

Nuclear Power: No better than it ever was.

Ace Hoffman, Carlsbad CA
presentation for:

Green Party County Council of LA
Sunday, Sept. 9th, 2012

Idyllwild, CA
Wednesday, Sept. 12th, 2012

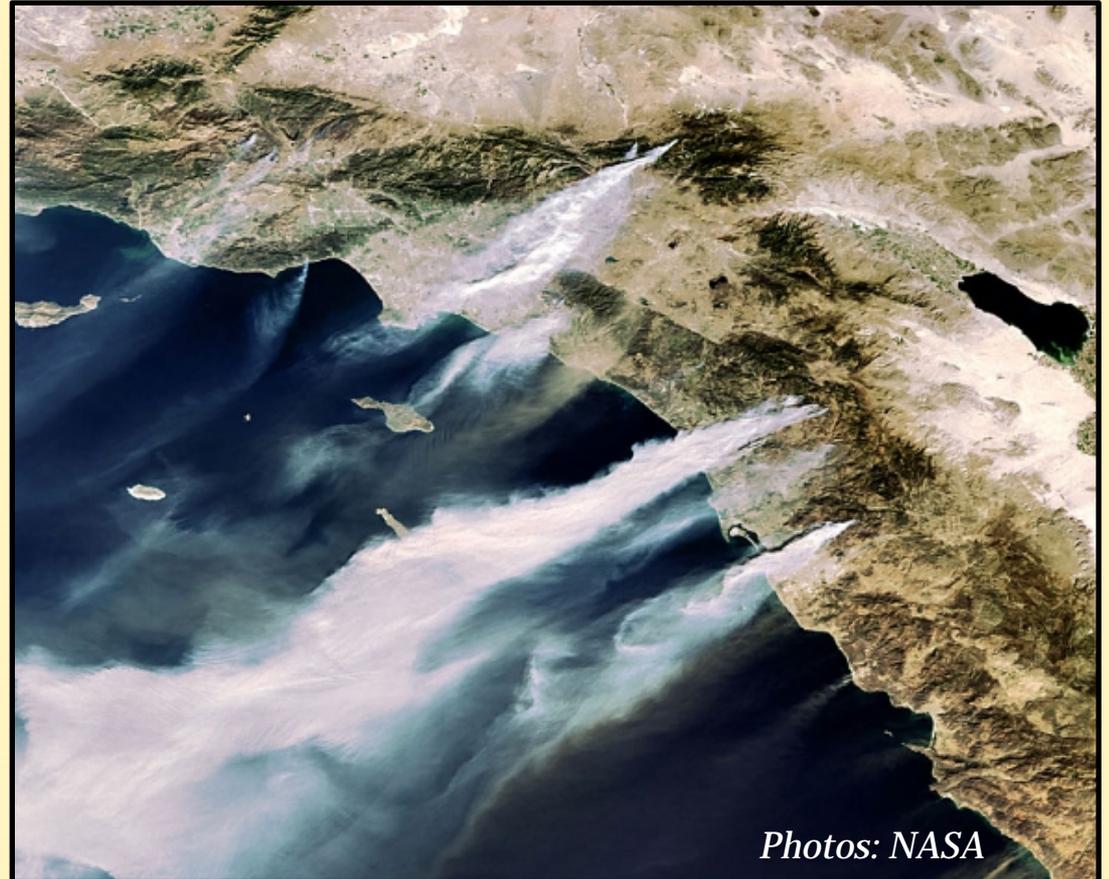
San Onofre Nuclear Waste Generating Station

Revised 9/12/2012

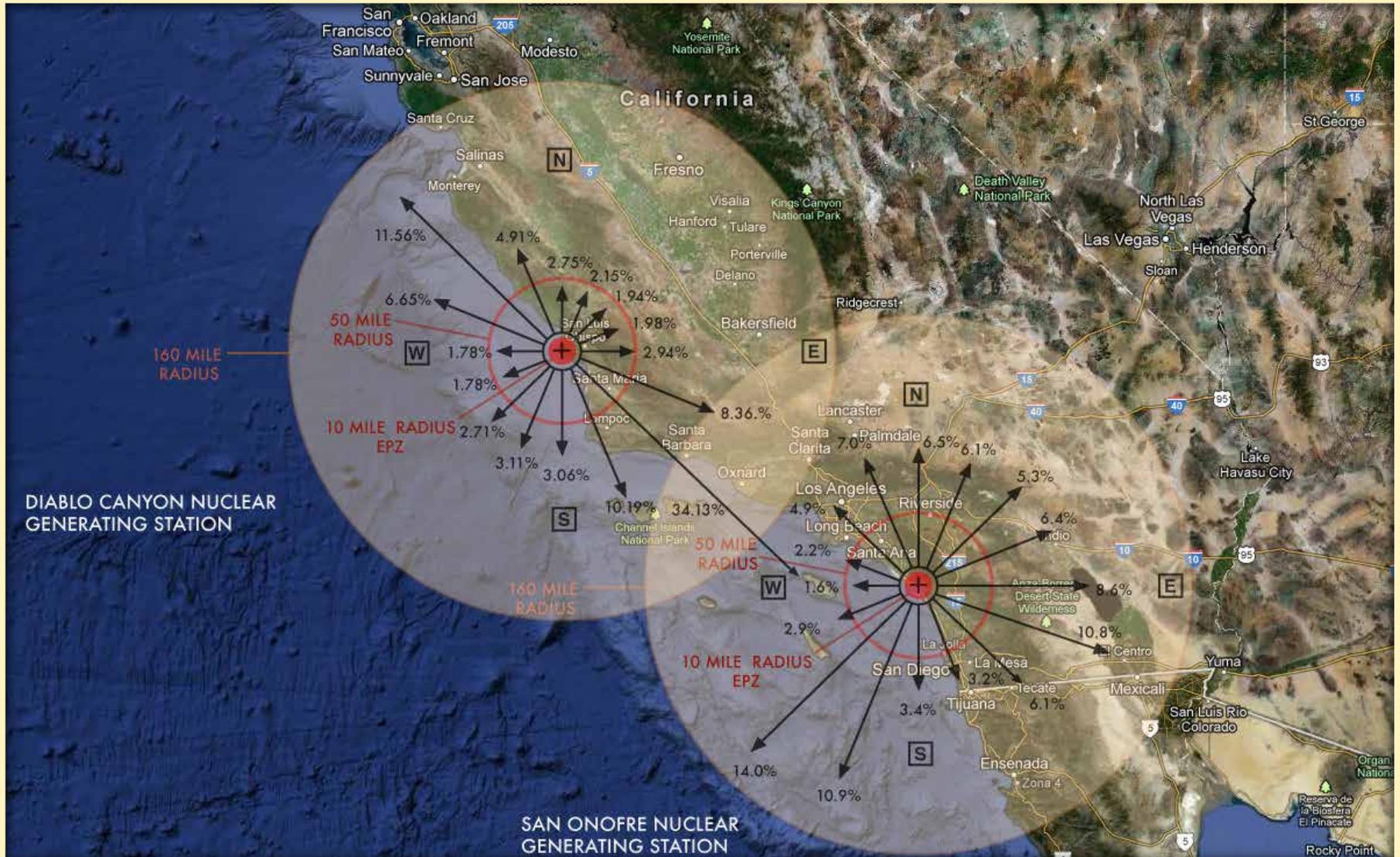
Smoke gets in your eyes:

Left: Plume from Sept. 2007 brush fire barely spreads as it travels over 200 km. across the Mojave Desert. Right: Plumes from Oct. 2007 fires drift out to sea.

Radioactive plumes are odorless, colorless, tasteless (except in very high doses) but can cause permanent evacuations and latent cancers hundreds of miles away.



Average wind directions for Diablo & SanO 10-mile evacuation zone, 50-mile zone, & 160-mile zone



Why nuclear power is a failure

Accidents:

Sudden; catastrophic;
near large populations.



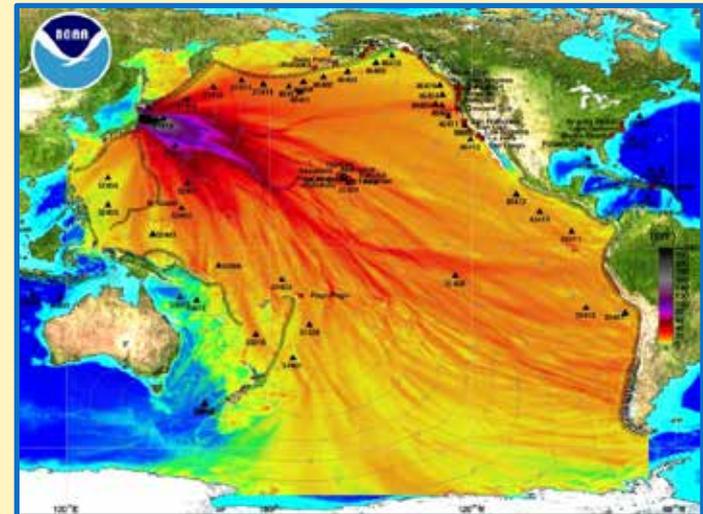
Fukushima Dai-ichi



Tsunamis



Earthquakes

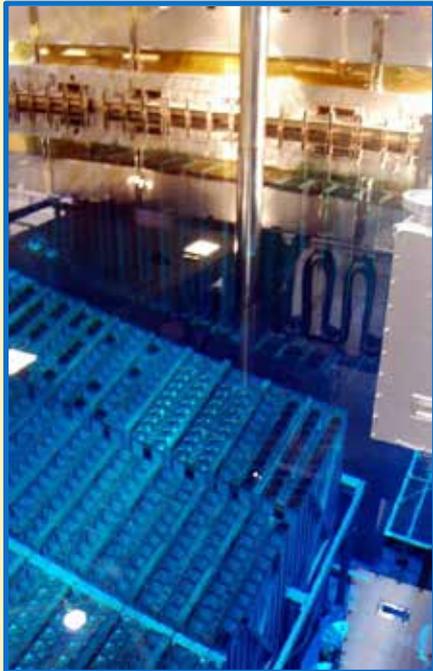


Honshu Tsunami Amplitude

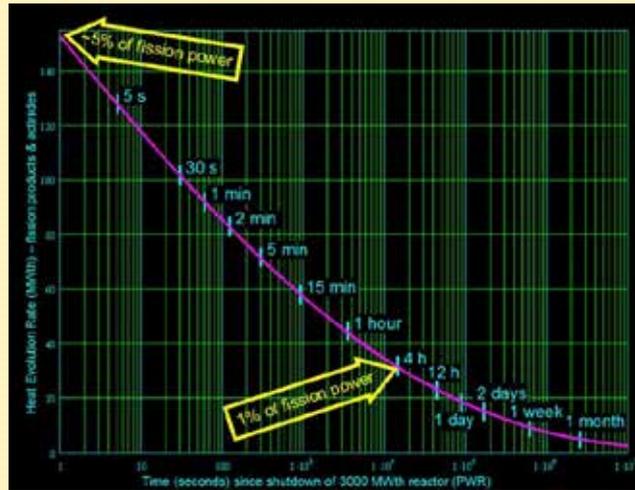
Why nuclear power is a failure



Dry Cask Storage



Spent Fuel Pool

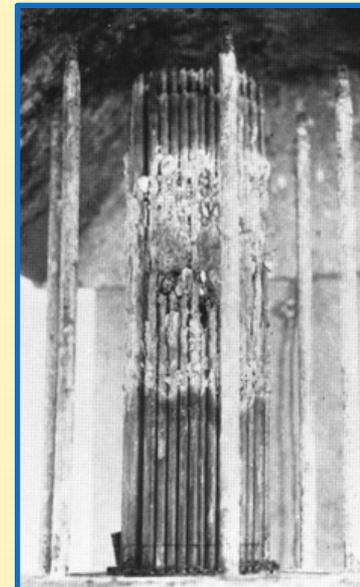


Decay heat post shut-down continues for eons...



Hanford "Tank Farm"
Workers

Waste:
An unsolvable
problem.

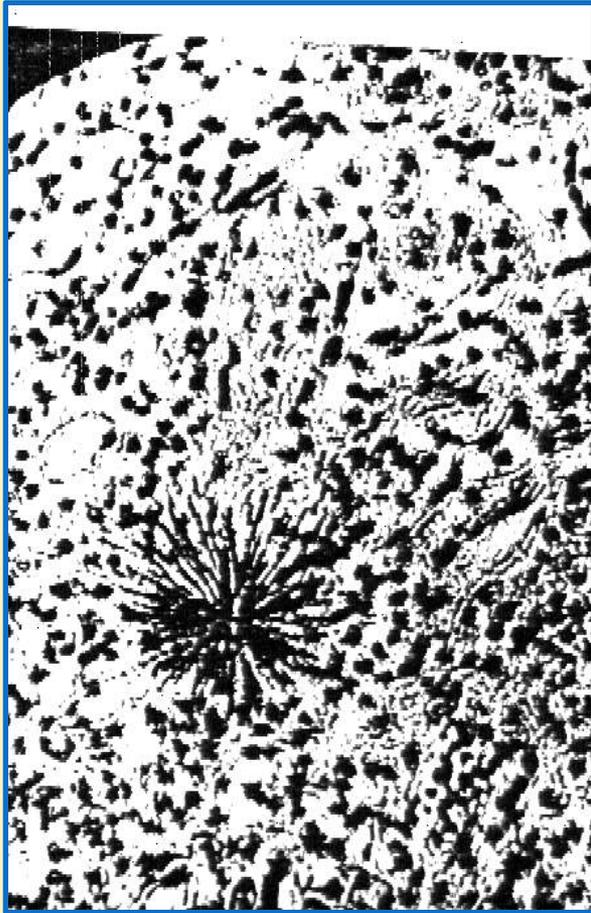


Melted
Fuel Rods



Fuel
Assembly
(BWR)

Why nuclear power is a failure (cont.)



Alpha particle tracks from a “hot particle”

Health Effects:

External, internal, “hot particle”, bioaccumulation, inflammation, long-term cancer risks.

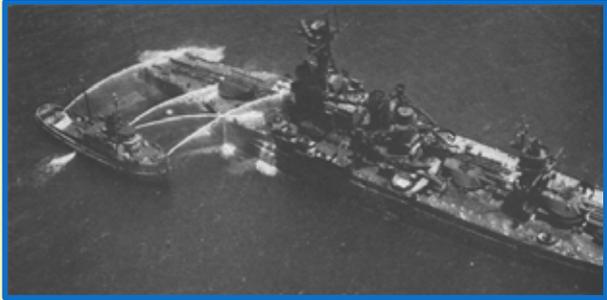


Fukushima deformed apple and persimmon



Fukushima two-mouthed fish

Why nuclear power is a failure (cont.)



Washing down ships, brushing off soldiers after nuclear bomb tests, 1940s & 1950s



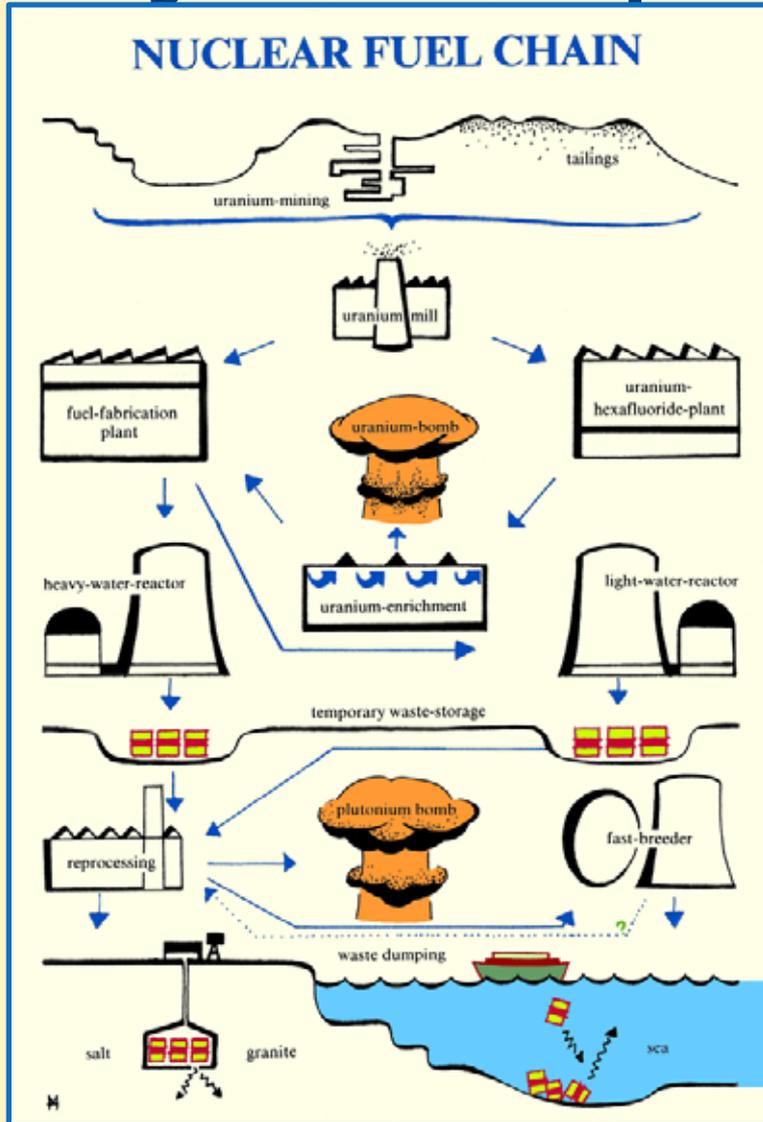
“Decontaminating” a research reactor, circa 2002

No Insurance:
Price-Anderson isn't even enough \$\$\$ for the vital brooms, brushes, hazmat suits & hoses for decontamination!



U.S. (left), Japan cleanup after Fukushima, 2011 - ???

Why nuclear power is a failure (cont.)



NOT “Carbon-free”:

Not during mining/construction, not during use, not during disposal (whatever *that* means).

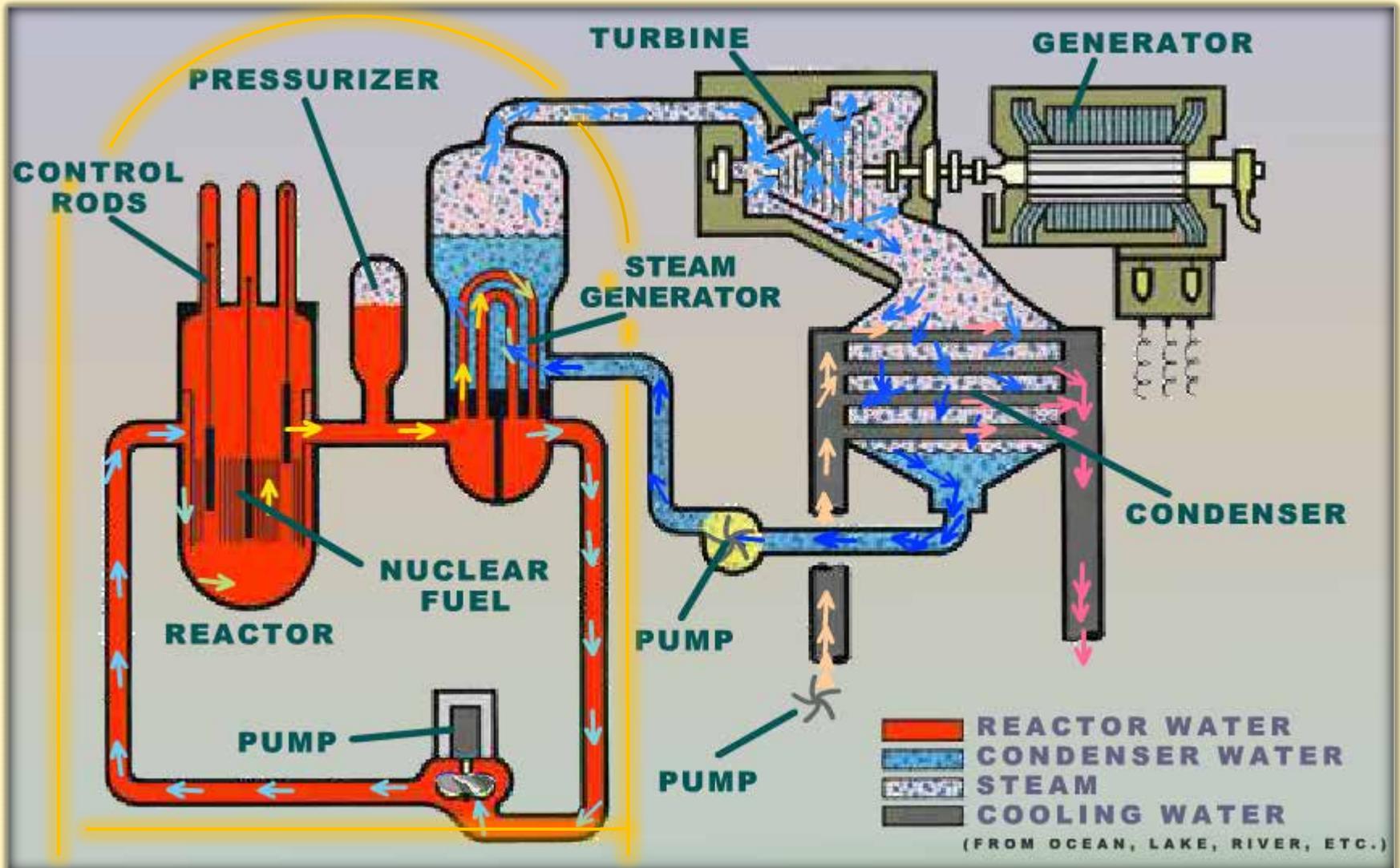


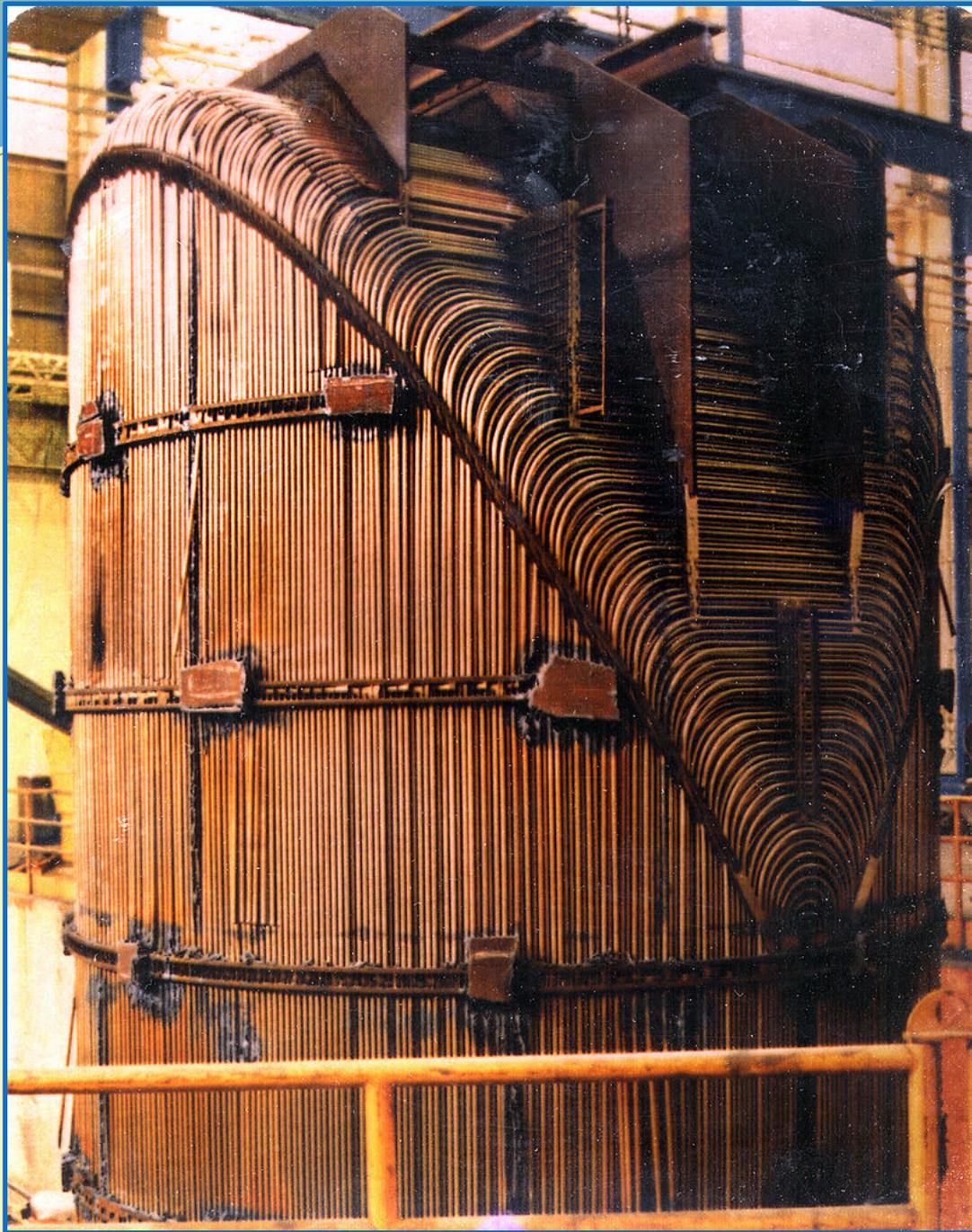
Why nuclear power is a failure (cont.)

- **Economics:** Renewables ARE cheaper! Wall Street won't invest in nukes, so: Gov't loan guarantees, P-A, ratepayer hikes – and an empty promise to take the used reactor cores away!
- **Proliferation:** India, Pakistan, North Korea.....
- **Not** democratic, **not** reliable, **not** honest, **not** popular, **not** rational...

...NOT GREEN!!!!

SGs are vital components of PWRs





- **SanO's SGs** are among the world's largest at about 640 tons each. There are (only) two per reactor. Each SG has 9,737 "U-tubes."
- **Palo Verde** (SCE is a part-owner) also has only two SGs per reactor. At 800 tons each, they are the largest in the world.

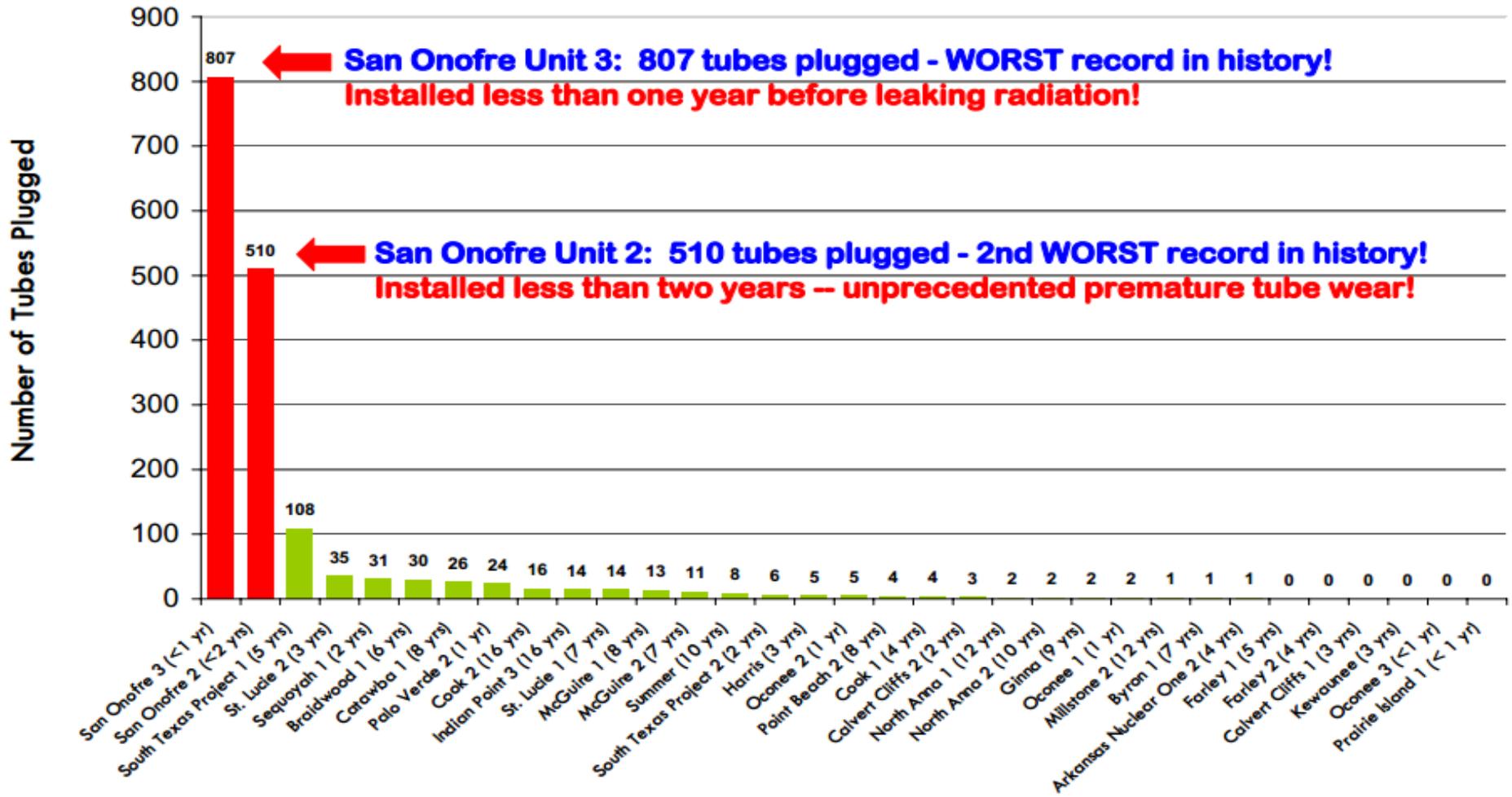
Typical "PWR" steam generator tube bundle under construction

Photo: Wikipedia

Steam Generators are problematic in the industry & could trigger a nuclear meltdown!

- **Unit 1 closed due to the SGs wearing out prematurely (early 1990s).**
- **Units 2 & 3's original SGs replaced due to premature wear.** The utility should have shut the reactors down when the wear reached unacceptable levels. Instead they billed ratepayers for new ones.
- **Unit 3 replacement SGs failed & leaked radiation within 1 year.** Unit 3 SGs may need to be replaced (at our expense, if history is any indicator).
- **Units 2 & 3 replacement SGs have same defective design & unprecedented wear. Unsafe to restart!**

U.S. Nuclear Reactors: Replacement Steam Generators Tubes Plugged to Avoid Radiation Leaks



Nuclear Reactors (years of replacement steam generator operation before tubes plugged)

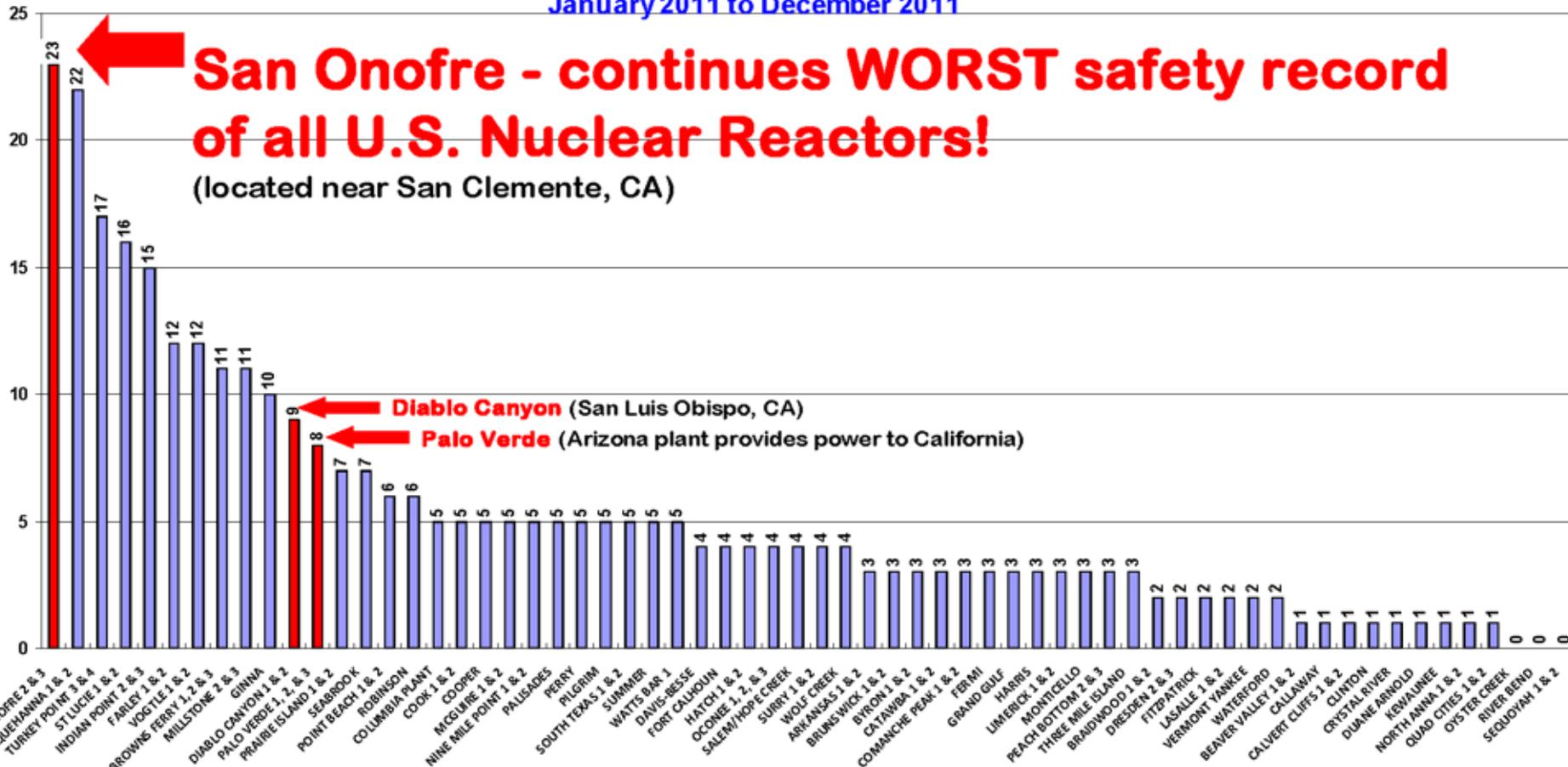
NUCLEAR REGULATORY COMMISSION: www.nrc.gov/info-finder/reactor/songs/tube-degradation.html#data,
<http://pbadupws.nrc.gov/docs/ML0723/ML072330588.pdf>, <http://pbadupws.nrc.gov/docs/ML1127/ML11270A015.pdf>
 FAIREWINDS: http://fairewinds.org/sites/fairewinds.org/files/reports/Edison_RSGs@SO_US_Worst_2012-7-11_FairewindsRptFOE.pdf

Fluid Elastic Instability (FEI) & Turbulence Induced Vibration (TIV)

- **SCE and NRC investigators identified Unit 3's tube rupture was a result of Fluid Elastic Instability** in the secondary coolant loop – a problem first identified in the 1970s. Self-amplifying pressure waves cause multiple tubes in the tube bundle to bend back and forth in unison until something breaks. At SanO, thousands of tubes were damaged in this manner, and on January 31st, 2012, **only** one tube leaked. FEI can lead to cascading (multiple) tube failure which could result in a nuclear meltdown.
- **Turbulence Induced Vibration (aka Flow Induced Vibration)**, while not as dramatic as FEI, can also lead to tube rupture and a nuclear meltdown.
- **A whistleblower stated TIV is also occurring within the reactor cores themselves, damaging the fuel rods.**

Complaints of Safety Problems at all U.S. Nuclear Power Plants from On-Site Employees & Contractors*

January 2011 to December 2011



Source: Nuclear Regulatory Commission (NRC) allegation statistics www.nrc.gov/about-nrc/regulatory/allegations/statistics.html

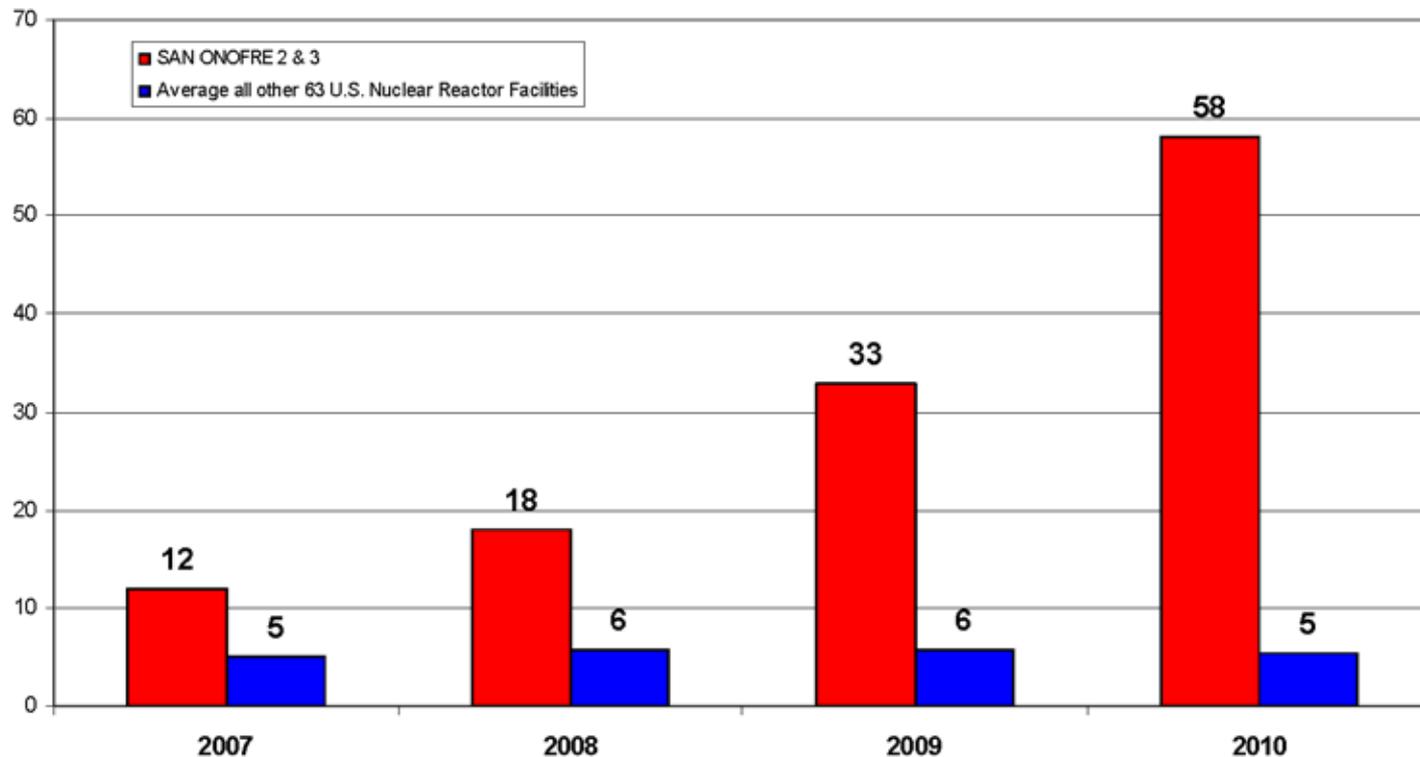
*The NRC refers to these complaints as "Allegations from On-Site Sources" (current/former power plant employees/contractors and anonymous allegers). These are reports of impropriety or inadequacy of NRC-related safety or regulatory concerns. One allegation report may contain multiple allegations; however, the NRC counts it as one allegation in this report. Note: A concern about a safety-conscious work environment (SCWE) problem at a facility is an important allegation. However, a Notice of Violation cannot be issued, because there is no applicable NRC regulation. There are 64 U.S. nuclear power plants & 104 reactors. Plants with multiple reactors are noted.

SAN ONOFRE 2 & 3 Nuclear Reactor Facility

vs.

All Other U.S. Nuclear Reactor Facilities

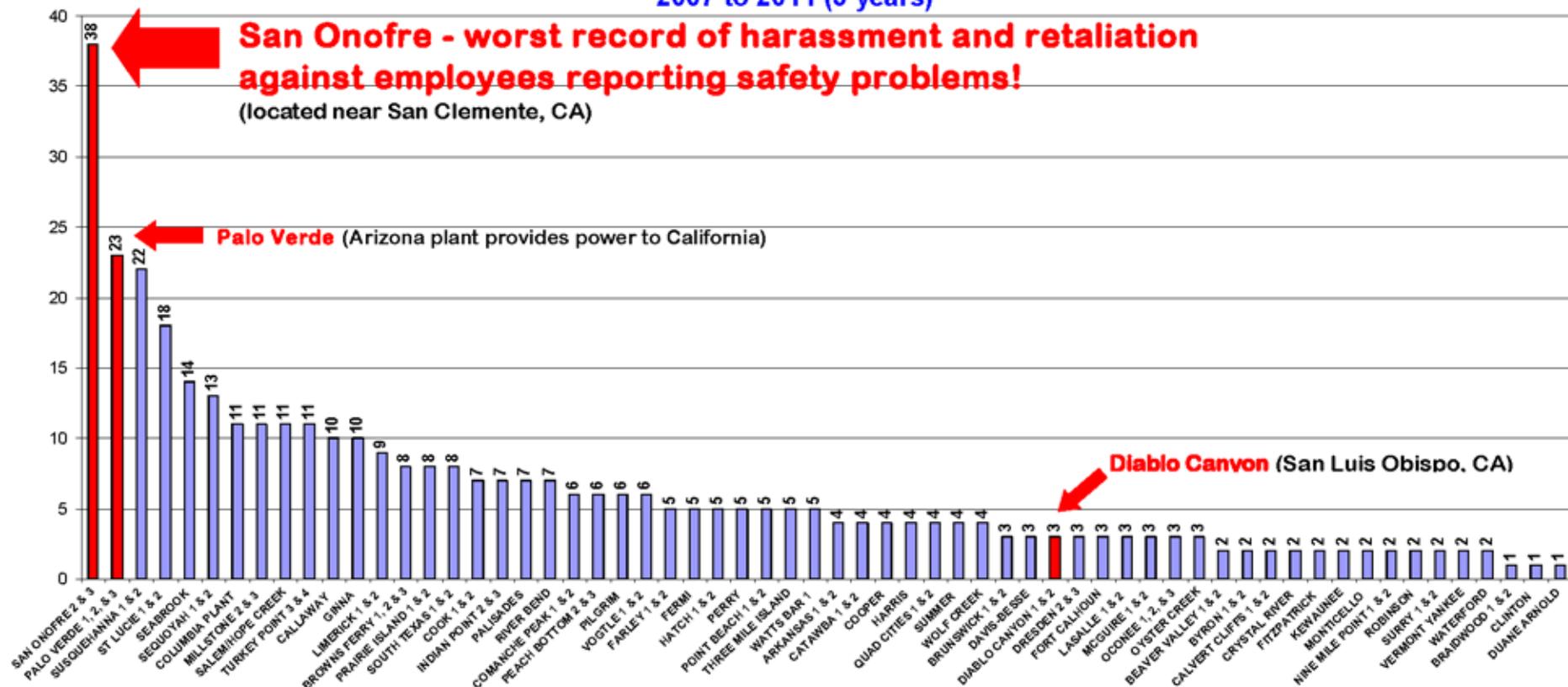
Complaints of Safety Problems from On-Site Employees & Contractors*
January 2007 - December 2010



*The Nuclear Regulatory Commission (NRC) refers to these complaints as "Allegations from On-Site Sources" (current/former reactor facility employees/contractors and anonymous allegers). These are reports of impropriety or inadequacy of NRC-related safety or regulatory concerns. This chart includes the number of on-site allegations filed with the NRC. However, each allegation may contain multiple complaints. The multiple complaint count is not included on this chart. Also, an allegation about a safety-conscious work environment (SCWE) problem at a facility is important. However, a Notice of Violation cannot be issued, because there is no applicable NRC regulation.
Source: www.nrc.gov/about-nrc/regulatory/allegations/statistics.html

SCE is a leader... in worker harassment and retaliation

Complaints of Employee Harassment and Retaliation
at U.S. Nuclear Power Plants*
2007 to 2011 (5 years)



Source: Nuclear Regulatory Commission (NRC) discrimination allegations www.nrc.gov/about-nrc/regulatory/allegations/statistics.html

*The NRC refers to these reports as "Discrimination Allegations" from employees, contractors, or subcontractors of harassment, intimidation, or discrimination for raising NRC-related safety or regulatory concerns. One allegation report may contain multiple allegations; however, the NRC counts it as one allegation in these statistics. "Discrimination Allegations Received" is a subset of all "Allegations Received." There are 64 U.S. nuclear power plants & 104 reactors. Plants with multiple reactors are noted.

SAN ONOFRE NUCLEAR POWER PLANT HAS THE WORST SAFETY RECORD

Complaints of Safety Problems at all U.S. Nuclear Power Plants

from On-Site Employees & Contractors*

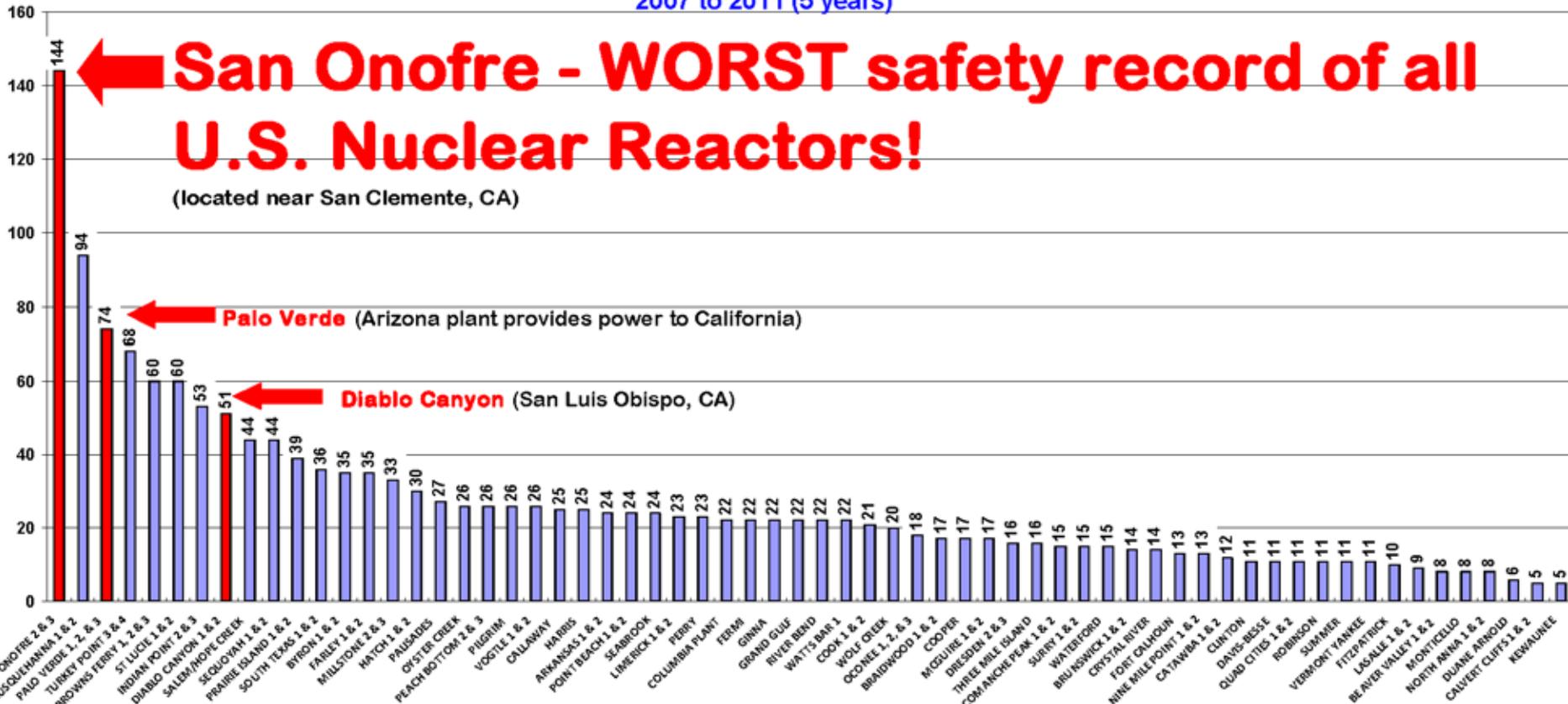
2007 to 2011 (5 years)

San Onofre - WORST safety record of all U.S. Nuclear Reactors!

(located near San Clemente, CA)

Palo Verde (Arizona plant provides power to California)

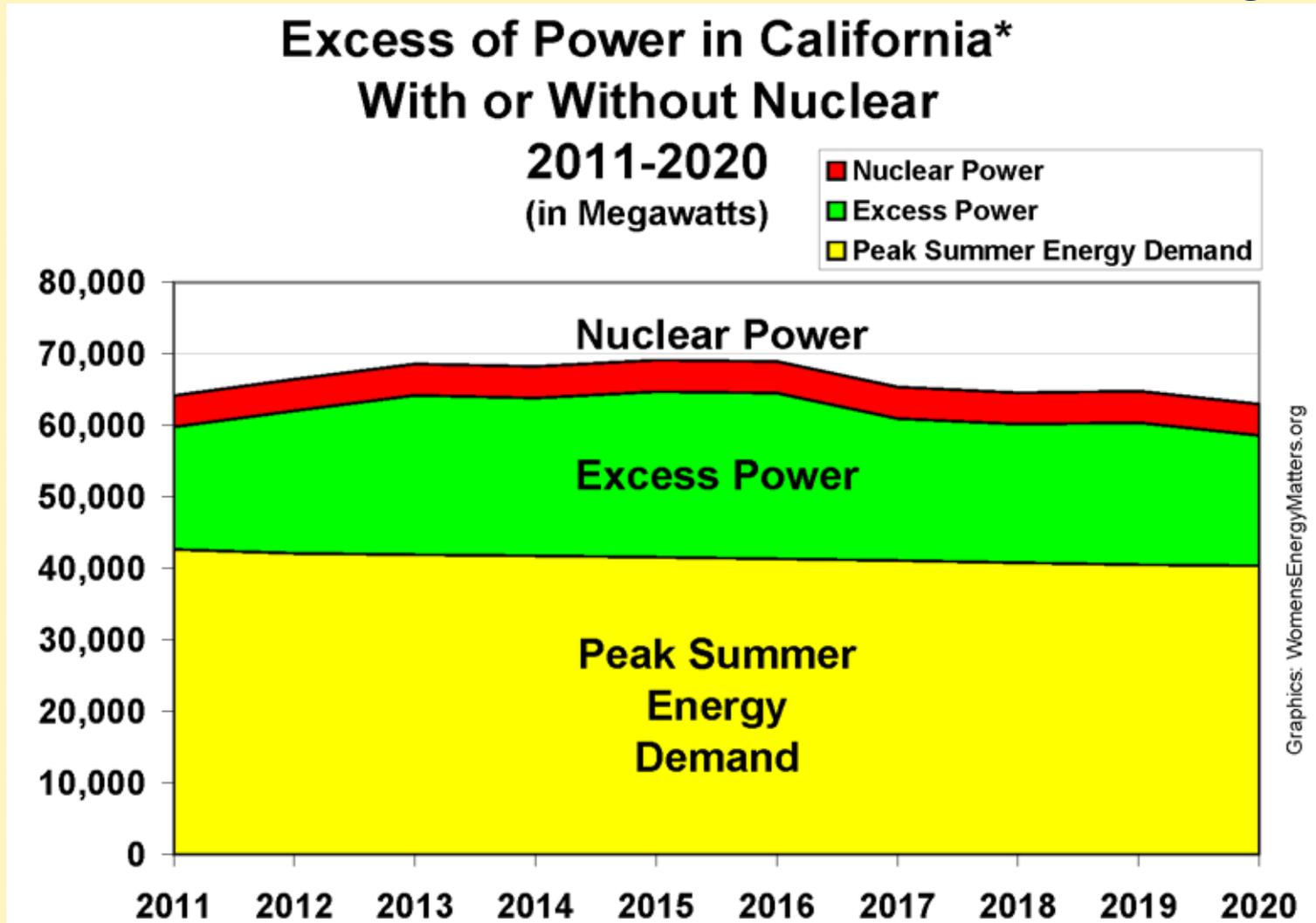
Diablo Canyon (San Luis Obispo, CA)



Source: Nuclear Regulatory Commission (NRC) allegation statistics www.nrc.gov/about-nrc/regulatory/allegations/statistics.html

*The NRC refers to these complaints as "Allegations from On-Site Sources" (current/former power plant employees/contractors and anonymous alлегers). These are reports of impropriety or inadequacy of NF related safety or regulatory concerns. One allegation report may contain multiple allegations; however, the NRC counts it as one allegation in these statistics (Note: A concern about a safety-conscious work environment (SCWE) problem at a facility is an important allegation. However, a Notice of Violation cannot be issued, because there is no applicable NRC regulation.) There are 64 U.S. nuclear power plants reactors. Plants with multiple reactors are noted.

We don't need SanO or Diablo Cyn



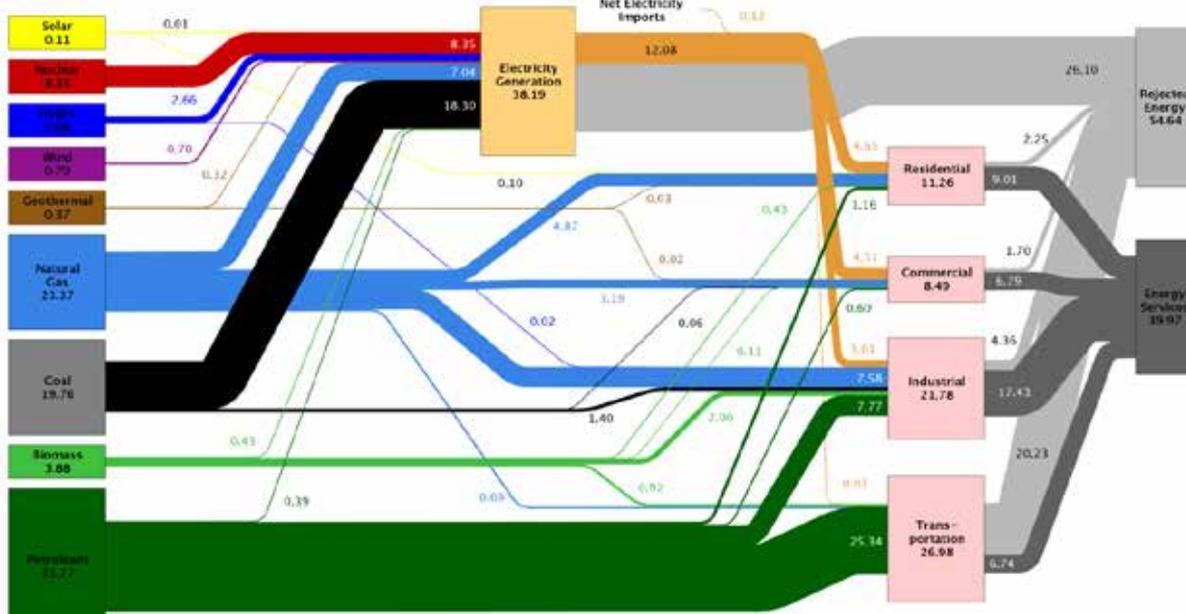
Graphics: WomensEnergyMatters.org

*SCE/PG&E/SDG&E utility net imports/retiring plants/planned additions. CA Public Utilities Commission 2/10/11 Admin. law judge ruling, Attach A, P17-19, CA Long Term Procurement Plan Proceed. R10050006. <http://docs.CPUC.ca.gov/efile/rulings/130667.htm>

There are many choices, better choices

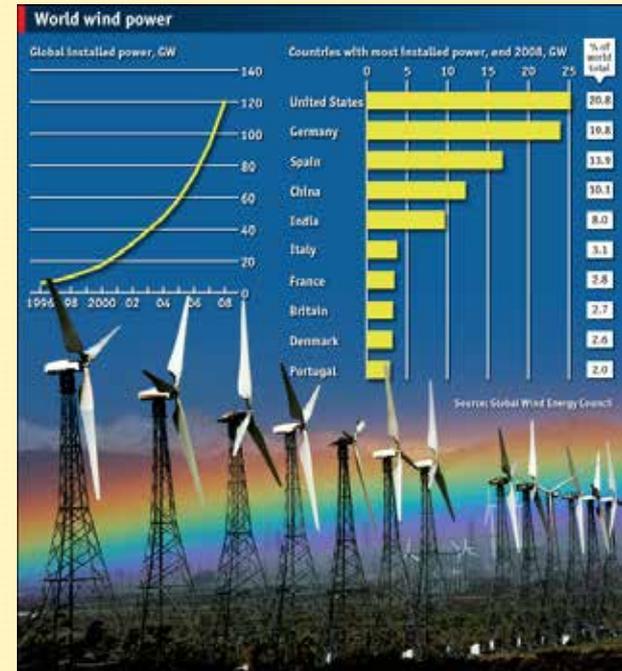
Estimated U.S. Energy Use in 2009: ~94.6 Quads

Lawrence Livermore National Laboratory



Source: LLNL, 2010. Data is based on DOE/EIA-0384(2009), August 2010. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports flows for non-thermal resources (i.e., hydro, wind and solar) in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 80% for the residential, commercial and industrial sectors, and as 25% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410217

Energy: An solvable problem



What is SCE planning to do next?

- **Avoid public scrutiny.** Take out self-promoting ads.
- **Avoid CPUC OII**, either by starting Unit 2 at lower power by Oct 31st; or by using political connections to the CPUC.
- **Avoid NRC adjudicated hearings.** Avoid NRC penalties.
- **Make large donations** to political leaders at all levels.
- **Avoid paying for their mistakes** (make ratepayer pay).
- **Keep SanO licenses so they can rebuild** both units at our expense, so they can keep milking their cash cow until it turns into a fire-spewing dragon and they abandon it and we all abandon SoCal for good. More than 8 million people would lose their homes, many would lose their lives, and everyone globally would be affected. A meltdown anywhere is a meltdown everywhere (as we have seen).

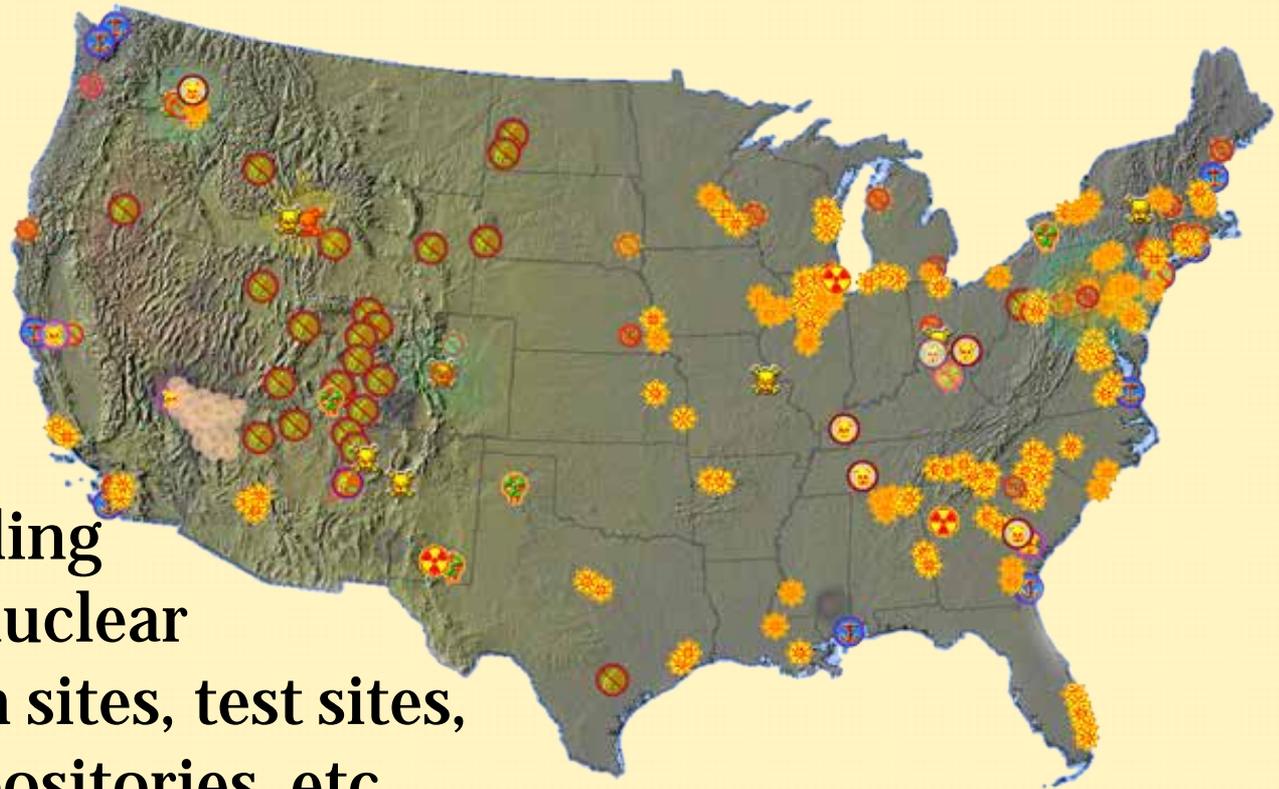
What can we do?

- **Pressure CPUC** to immediately initiate an *independent* investigation of what went wrong with SanO, including a special look at the many advantages of keeping it closed.
- **Demand NRC** not allow EITHER Unit 2 or 3 to reopen, and hold public hearings in all cities within 160 miles.
- **Additional unresolved issues** include earthquake, tsunami, wildfire and other natural and man-made hazards. An accident far worse (and more sudden) than Fukushima is possible at San Onofre (or at any reactor).
- **Designs with only two SGs per reactor should be considered flawed.** Avoidance of **FEI** and **TIV** cannot be guaranteed. And each SG at SanO only has one “**Atmospheric Dump Valve,**” -- another design flaw.

Looking ahead...

It's time to “phase out” nuclear power in California – not just San Onofre, but Diablo Canyon as well.

US: 104 power reactors, plus uranium mines, fuel fabrication, Navy homeports, nuclear shipbuilding and ship repair, nuclear weapons research sites, test sites, nuclear waste repositories, etc..



(Every nuclear reactor site is a nuclear waste repository at this time.)

Greens oppose nuclear power

“The generation of nuclear waste must be halted. It is hazardous for thousands of years and there is no way to isolate it from the biosphere for the duration of its toxic life. We oppose public subsidies for nuclear power.”

-- Green Party Platform 2012

**“The Green Party recognizes that there is no such thing as nuclear waste
“disposal.””**

-- Green Party Platform 2012

Greens oppose nuclear power (cont.)

“End the use of nuclear power. Nuclear energy is massively polluting, dangerous, financially risky, expensive and slow to implement. Our money is better spent on wind, solar, geothermal, conservation and small-scale hydroelectric.”

-- Green Party Platform 2012

“We can and must leave the old economy behind – which was based on mining, extraction, and dirty dangerous expensive nuclear power.”

-- Jill Stein, Green New Deal

Thank you!

This presentation will be available online at:

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*July, 2011:
Removal of
an old steam
generator for
long-term
storage in
Utah...*



Extra images...



HIROSHIMA '45
CHERNOBYL '86
WINDOWS '95

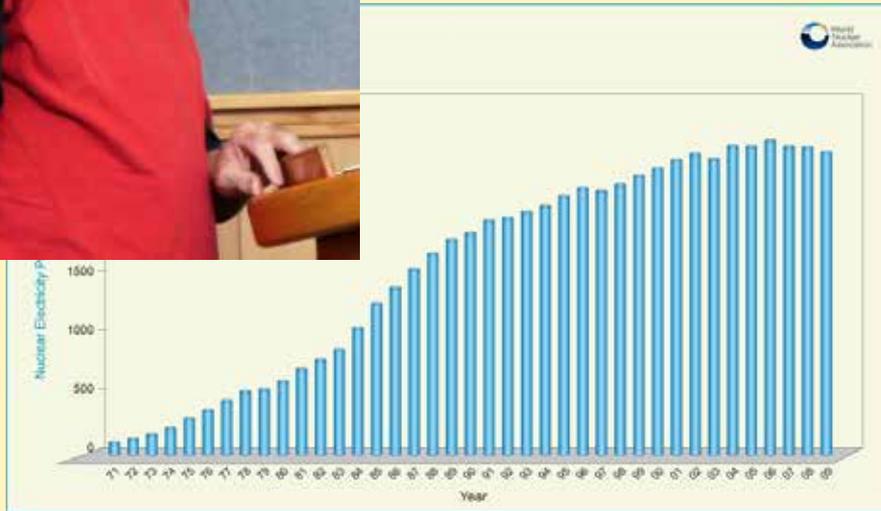
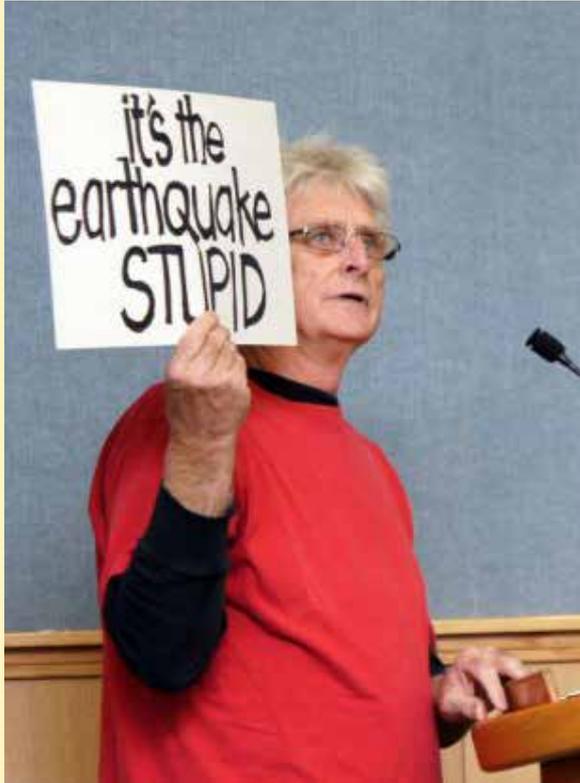


**I refuse
to believe
corporations
are people
until Texas
executes one.**

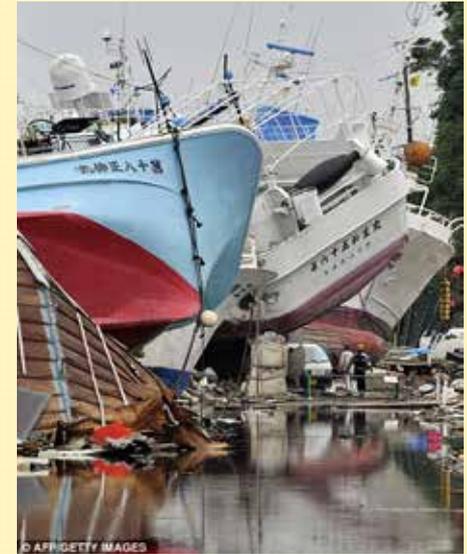
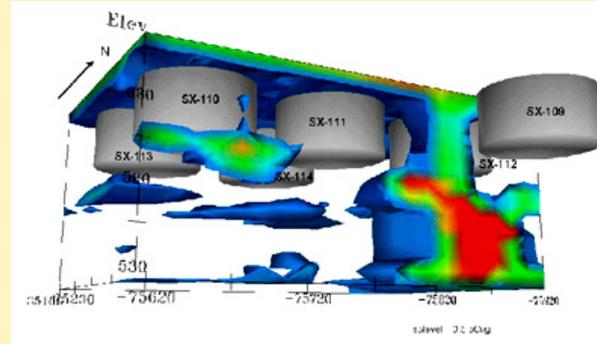


Chernobyl sarcophagus

Extra images...



Extra images...



You will be forced out of your home at the point of a gun.

