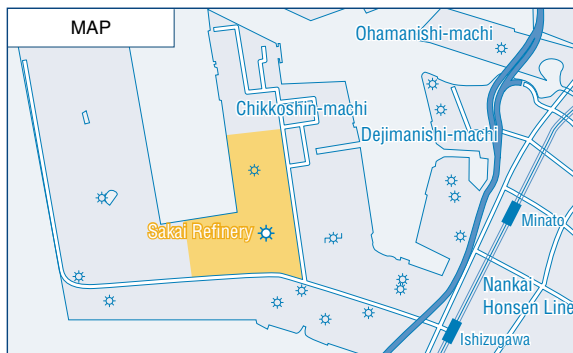
- **Energy conservation**
Conservation of energy through the installment of such equipment as the "high pressure steam trap exhaust heat recovery equipment", and "improvement of the steam pipe work for optimizing the use of steam", etc.
- **Environment equipment**
Introduced the "gasoline desulfurization units (sulfur free gasoline supply)", etc.

Health and Safety Activities

- **Accomplishment of major maintenance programs and introduction of large equipment (gasoline desulfurization units)**
Carried out operations without a single accident or disaster by thoroughly implementing operational management, construction quality management, and site education for both the production and safety divisions.
- **Preventative measures**
Implemented "Director and dupty-director safety meetings" (a meeting for the exchange of opinions between the operators and the director/dupty-director), etc.

Regional Communication Activities

- **Cleaning of areas outside of the business premises (twice annually, participation by approximately 150 people), volunteer cleanup activities (10 times annually, participation by approximately 30 - 40 people each time)**
- **Participation in the local town council sponsored summer festival and the Iwatsuta Shrine's Yassai Hossai festival**
- **Holding of the tennis school (twice annually), etc.**



Number of Staff holding Environmental Qualifications

Air pollution control manager	17
Water pollution control manager	13
Noise pollution control manager	2
Vibration pollution control manager	1
Hazardous materials officer (Class A & B)	265
High-pressure gas production safety manager (Class A & B)	166
Qualified person for heat management	14
Qualified person for electricity management	3
Specially controlled industrial waste manager	2
Environmental certified measurer	2
Boiler operator (Special grade)	3
Boiler operator (1st & 2nd grade)	189

Number of visitors to the Refinery in Fiscal 2004	15 visits 171 people
No accident record (as of December 2004)	1,515,000 hours
PCB custody status	High voltage condensers 15 units Others

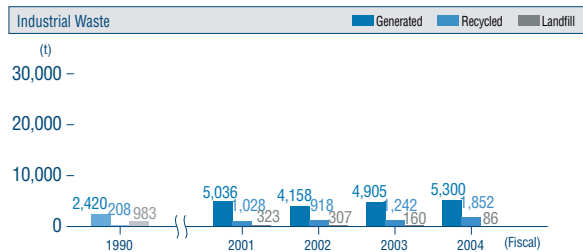
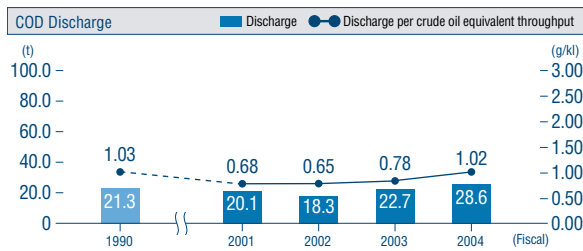
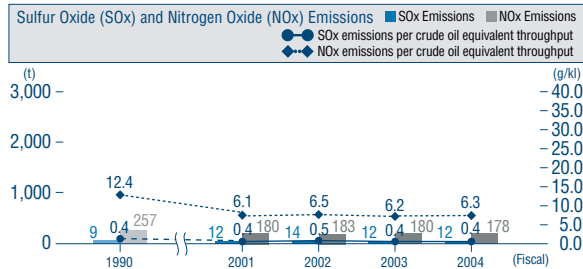
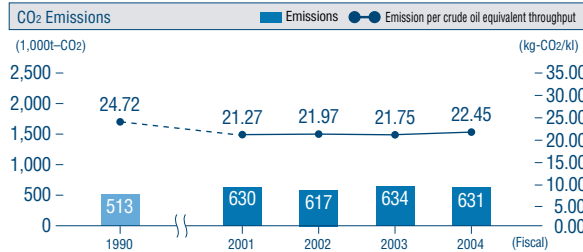
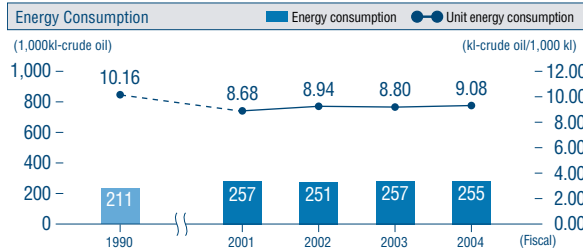
Regulated Pollutants

Air pollutants	Pollutant	Standard	Actual Performance in Fiscal 2004	
			Maximum	Average
	NOx (m ³ N/hour; total pollutant load control)	50.028	16.00	9.97
	SOx (m ³ N/hour; total pollutant load control)	48.011	16.24	0.5
	Particulate (CG/EB; g/m ³)	0.03	Below measurement threshold	

Water pollutants	Pollutant	Standard	Actual Performance in Fiscal 2004	
			Maximum	Average
	COD (kg/day; total pollutant load control)	186.8	128.49	78.46
	COD (mg/L)	15 (10)	9.8	8.3
	SS (mg/L)	40 (30)	Below measurement threshold	
	Oil Content (mg/L)	2	Below measurement threshold	
	Nitrogen (kg/day; total pollutant load control)	206.02	99.18	36.06
	Nitrogen (mg/L)	35	4.0	3.0
	Phosphorus (kg/day; total pollutant load control)	24.87	2.383	0.659
	Phosphorus (mg/L)	1.5	0.635	0.190
	Phenols (mg/L)	2	Below measurement threshold	

Values in () are daily average.

Environmental Performance (energy, etc.)



Environmental Performance (PRTR)

PRTR listed substances	Releases	Releases				Transfers
		Air	Water	Soil	Total	
Ethyl benzene	kg/year	130	0	0	130	0
Xylene	kg/year	630	0	0	630	0
Cobalt and its compounds	kg/year	0	0	0	0	360
1,3,5-trimethylbenzene	kg/year	0.3	0	0	0.3	0
Toluene	kg/year	1,700	0	0	1,700	0
Nickel compounds	kg/year	0	0	0	0	1,200
Benzene	kg/year	670	0	0	670	0
Molybdenum and its compounds	kg/year	0	0	0	0	2,000
Zinc compounds (water soluble)	kg/year	0	1,200	0	1,200	0

* In addition to above, we treat 2-aminoethanol over 1 thousand kg per year, the release and transfer volume are 0 kg per year.

Environmental Accounting

Category and Key Activity	Fiscal 2004	
	Investment	Cost
1. Business area: Pollution prevention	44	713
Global environmental conservation	8	2,296
Resource circulation	0	109
2. Upstream/downstream: Green purchasing	0	0
Reduction of environmental impact of products	3,760	6,131
Sulfur reduction of products	(3,446)	(3,469)
Substitution of toxic substances in gasoline	(314)	(2,662)
3. Administration	2	61
4. Research and development	0	0
5. Social activity	0	0
Total	3,814	9,310

Purchasing recycled paper: 1 million yen

Economic benefit (million yen)

Details of Benefit	Fiscal 2004
Energy conservation (cogeneration)	561
Total	561

Environmental conservation benefits

Item	Fiscal 2004	
	Reduction (year-on-year)	
	Concentrations/unit value	Impact
1. Benefits corresponding to worksite costs		
Resources input into business activities		
Energy input	- 0.28 (kl-crude/1,000kl)	45 (TJ)
Water input	- 3 (g/kl)	122 (1000t)
Related to environmental impacts and wastes		
Emissions to air:		
CO ₂	- 0.70 (kg-CO ₂ /kl)	3 (1000t-CO ₂)
SO _x	0.0 (g/kl)	0 (t)
NO _x	- 0.1 (g/kl)	2 (t)
Benzene	0.00 (g/kl)	- 0.11 (t)
Emissions to water:		
COD	- 0.24 (g/kl)	- 5.9 (t)
Industrial waste :		
Generated	- 20 (g/kl)	- 395 (t)
Recycled	- 23 (g/kl)	- 610 (t)
Landfill	2 (g/kl)	74 (t)
2. Benefits related to upstream and downstream costs		
Related to goods and services		
Reducing sulfur content of products	(sulfur content: mass %)	(potential SO _x : t)
High octane gasoline	- 0.0001	- 1
Regular gasoline	0.0006	7
Naphtha	0.0117	26
Jet fuel oil	- 0.0262	- 150
Kerosene	0.0004	3
Diesel fuel	0.0012	17
Heavy fuel oil A	- 0.0325	- 134
Heavy fuel oil C	- 0.1977	2,399
LPG	0.0001	0
Total	0.0201	2,167
Reducing benzene in gasoline	- 0.0588 (volume %)	- 909 (t)
CO ₂ emissions from product use	0.0098 (t-CO ₂ /kl)	324 (1,000t-CO ₂)