Sakai Oil Refinery

Address: 3-16 Chikko-Shinmachi, Sakai-shi, Osaka-fu
Start of operations: October 1968
Area: 1,254,602 m²
Employees: 237
Crude oil processing capacity: 110,000 barrels/day*   (as of March, 2001)

*80,000 barrels/day from April, 2001

Regulated materials

Air related	Material	Regulation	Regulation contents	Regulation value	Actual results Maximum	Average
	NOx (m³$_N$/hour)	Municipal reporting guideline	Total volume regulation	52.9	17.1	9.9
	SOx (m³$_N$/hour)	Municipal reporting guideline	Total volume regulation	45.6	0.9	0.5
	Dust (boiler) (g/m³$_N$)	Air Pollution Control Law	Concentration regulation	0.05	Below lower measurement limit	

Water related	Material	Regulation	Regulation contents	Regulation value	Actual results Maximum	Average
	COD (kg/day)	Water Pollution Control Law	Total volume regulation	186.8	85.6	51.8
	(mg/L)	Prefectural regulation	Concentration regulation	15 (10)	9.9	7.1
	SS (mg/L)	Prefectural regulation	Concentration regulation	40 (30)	6.0	Below lower measurement limit
	Oil content (mg/L)	Prefectural regulation	Concentration regulation	2	Below lower measurement limit	
	Nitrogen (mg/L)	Prefectural directive	Concentration regulation	35	6.0	3.0
	Phosphorus (mg/L)	Prefectural directive	Concentration regulation	1.5	0.58	0.19
	Phenol (mg/L)	Prefectural regulation	Concentration regulation	2	Below lower measurement limit	

Figures in parentheses = daily average

Environmental performance

	Volume used/volume discharged		Basic unit	
Energy	243,005	crude oil kL/year	9.19	crude oil kL/1,000kL
CO₂	680,666	CO₂ tons/year	25.75	CO₂ kg/kL
SOx	12	tons/year	0.45	g/kL
NOx	177	tons/year	6.70	g/kL
COD	19	tons/year	0.71	g/kL

Quantity of industrial waste generated	4,585	(tons/year)
Quantity of industrial waste recycled	1,003	(tons/year)
Quantity of industrial waste disposed	509	(tons/year)
PRTR (atmospheric release) benzene	1.3	(tons/year)
PRTR (atmospheric release) toluene	2.0	(tons/year)
PRTR (atmospheric release) xylene	0.8	(tons/year)
PRTR (atmospheric release) ethyl benzene	0.2	(tons/year)
PRTR (recycling) volume of industrial waste recycled	19.3	(tons/year)

Environmental accounting

Item	Environmental protection cost			Item	Environmental protection effect	
					Reduction of environmental impact	
	Cost	Investment	Fiscal-year-end acquisition costs		Decrease of environmental impact	Concentration/ basic unit
0 Product environmental impact reduction costs	5,842	302	20,972	0 Effectiveness of reduction of product environmental impact		
Heavy fuel oil sulfur reduction	1,441	101	1,174	Product sulfur reduction	(Latent SOx, tons)	(Sulfur content, %)
Diesel fuel sulfur reduction	1,066	10	3,137	Gasoline	136	0.0080
Removal of lead from gasoline	3,187	191	15,808	Kerosene	43	0.0059
				Diesel fuel	1,943	0.1585
					(kL)	(%)
Benzene reduction in gasoline	148		853	Benzene reduction in gasoline	52,701	4.5174
1 Business area costs	3,060	33	6,231	1 Effect within business area	(t)	(g/kL)
				SOx emissions	1	0.08
				NOx emissions	26	0.23
				Benzene emissions	0.1	0.00
				COD displacement	0.3	0.06
Pollution prevention costs	769	26	3,509			
Global environmental protection costs	2,264	7	2,572	CO₂ emissions	(1,000 tons CO₂) 77.38	(kg-CO₂/kL) 0.12
					(t)	
Resource recycling costs	27		150	Industrial waste generated	1,024	
				Reused industrial waste	122	
2 Upstream/downstream costs				Industrial waste disposed	123	
3 Administration activity costs	9					
4 Research and development costs						
5 Social activity costs	110					
Total	9,021	335	27,203			

Economic Effect (million yen)

Savings through energy reductions (savings through cogeneration)   1,140
Saving through catalyst recycling (reduction of waste management cost)   31