Letters

Penguins Oiled in Argentina

Oily ballast water dumped from oil tankers appears to be a major source of mortality for seabirds along the Argentine coast. At Punta Tombo, Argentina (44°02′S, 65°11′W), in March 1982, more than 390 oil-covered Magellanic penguins (*Spheniscus magellanicus*) came ashore and died. At Punta Tombo from September 1983 through 1986, hundreds of penguins were found covered with oil. During incubation in September and October 1986, significant numbers of heavily oiled birds were observed at Punta Tombo, including one pair whose eggs became covered with oil from contact with the incubating parent and did not hatch. The latest oil spill from ballast water was detected on 11 February 1987, when oil washed ashore at Cabo Dos Bahias, Argentina (44°55′S, 65°31′W). In this case, as in previous events, a tanker was seen about 10 kilometers from shore, and 4 days later oil stains on beaches and oil sheens in tide pools appeared. Oil continued to build up on beaches, reaching its highest concentration on 13 February 1987.

Discharge of oil is becoming more common. To quantify its effect on Magellanic penguins at Cabo Dos Bahias, we surveyed the two main beaches penguins use to enter the rookery for oiled birds at 17:45 on 13 February 1987. There were 2556 Magellanic penguins standing along the shore, most (~75 percent) of them molting. Of the 823 adults, 24 had spots of oil on their head or front. Two other adults had a sheen of oil over all their feathers. Nearly all of the 1733 juveniles (~95 percent) were in various stages of molt, and 66 had oil spots on their feathers. Between one-fourth and one-half of the surface area of four other juveniles was covered with oil. We saw one chick that had an oil sheen. Because birds were standing close together and many had their backs to us, we could completely see only about one-third of the 2556 birds counted. Thus, although direct counts showed 3 percent of the adults and 4 percent of the juveniles with oil, the figure should be adjusted for our ability to see the birds. Thus, approximately 9 percent of the adults and 12 percent of the juvenile penguins were oiled.

Even small amounts of oil on penguins compromise their insulation, increase energy needs, and if ingested, can cause physiological damage. Oiled birds often die. The technology to remove oil from water has existed since the 1930s. Because it is cheaper to dump oil-contaminated ballast water into the ocean, most tankers still dump untreated waste water. The cost to wildlife worldwide is probably much greater than previously thought, and policies to prohibit dumping should be instituted.

P. DEE BOERSMA
Institute for Environmental Studies
and *Department of Zoology,*
University of Washington,
Seattle, WA 98195

R&D Expenditures in the Petroleum Industry

The sharp decline in crude oil prices during 1986 has elicited concern that research and development (R&D) expenditures by the petroleum industry would be curtailed so substantially that future oil and gas recovery will be adversely affected. John Walsh's article "Oil industry R&D takes a fall" (News & Comment, 27 June 1986, p. 1593) traced the decline in petroleum industry R&D to the beginning of the 1980s. According to Walsh, R&D activity "within the petroleum industry has been cut by at least 30 to 40 percent in the last 3 years."

Walsh's commentary was based on very limited, ad hoc data. A more systematic source of R&D data in the petroleum industry indicates that these apparent trends were not evident through 1985 (the most recent year for which data are available). The Financial Reporting System (FRS) of the Energy Information Administration collects detailed financial and operating data, including R&D expenditures, from 22 of the largest domestic energy producers (*1*). These data indicate that petroleum-related R&D expenditures, particularly those associated with oil and gas recovery, remained quite stable from 1981 through 1985.

Contrary to the impression given by Walsh, R&D expenditures of the major energy producers rose by more than 1 percent in 1985 over the 1984 level (*2*, p. 84). While R&D sponsored by the federal government dropped by almost 15 percent from 1984, this source of funds only accounted for 2.2 percent of the total R&D expenditures in 1985, down from 3.1 percent in 1981 (Table 1). Internal company sources of R&D funds rose 1.4 percent in 1985 and accounted for 97.3 percent of total R&D spending.

Table 2 indicates the distribution of the energy and nonenergy R&D funds from 1981 through 1985. Nonenergy R&D spending rose 2.5 percent in 1985 and has been larger than total energy R&D spending since 1983; this is partly because of the presence in the database of Du Pont, whose prime business activity is in related nonen-

Table 1. Sources and distribution of R&D funds for major energy producers (*3*). Numbers in parentheses indicate distribution among sources (%).

Sources	Millions of dollars					Change (%) 1984–1985
	1981	1982	1983	1984	1985	
Internal company	3338.1 (95.7)	3719.7 (96.0)	3691.8 (96.8)	3945.0 (97.1)	3998.9 (97.3)	1.4
Federal government	108.3 (3.1)	104.1 (2.7)	93.1 (2.5)	104.2 (2.6)	88.8 (2.2)	−14.8
Other	40.6 (1.2)	50.3 (1.3)	27.4 (0.7)	14.6 (0.3)	19.8 (0.5)	35.8
Total	3487.0	3874.1	3812.3	4063.8	4107.5	1.1

Table 2. Worldwide R&D expenditures by major energy producers (*3*). Sum of components may not equal total because of independent rounding.

Uses of funds	Millions of dollars					Change (%) 1984–1985
	1981	1982	1983	1984	1985	
Petroleum total	1136.2	1247.2	1243.3	1306.8	1337.6	2.4
Oil and gas recovery	668.0	751.8	756.3	692.4	801.4	15.7
Other petroleum	468.1	495.3	487.1	614.4	536.2	−12.7
Nonpetroleum energy total	609.3	631.9	510.0	505.6	433.7	−14.2
Synthetic fuels	420.9	379.6	280.8	235.4	217.5	−7.6
Renewable energy	52.4	53.9	53.2	54.5	78.3	43.7
Other energy	136.0	198.4	176.1	215.7	137.8	−36.1
Total energy	1745.4	1879.1	1753.3	1812.5	1771.3	−2.3
Nonenergy total	1625.2	1839.4	1970.7	2157.3	2211.6	2.5
Unassigned	116.4	155.6	88.3	94.0	124.7	32.7
Total R&D	3487.0	3874.1	3812.3	4063.8	4107.5	1.1