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Persian Gulf: The Nowruz Oilspill and Its Impact



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An Intelligence Assessment

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GI 83-10142
May 1983.

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Persian Gulf: The Nowruz Oilspill and Its Impact [Redacted]

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An Intelligence Assessment

This paper was prepared by [Redacted]
[Redacted] of the Office of
Global Issues. It was coordinated with the National
Intelligence Council. [Redacted]

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Comments and queries are welcome and may be
directed to the Chief, Near East Branch, OGI, on
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**Persian Gulf: The Nowruz
Oilspill and Its Impact**

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Key Judgments

*Information available
as of 23 May 1983
was used in this report.*

Despite widespread alarmist press reporting and expressions of deep concern by the western Persian Gulf states about imminent economic disruption from the spreading Persian Gulf oilspill, the oil has stayed mostly on the Iranian side of the gulf; only fragments of the slick have come ashore on the gulf's western coast, and direct costs there have been minimal.

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However, the situation appears to be deteriorating on the western side of the gulf as more oil is being sighted close to the coasts of Saudi Arabia, Qatar, and Bahrain. Several desalination plants have been shut down as a precaution, and Saudi Arabia's largest freight port on the gulf, at Ad Dammam, was reported closed for six hours on 9 May because of a large oil slick that passed down the coast.

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Continuation and increase of the oilspill could cause other port closures and shutdown of additional coastal seawater desalination plants, which supply a major part of the coast's freshwater for drinking, industry, power plants, and oilfield operations. The threat to the western Gulf coast will increase if shifts in winds and currents bring more oil westward. Of equal concern is the likelihood that the flows from the damaged wells will increase if burning superstructures collapse; if the well pipes melt down to the water, which would extinguish the fires that are burning some of the oil; or if additional Iraqi attacks cause new leaks before a cease-fire can be arranged.

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Negotiations to arrange for capping the oil leaks have so far been futile, as Iran and Iraq have refused to move from political positions that are linked to the war. Iraq has tried to use the pollution issue to gain international support for a limited cease-fire, which it hopes would lead to a general cease-fire and an end to the war. Until very recently, Iran opposed even a limited cease-fire, apparently not wanting a precedent for a negotiated end to the war. Tehran has wanted Baghdad to assume responsibility for the pollution and to announce that it will not attack technical experts who are brought in to cap the wells. In emphasizing Iraq's culpability, Iran has tried to drive a wedge between Iraq and the Gulf states, which are threatened by the oilspill.

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The recent Iranian invitation to representatives of the Gulf Cooperation Council for discussions on ending the oilspill, the cordial reception received by the representatives on arrival, and Tehran's admonition to them to continue working for an end to hostilities in the gulf suggest that some factions in Iran may now be interested in seeking political resolution of the oilspill problem and perhaps other war issues.

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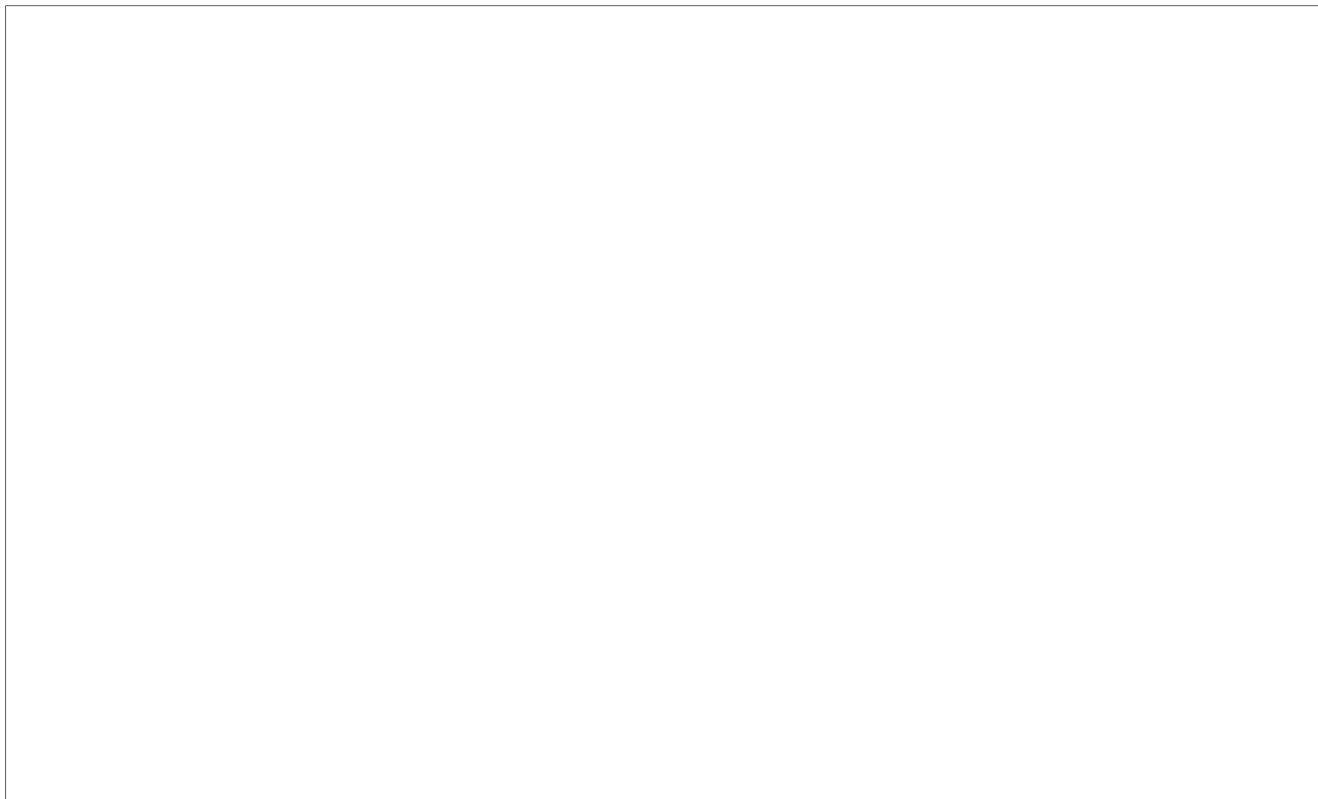
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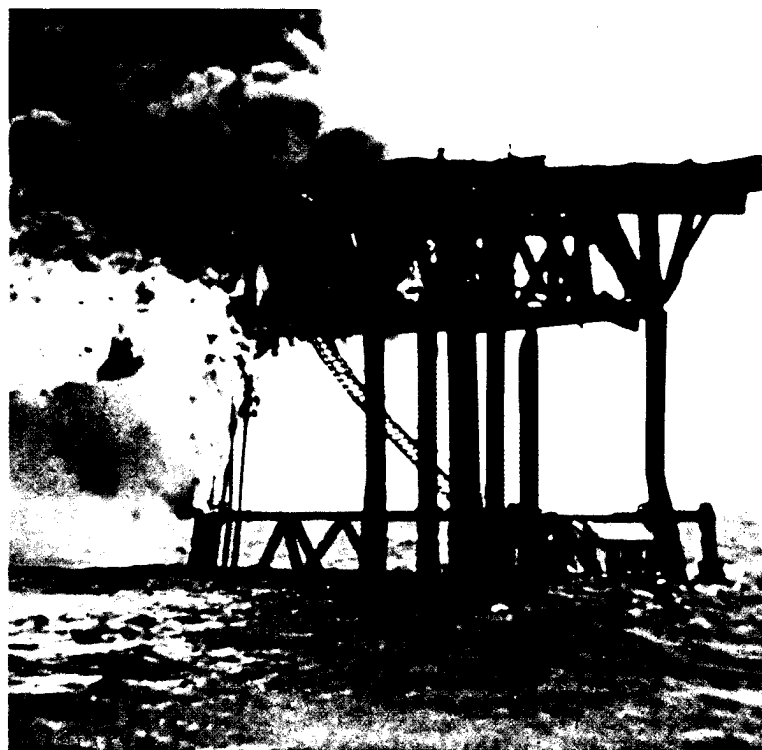
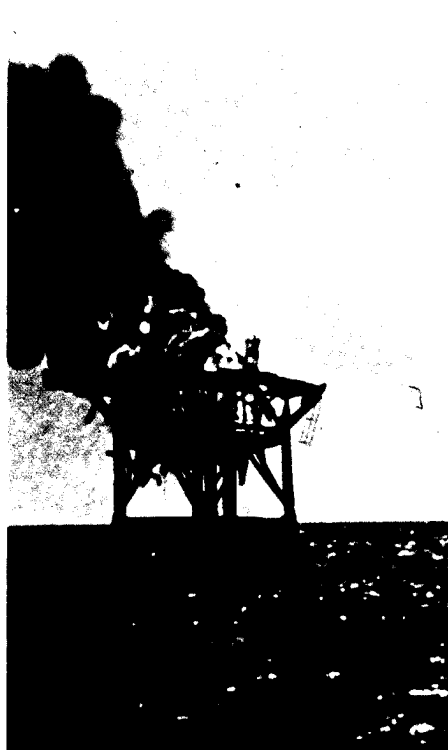
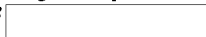


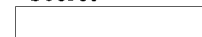
Figure 3. Oil and gases burning at the platforms in the Nowruz oilfield, early March 1983



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Persian Gulf: The Nowruz Oilspill and Its Impact



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Source and Size of the Spill

In March 1983, after two and one-half years of sporadic and ineffective attacks against Iran's Khark Island and coastal oil terminals, Iraq extended its air attacks to Iran's shutdown oil platforms in the Persian Gulf. At least five wells in Iran's Nowruz oilfield are leaking:¹

- One well started leaking after a platform collapsed on 27 January from damage suffered in a tanker accident two years ago; amount of spill estimated at 1,500 to 2,000 barrels per day (bpd).
- Four wells on three platforms were set afire and were leaking from Iraqi air attacks on 2 March; amount of spill not known
- An oil platform was reported set afire by Iraqi attacks on 12 April; small, but unspecified, leakage.

Iraq announced additional attacks on Nowruz field platforms on 19 April, and on platforms in both the Nowruz and Ardeshir oilfields on 1 May. We cannot confirm that these more recent attacks resulted in additional leaks.



Firm data on the combined spill rate of the damaged wells are lacking; current estimates by Gulf state officials and oil industry sources range from 4,000 to 12,000 bpd. These data suggest that the cumulative spill totaled 350,000 to 900,000 barrels by 23 May. This is a significant increment to normal spillage into the gulf, which researchers estimate averages 700,000 barrels annually from tankers, offshore wells, oil terminals, industrial sites, and natural seepage.² Tankers have been sighted taking advantage of the spill to dump their waste oil.

¹ The Nowruz oilfield is located about 90 kilometers from the nearest Iraqi coast, 50 kilometers from Iran, and approximately 15 kilometers inside Iranian waters (lacking negotiated sea boundaries, the limit of Iranian waters is assumed to be the median line between the Kuwaiti and Iranian coasts). Water depths at the field are about 18 meters.

² According to a research report on gulf pollution, the two largest previous gulf spills were 100,000 barrels in 1970 and 50,000 to 80,000 barrels in 1980.

Disposition of Oil in Water

Depending on wave action and the chemical properties of the particular oil, it may sink and then resurface, and oil-water emulsions may remain suspended several feet to several meters beneath the surface. Spilled oil can:

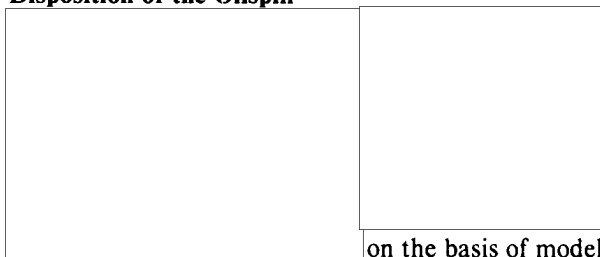
- Evaporate (mainly in the first few days).
- Spread to form a slick.
- Mix or emulsify with water to varying depths.
- Sink after attaching to solid particles in the water.
- Form tarry lumps.
- Be consumed by plankton.
- Be degraded by bacteria.

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Disposition of the Oilspill



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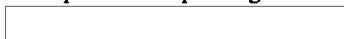
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on the basis of modeling projections and analyses by the National Oceanic and Atmospheric Administration, and taking into account currents, winds, and on-site observations, we estimate that the current disposition of the oil is:

- 40 to 50 percent evaporated.
- 20 to 25 percent beached.
 - Iran (18 to 20 percent)
 - Saudi Arabia (3 percent)
 - Kuwait, Bahrain, Qatar (1 to 2 percent)
- 30 to 35 percent in gulf waters, much of it near Iran (figure 4).

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Iran reported on 4 May that the oil was moving away from its shores toward the western gulf coast, but independent reporting is not available to confirm this.



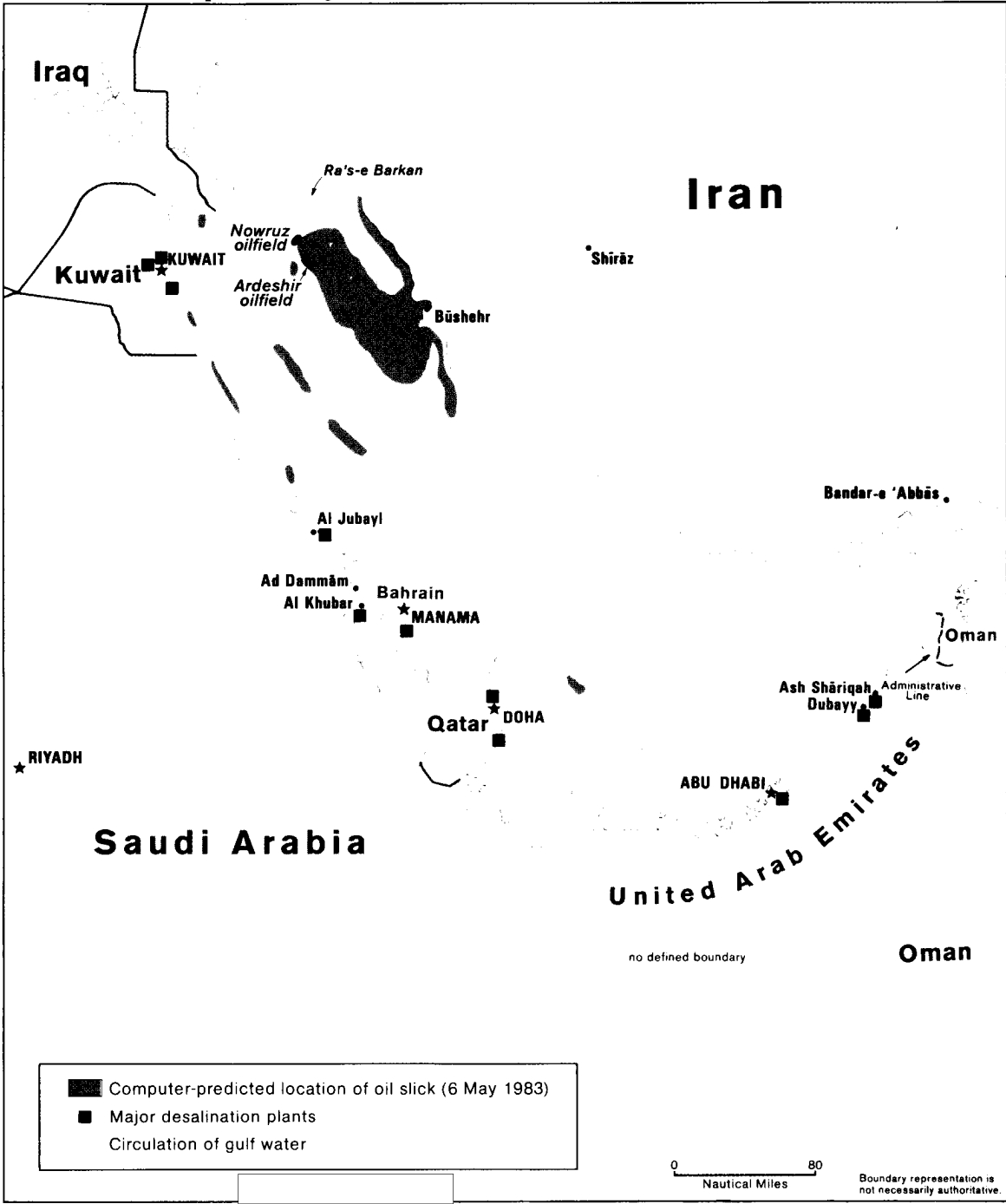
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Figure 4
Persian Gulf: Oilspill and Impact



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Risks Ahead

Pollution monitoring specialists familiar with the gulf's circulation and wind patterns believe that the risk of having a considerable quantity of oil washed ashore is greatest for Iran, Bahrain, Qatar, and Saudi Arabia, and least for Kuwait and the Emirates. Currents are extremely complex and changeable, however, and shifts could change the order of risk. The risk of damage to the Gulf states from the oilspill will become greater if the leaks continue for several months or if the flow rate increases substantially:

- *Risk of Prolonged Leaking.* Much will depend on when a cease-fire can be arranged to allow well-capping to begin. According to reports from the Regional Organization for the Protection of the Marine Environment (ROPME), based in Kuwait, well-capping specialists have been on standby in the region since February. Even after a cease-fire is secured, however, as much as two months will be required to cap the wells. [redacted]

- *Risk of Increased Spill.* Gulf oil industry experts have expressed growing concern that the platform fires may melt the well pipes down to the surface of the water, which would extinguish the fires now burning much of the escaping oil. An Iranian official stated during the first week of May that this had already happened and that the flow into the gulf had increased to more than 7,000 bpd. [redacted]

- *Risk of New Attacks.* Iraqi officials have threatened to attack additional Iranian offshore oil targets. Iraq is trying to put increasing economic and psychological pressure on Iran to end the war and to influence other nations to increase their mediation efforts. Iraq's air superiority over Iran makes additional attacks a continuing threat. We cannot assess the severity of the risk to Iranian wells because we do not know which wells are turned off above the water's surface and which are turned off below the surface. [redacted]

The Persian Gulf

The Persian Gulf is more vulnerable to pollution than most ocean bodies. Although nearly as large as the total area of the Great Lakes (230,000 square kilometers), it is shallow. Maximum depths are 100 meters, and large areas adjacent to the western and northern shores are less than 20 meters deep. Because of its relatively small volume, the gulf is less able to absorb a major oilspill than are deeper ocean areas. Moreover, gulf waters circulate in a virtually closed system: the evaporation rate is high, the inflow from rivers is small, and water flows from the Indian Ocean into the gulf. This inflow occurs at the surface, preventing floating oil from exiting. The extremely high evaporation rate also makes gulf waters highly saline, limiting the number of marine species and their tolerance to additional stress from serious oil pollution. [redacted]

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Actions to Date

Cleanup Operations. All of the western gulf countries have been mobilizing against the oilspill since the first leak became known in early February. Each country has created a policy committee that is considering or implementing protective measures for key facilities, such as seawater desalination plants and port facilities. These measures include establishing offshore booms around ports and industrial facilities as well as extensive preparations for cleaning up the oilspill. Each country has also mobilized oil company personnel and other specialists to patrol and monitor the movement of the spill in its national waters. [redacted]

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[redacted] Qatar and Bahrain are furthest along in preparing countermeasures. [redacted]

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It is not yet possible to assign a specific cost to stopping and cleaning up the oilspill. [redacted]

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Offers of Assistance. Industrial firms from many nations—including the United States, Japan, Mexico, France, West Germany, and Austria—have offered their services for protective and cleanup measures. Japan seems to have taken the most comprehensive approach, having sent a high-level delegation of government officials, industry representatives, and oilspill specialists to the area. [Redacted]

Economic Impact

Despite press reports as early as March that the western gulf nations were in imminent danger of massive economic disruption, as of mid-May the economic effects of the oilspill were limited. If and when much larger quantities of oil begin coming ashore, the most serious consequence is likely to be more widespread disruption of freshwater supplies, which are critical to the area's economic activities and public well-being. [Redacted]

Impact to Date. Although the oilspill has probably had some effect on Iran's coast and offshore areas, the consequences are probably minor because the coastal area is relatively lightly populated and undeveloped. An Iranian radiobroadcast on 4 May claimed that no oil pollution or harm to sea life had been noted in Iranian waters. [Redacted]

[Redacted]

On the more developed west coast of the gulf, the costs are rising. Expenses include placing booms and nets in the water to protect coastal facilities from the approaching oil, skimming oil from near-shore areas, and the precautionary shutdown of at least one seawater desalination plant at Al Khubar by Saudi Arabia and others by Qatar and Bahrain. [Redacted]

[Redacted]

Port activities have so far been largely unaffected by the oilspill. The situation may be changing: Saudi Arabia's largest freight port on the gulf, at Ad Dammam, was reported closed for six hours on 9 May while skimmers worked to remove a mile-square oil patch. [Redacted]

Ecological damage, with major economic impact on the fishing industry, has already occurred. Saudi Arabia's University of Petroleum and Minerals Research Institute has reported that gulf waters off parts of Saudi Arabia are now devoid of any sea life. Similarly, the Kuwait Institute of Scientific Research reported an unusual absence of fish in areas near normally productive coral reefs. Consumers' perception that the catches are unfit caused Saudi Arabia to limit its fishing operations in April. Qatar, on the other hand, reported on 23 April that oil from the spill had not invaded its primary fishing waters east of the peninsula in significant amounts. [Redacted]

Potential Effects. An increased flow from damaged wells or changes in winds or currents could result in a significantly increased threat to water supplies, electric power generation, shipping, and fishing, as well as to recreation and coastal and marine ecology. [Redacted]

Water Supplies. The most immediate threat from the oilspill is to the water supplies of the western gulf states. All of the states rely heavily on coastal facilities that desalinate seawater for their freshwater (appendix). The plants cannot operate when oil mixes with intake water to clog filtration systems. Oil that enters the distillation unit is not removed from the water, causing damage to the plant's equipment and giving the desalted water an oily content. Water intakes are of two basic types: offshore pipelines that take in water below the surface and canal-like surface inlets used by the larger plants, some of which draw in millions of gallons per day (figure 5). The methods being prepared to prevent the oil from entering the surface—placing booms around the intakes and skimming oil from the water's surface—are only partially effective because they catch the oil near the surface. Much of the oil from this spill is reported to have mixed with water to several meters below the surface. [Redacted]

[Redacted]

In the event that offshore booms and skimming do not prove effective deterrents to a heavy flow of oil and critical plants are forced to shut down, a water shortage could emerge fairly quickly. Although water

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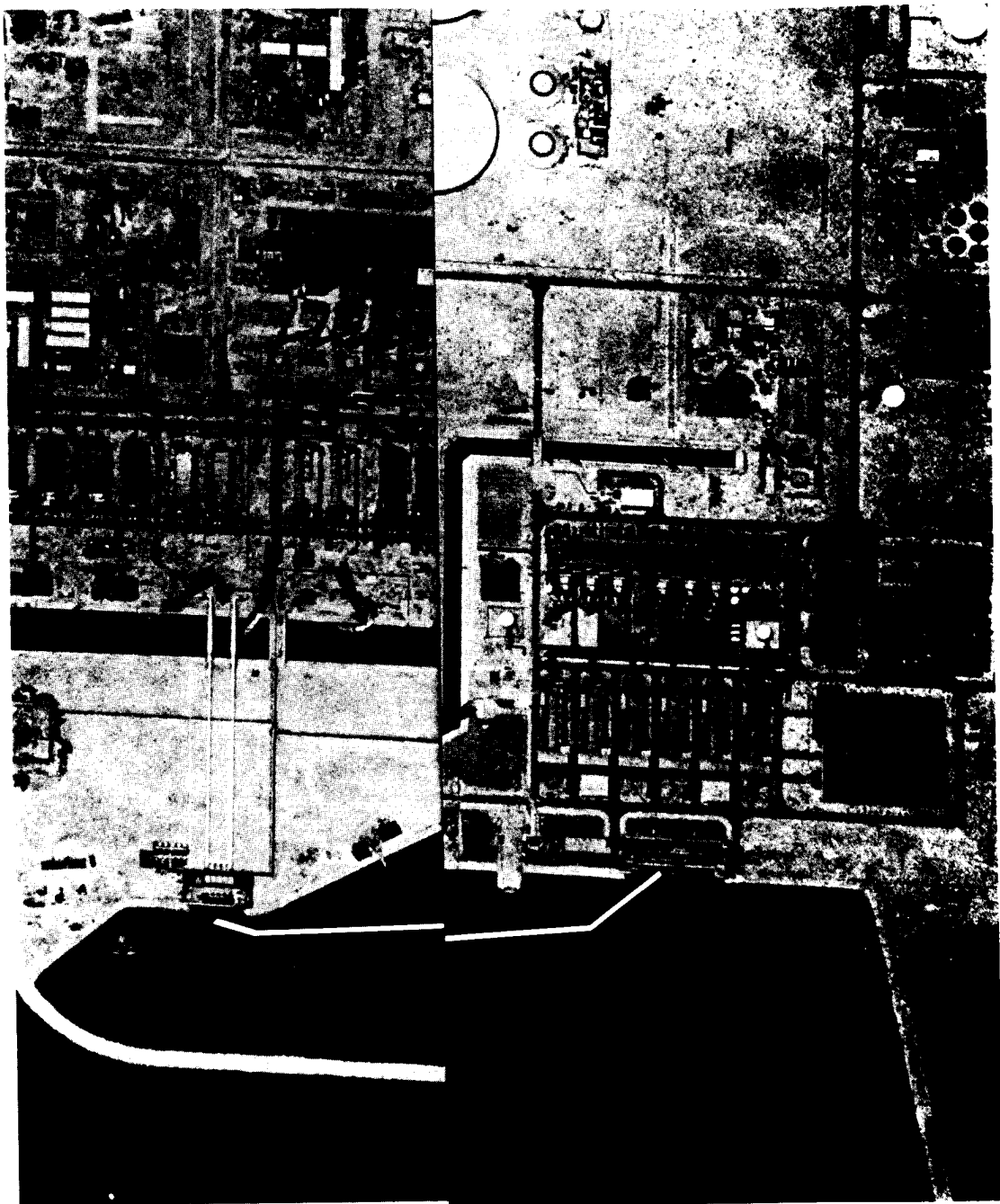


Figure 5. Al Jubayl desalination plant, Saudi Arabia

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storage tanks are available, we have no information on their capacity. Vulnerable operations include manufacturing processes, agriculture, and electrical power plants, which rely on water for cooling. Offshore oil facilities are dependent on small units that supply water for drinking and cooling equipment. Any reductions in freshwater or electricity availability would cause particularly serious problems in the upcoming summer months. [redacted]

Several nations—including Iran and Japan—have stated their readiness to supply water to the gulf nations. Some press sources quoting Iranian officials report that Iran is already shipping tankers of water to Bahrain, Qatar, and the UAE. These reports are probably based on Iranian propaganda; the gulf states have not reported receipt of water from Iran. [redacted]

Shipping. Even if the risks cause insurance and charter rates to rise, the current oversupply of available oil tankers should ensure that tanker owners will be willing to continue operating in the gulf. Nevertheless, disruptions to normal shipping could occur in areas where the oil sinks deep enough to clog intakes. Surface slicks are not normally a problem for vessels with deep intakes and would not affect most oceangoing ships that visit the gulf, the majority of which have drafts of 10 to 30 meters and cooling intakes near their keels. In any event, disruptions are more likely to occur in ports—temporarily interrupting ship loadings and unloadings—if concentrations of oil bypass the protective measures being readied. Large amounts of oil on the western gulf could temporarily close many of the freight and oil ports of Kuwait, Saudi Arabia, Qatar, and Bahrain. [redacted]

Fishing. Fishing is locally important throughout the Persian Gulf, although catches have been decreasing over the last decade because of overfishing of some species, pollution, and competition with other economic sectors for labor. The industry is composed of two main sectors: modern export-oriented shrimp fisheries and traditional labor-intensive coastal fishing operations, which supply a significant share of dietary protein in the Arabian Peninsula states. A worsening oilspill would pose two risks for the industry—damage to fishing equipment and damage to the fishing

grounds themselves. If the spill gets worse, fishing in the more northwestern Gulf states is more likely to be disrupted than that in the UAE; a large portion of the UAE fishing industry is based in the Gulf of Oman and Indian Ocean—areas that will be unaffected by the spill. Long-term impact on the industry is unlikely, unless the oilspill persists; most marine species can recover from a major spill in six months to two years (figures 6 and 7). [redacted]

Politics of the Spill

Efforts to encourage Iran and Iraq to reach an agreement that would allow capping the leak are being pursued by the gulf nations—through the Gulf Cooperation Council (GCC) and ROPME—and by the United Nations. So far, these negotiations have been futile as both sides refuse to move from their political positions, which are linked to the wider war. [redacted]

Iraq's Position. Because Iraq's coast is in little danger of pollution from the oilspill, we believe Iraq's policy is to let the oil flow. Iraq may attack other Iranian offshore oil targets to pressure Iran into accepting a cease-fire and ending the war. [redacted]

[redacted] Iraq seems to want an implicit link between a Nowruz cease-fire and Security Council resolutions calling for a general cease-fire and deployment of UN observers. [redacted]

Iran's Position. Tehran apparently has believed that the oilspill situation worked more to its advantage than to its disadvantage. Iran has suffered no oil export loss from the oilspill—though it claims damages of \$700 to 800 million—because the Nowruz and probably other offshore fields were closed down early in the war. Iranian officials have played down the potential effects of oil pollution on their coast. Iran has been wary not to allow a limited cease-fire to cap the wells expand into a general cease-fire to end the war. Tehran's position is that Iraq unilaterally declared the northern gulf a war zone by its initiation of

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Figure 6
Persian Gulf: Fishing Areas and Coastal Ecology



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Figure 7
Persian Gulf: Ecological Vulnerability



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hostilities, and Iran will not consent to any agreement that implies that it was at fault in the oilfield incidents. Iran has refused to permit the term "cease-fire" in any agreement and places a precondition on its permitting the capping: the personnel monitoring a declared safe zone must be from ROPME countries that have no links with the United States; Tehran's preference is the UAE. In addition, Iran opposes an Iraqi demand that Iraqi observers be permitted on site at the damaged wells, although Iran reportedly is not averse to Iraqi observers on the monitoring ships [redacted]
[redacted]

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New Developments. On 2 May, Iran invited UN observers to tour war-damaged areas, and Iraq has since agreed to a plan that the observers will inspect such areas in both countries, according to a report from the US Mission at the United Nations. [redacted]
[redacted]

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[redacted] These developments have raised new hopes that Iran and Iraq are modifying their conditions for ending the war and that both sides might at least be responsive to renewed efforts by intermediaries seeking to end the gulf oilspill. GCC members are skeptical about Iran's sincerity, suspecting that Tehran may only be trying to drive a wedge between Iraq and its Arab supporters. [redacted]

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Appendix

Importance of Desalinated Water to Specific Countries

Kuwait, because of its location near the head of the Persian Gulf and west of the Nowruz oilfield, will probably receive less oil from the spill than will the nations farther south. However, Kuwait is heavily dependent on its large seawater desalination plants, having very limited supplies of domestic fresh ground-water. Kuwait has large amounts of underground brackish water, but we have no information on its capabilities to direct this water to the coastal desalination plants for treatment. [redacted]

shutdown of Kuwait's seawater plants would be a "virtual disaster," and Kuwait would need to truck water from Iraqi facilities on the Euphrates or contract to have water brought in by ship. [redacted]

Saudi Arabia is the major producer of freshwater from seawater. Its coastal desalination plants supply both coastal and inland needs, including part of the water supply of the capital, Riyadh. Saudi Arabia (and also Bahrain, which has little seawater desalination capacity) has substantial capacity in inland plants that treat brackish water. These could probably supply sufficient water for emergency use, but power production and industrial output would be severely affected by reduced freshwater supplies. [redacted]

Qatar has little underground freshwater or inland desalination capacity and would probably have to import freshwater. The head of the Qatar General Petroleum Company has said that if the desalination plants were closed, Qatar could produce enough water from artesian wells. However, most of Qatar's shallow underground water is brackish, and some of it is polluted. Recharging of underground water by seepage of rainwater produces a thin layer of relatively freshwater on the surface of the underground reservoirs; any increased use of well water would quickly degrade its quality. [redacted]

The United Arab Emirates is building several large desalination plants to supplement those completed in the last few years. Economic and population growth

Seawater Desalination Capacity on the Persian Gulf (Million gallons per day)

Total	569
Kuwait	
Doha	50
Ash Shu'aybah South	37
Ash Shuwaykh	26
Other plants	22
Saudi Arabia	
Al Jubayl	135
Al Khubar	57
Others	11
Bahrain (all plants)	5
Qatar	
Ra's Abu Fantas	35
Doha	12
Others	8
UAE	
Abu Dhabi	80
Dubayy	47
Ash Shariqah (Sharjah)	13
Other plants	16
Iran	
Jazireh-ye Khark (Khark Island)	2
Jazireh-ye Kish (Kish Island)	2
Other plants	11

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have severely strained fresh groundwater resources, which supply less than 50 percent of demand and are generally of poor quality. [redacted]

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Iran has very little seawater desalination capacity. Most important are small plants on Khark Island and Kish Island. If the Khark Island plant has not been shut down, it probably has not been operating at full capacity throughout the war with Iraq. [redacted]

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