

# PUBLIC SUBMISSION

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**Docket:** NRC-2009-0552

Notice of Receipt and Availability of Application for Renewal of Diablo Canyon Nuclear Power Plant License

**Comment On:** NRC-2009-0552-0026

Diablo Canyon Power Plant, Units 1 and 2; Notice of Intent to Prepare an Environmental Impact Statement

**Document:** NRC-2009-0552-DRAFT-0077

Comment on FR Doc # 2015-15921

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*SOFR 37664*

## Submitter Information

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## General Comment

I Gene Nelson, Ph.D. serve as the Government Liaison for Californians for Green Nuclear Power <http://www.CGNP.org>.

Attached find a relevant file in support of the renewal of the license application for Diablo Canyon Plant, Units 1 and 2.

The Docket Number is NRC-2009-0552.

This just-published article by nuclear scientist James Conca, Ph.D. underscores the myriad damages to the biosphere being caused by anthropogenic climate change. Most of the adverse changes are closely connected with the burning of fossil fuels, including so-called "clean" natural gas. Instead, the U.S. should be aggressively expanding the use of nuclear power, with appropriate weight being given to the emissions-free and carbon-free nature of nuclear power.

## Attachments

Climate Change Heating Oceans and Rivers - Conca 08 31 15

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**James Conca** Contributor

*I write about nuclear, energy and the environment*

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ENERGY 8/31/2015 @ 6:00AM | 2,973 views

## Climate Change Has Got The Earth In Hot Water

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It is understandable that people discussing global warming focus on air temperatures. Lower atmospheric temperatures are shown on the news and weather reports every day. We walk around in the air. We breathe it in. We talk about how hot it's been this summer, how warm last winter was, or how this is the hottest day on record.

But global warming is all about *water*. Water, not the atmosphere, drives the weather, and drives climate. The atmosphere is mostly *affected by* the water on Earth, not the other way around. Atmospheric temperatures are volatile. Not so ocean temperatures.

The oceans absorb a thousand times more heat than the atmosphere and hold [90% of the heat of global warming](#).

Water temperatures change slowly, much slower than air temperatures, because there is so much more mass in a particular volume of water to heat than in a similar volume of air and that mass of water can hold so much more heat than can air.

Which is why the National Oceanic and Atmospheric Agency's annual [State-of-the-Climate report](#) is so chilling.



*It turns out that global warming is all about water, not the atmosphere. The oceans absorb a thousand times more heat than the atmosphere and hold 90% of the heat of global warming. And the oceans are heating steadily, with some dire effects. Source: NOAA*

The global-average sea surface temperature last year was the highest on record. The warmth was particularly notable in the North Pacific Ocean, the same region experiencing a drop in pH because of [acidification from dissolved CO<sub>2</sub>](#) – nothing to do with climate change, just increased CO<sub>2</sub> concentrations forming carbonic acid in seawater.

Global upper ocean heat content was a record high, reflecting the continued accumulation of heat in the upper layer of the oceans. NOAA climate monitoring chief Deke Arndt, co-editor of the report, said the seas last year “were just ridiculous.”

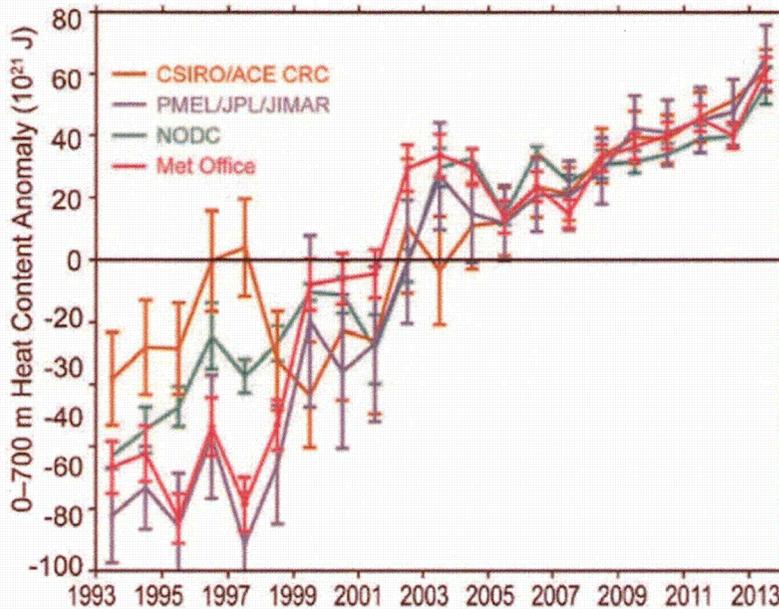
Other [highlights](#) in the NOAA report concerned record air temperatures across the globe, glacial warming, permafrost heating and other findings. As I sit writing this, the smoke is preventing me from seeing down the road. Over 1,000 square miles have burned here in Washington and Oregon.

But it's the oceans that have got us in such hot water.

Water determines our lives and our future. Water is the only reason life exists on this planet in the first place. And the effects of warming waters are devastating to what life exists on Earth today.

A huge deadly [warm water blob](#), the biggest in history, now stretches from Mexico to Canada, threatening even more marine life. Warm ocean temperatures are killing coral reefs. Ocean productivity at the base of the food chain decreases as temperatures rise. Warm waters holds less oxygen, and that's killing fish, crabs and other marine life ([Tri-City Herald](#)). Sub-tropical fish are appearing offshore of Alaska.

Right here in Washington State, the river temperatures are so high that fish are dying in droves. Huge sturgeons, 10-feet long, are floating belly-up in the Columbia River ([Tri-City Herald](#)). Over 500,000 salmon have died this summer here in eastern Washington alone, completely reversing the recent gains in salmon population that resulted from years of careful work.



Upper ocean heat contents over the last 20 years, relative to the historic average, from four different globally-integrated data bases, showing a large increase in excess heat since 1993. Source: NOAA State of the Climate report

Fish and Wildlife officials in Oregon moved over 160,000 salmon to the Little White Salmon National Fish Hatchery, in the Columbia River Gorge, hoping to save them from water temperatures exceeding 70°F ([Thinkprogress.org](#)). Idaho declared a state of emergency because of massive sockeye salmon deaths.

Ritchie Graves, a fisheries biologist at NOAA, told the [Associated Press](#) that 80% of returning sockeye this year could die as a result of the high water temperatures.

This year marked some of the Pacific Northwest's lowest snowpack levels in history, 16% of normal in Washington and only 11% of normal in Oregon, even though there has been normal rainfall. Both states declared drought emergencies because record heat has caused that water to run off quickly and has robbed so much as evaporation.

Jeff Severinghaus, at the Scripps Institution of Oceanography, said if this NOAA report is Earth's annual checkup, the doctor is saying "*you are gravely ill*".

But why is water so critical?

Because H<sub>2</sub>O has some amazing properties, properties that stem from H<sub>2</sub>O's ability to form strong hydrogen bonds. The two hydrogen atoms are not symmetric (on perfectly opposite sides of the oxygen atom from each other) but both are sort of on the same side of the oxygen, skewing the positive and negative charges each to one side of the water molecule. This allows water molecules to stick to each other back-to-front and side to side, giving water a set of unique properties on planets such as Earth.

In fact, most of these properties were essential for life to evolve on Earth in the first place. Just think about how things would be different if any one of the following properties were different:

- H<sub>2</sub>O has three phases (solid, liquid and gaseous) that all exist somewhere on the Earth's surface, and often together.
- H<sub>2</sub>O's solid phase (ice) floats in its liquid phase (water).
- water has a very high thermal and electrical conductivity. It conducts heat and electricity really well and really fast, and its presence in soil, rock and air transfers these conductive properties to these materials as well.
- water has one of the highest heat capacities of any substance. It can absorb and hold an awful lot of heat.
- water has high heats of vaporization and crystallization. It takes a huge amount of heat to turn ice into water. It takes even more to turn water into steam. Likewise, it gives off that much heat going in the opposite direction.
- water has a very high surface tension, the force that forms water into droplets and makes water travel up a paper towel against gravity. The essential part of a capillary force, the surface tension pulls water into merely small pores and cracks but prevents water from moving into microscopically small pores and cracks.
- water is an extremely good solvent for most compounds. Several water molecules surround individual atoms or molecules, actually making them part of the water. Water can dissolve many materials like salt, sugar, alcohol, and most gases, but not many fats and oils (the cells in our bodies couldn't exist without this one).
- water can act as both an acid or a base, it can give up or take on protons and electrons, allowing a huge range of chemical reactions, more than any other compound.
- water is transparent to visible, near-ultraviolet and far-infrared light, but it absorbs all other ultraviolet and infrared light as well as microwaves.
- water is essentially an incompressible fluid.

These properties of water have inextricably tied life and climate together for 4 billion years, and will continue to determine what happens to all our lives going forward.

Water is the biggest thermal sink on Earth, and we better be able to stand the heat.

Follow Jim on <https://twitter.com/JimConca> and see his and Dr. Wright's book at <http://www.amazon.com/gp/product/1419675885/sr=1-10/qid=1195953013/>

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