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Seawater intake spurs outcry

Power plants' toll on marine life has state panels set to consider legislation

By Terry Rodgers

STAFF WRITER

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Each day, the 21 power plants along California's coast pull in nearly 17 billion gallons of seawater.

The ocean water is used as a kind of radiator fluid to help cool the systems that generate 40 percent of the state's electricity. But the practice has killed billions of fish eggs, larvae and other marine life. Such depletion of the ocean food chain – 80 square miles of coastal habitat are affected daily – has gone on for decades.

After the seawater cycles through the systems, it's expelled back into the ocean. This warm and murky mixture inhibits the growth of kelp and eelgrass, both crucial habitats for fish living near the shore.

The power industry says the loss of marine life is insignificant and that retrofitting plants would be too expensive.

However, a majority of scientists agree that using seawater for cooling power plants is damaging the coastal ecosystem, especially at bays and estuaries, which are critical nursery habitats for fish.

The practice, known as “once-through cooling,” represents “the single greatest and unaddressed environmental issue associated with power plant operation in the state,” said Jim McKinney, an environmental policy specialist for the California Energy Commission.

After years of rancor, the simmering controversy is about to reach a full boil.

On Monday, the State Lands Commission will consider a resolution to deny new leases for power plants that use once-through cooling.

Three days later, Gov. Arnold Schwarzenegger's year-old Ocean Protection Council will examine the issue and possibly recommend legislation to address environmentalists' concerns.

The commission's resolution mirrors federal regulations issued in 2001 that essentially banned once-through cooling for new power plants. Debates similar to those in California are playing out from coast to coast.

The commission is the landlord of the state's tidelands, where 10 power plants



SEAN M. HAFEEY / Union-Tribune
The South Bay Power Plant in Chula Vista is among the 21 coastal power plants in California that use ocean water as a coolant. Duke Energy has said the South Bay plant will switch to an alternative cooling method when the facility is upgraded.

operate, including the Encina Power Station in Carlsbad and the San Onofre Nuclear Generating Station at the northern end of Camp Pendleton.

It works with a host of state agencies that regulate discharges from coastal power plants, such as the Energy Commission, Coastal Commission and Water Resources Control Board.

The board's staff is drafting a proposed set of state regulations for once-through cooling.

"We're not going to recommend a blanket elimination of once-through cooling, but we want to have the impacts reduced to an acceptable level," said Dominic Gregorio, the board's senior environmental scientist.

The South Bay Power Plant in Chula Vista is on a bayfront site owned by the San Diego Unified Port District. It also uses once-through cooling, but Duke Energy recently said it intends to switch to an alternative approach when that facility is upgraded.

Methods more modern than once-through cooling include "dry cooling," in which giant fans blow air to prevent overheating, and closed-cycle "wet" systems in which the water used for cooling is recycled.

If the State Lands Commission approves the resolution, it may also affect California's next generation of coastal desalination plants. Nineteen such facilities are planned along the state's coast, including several that would be built next to power plants and use their existing seawater intake systems.

"This is an issue with multibillion-dollar implications," said Warner Chabot, vice president of The Ocean Conservancy, a national environmental group that opposes the once-through cooling process.

The politics involved are high-stakes, too. Steve Westly, chairman of the State Lands Commission, is running for governor. He and fellow Democrat and state Treasurer Phil Angelides, who also wants to be governor, are competing for endorsements from environmental groups.

Destructive cycle

Traditionally, fishermen have fought environmentalists on such issues as marine reserves, where fishing is banned. But they have joined hands with the "greens" to oppose once-through cooling.

"This issue has brought together the most diverse group . . . of any issue I've worked on in 12 years," said Linda Sheehan of the California Coastkeeper Alliance.

Scientists, environmentalists and fishing groups said that in general, seawater-based cooling systems harm marine life in three ways.

First, fish are sucked into an intake pipe and pinned against screens that typically have holes three-eighths of an inch in size.

Next, marine organisms small enough to pass through the screens are killed by pumps, water pressure and heat as they undergo more parts of the once-through cooling process.

The power plant then expels the heated seawater, which has become murky because it contains the



dead marine organisms' remains. This discharge impedes the development of native vegetation along the coastal ocean floor.

On its end, the power industry sharply disagrees with its opponents' assessment of how much once-through cooling harms marine life.

"I could see moving all of our power plants inland if we had widespread, convincing evidence that coastal plants are impacting (the ocean), but that's just not the case," said David Kay, manager of environmental projects for Southern California Edison, which owns the San Onofre facility.

The amount of small fish and eggs being killed is tiny when compared with the coast zone's total marine life, the power companies contend.

"It's a flea bite," Kay said.

Most studies on the impact of once-through cooling were done in the 1960s and '70s by power companies nationwide. But a 2005 analysis completed for the state Energy Commission said those industry studies are unreliable.

That report concluded: "Once-through cooling is contributing to declining fisheries and the degradation of estuaries, bay and coastal waters. These (power) plants indiscriminately 'fish' the water in these habitats by killing the eggs, larvae and adults when water drawn from the natural environment flows through the plant."

Recent research has documented sizable damage to ocean life, said Michael Foster, co-author of the Energy Commission report and a marine biologist in Moss Landing. California's coastal power plants kill up to 50 million small fish and larvae per day, he estimated.

"Seawater is not just water," Foster said. "It's actually a community of living organisms, some of which spend their whole lives in that water and some of which produce eggs and larvae that grow up in that water."

A random scoop of 300,000 gallons of coastline seawater contains an average of 500 marine species, ranging from great white sharks to plankton the size of a grain of sand, Foster said.

He acknowledged, though, that it's difficult to separate the adverse effects of power plants from other forces changing the populations of ocean species. Those factors include global warming and contaminated urban runoff.

Costs and benefits

The power industry contends that it's too costly to retrofit California's coastal power plants, many of which are antiquated. A few lack space for upgrades. Inland power plants use dry-cooling or closed-cycle wet systems.

Capital costs to retrofit the 21 power plants with ocean-friendly cooling systems are estimated at \$2 billion to \$2.5 billion, according to the power industry.

If those costs were passed along to ratepayers, a homeowner's average power bill would increase by about 1 percent, said Michael Powers of Powers Engineering, a San Diego consulting firm.

Alternative cooling systems that don't harm the ocean are economically and technically feasible, Powers said.

But there is a trade-off in plant efficiency.

Plants that covert from a once-through seawater system to dry cooling typically experience a 2.5 percent loss in plant efficiency due to the electricity needed to power huge fans, Powers said.

Facilities that convert to closed-cycle wet systems lose 1 percent or less of plant efficiency, he said. Powers believes any state-imposed plan to phase out once-through cooling would do ratepayers a favor by forcing inefficient and obsolete plants to either modernize or shut down.

“Most of these units will be falling apart by 2020 anyway,” Powers said.

Some states have already adopted a tougher stand against once-through cooling.

New York, for example, has told owners of the Indian Point nuclear plant in Buchanan to install closed-cycle cooling towers the next time they renew their operating permit.

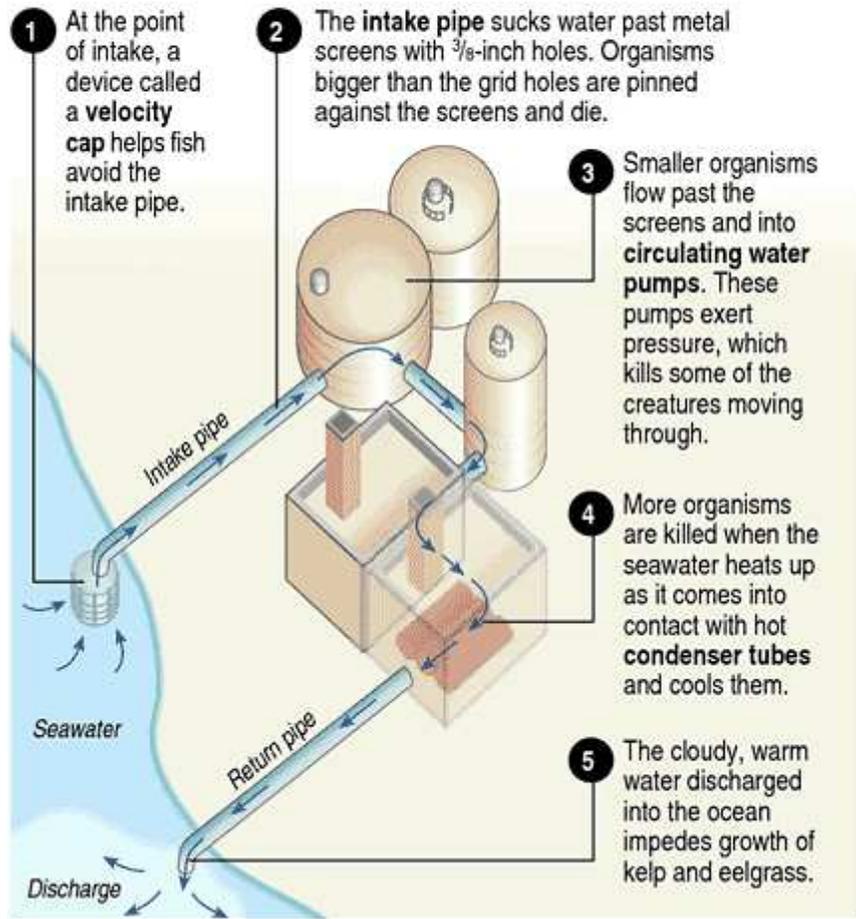
The push to reduce the environmental impacts from once-through cooling is being driven by the U.S. Environmental Protection Agency's latest interpretation of the federal Clean Water Act. The EPA has put power-plant operators on notice that they must reduce their damage to marine life by 2008. The regulations offer five paths for plant owners to achieve compliance.

Environmentalists said the EPA rules are too loosely written and won't motivate companies to invest in alternative cooling systems. Some companies will be able to comply merely by hiring consultants to generate reports showing that their plants have a negligible impact on the ocean, conservationists and other critics of the rules have asserted.

■Terry Rodgers: (619) 542-4566; terry.rodgers@uniontrib.com

Seawater cooling systems

California's 21 coastal power plants use almost 17 billion gallons of seawater daily to cool their systems. The process kills a variety of marine creatures and plants. A look at the cooling process:



SOURCES: Southern California Edison; Associated Press illustrations

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