

Joosten, Sandy

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Subject: SoCal Edison's fraudulent behavior regarding the Replacement Steam Generators at San Onofre

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Dear Readers,

Here is a typical description of the legal meaning of the word "fraud":

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Fraud:

A false representation of a matter of fact -- whether by words or by conduct, by false or misleading allegations, or by concealment of what should have been disclosed -- that deceives and is intended to deceive another so that the individual will act upon it to her or his legal injury.

Fraud must be proved by showing that the defendant's actions involved five separate elements: (1) a false statement of a material fact, (2) knowledge on the part of the defendant that the statement is untrue, (3) intent on the part of the defendant to deceive the alleged victim, (4) justifiable reliance by the alleged victim on the statement, and (5) injury to the alleged victim as a result.

Fraud is commonly understood as dishonesty calculated for advantage.

The above definition is from:
The Free Legal Dictionary by Farlex
<http://legal-dictionary.thefreedictionary.com/fraud>

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The actions of Southern California Edison (SCE) in pushing their Replacement Steam Generators (RSGs) for San Onofre Nuclear Generating Station (SanO) through the California Public Utilities Commission (CPUC) (for ratepayer funding) and through the Nuclear Regulatory Commission (NRC) (for safety approval) amounts to fraud. Presented as "like-for-like" with the Original Steam Generators (OSGs), the RSGs were in fact significantly UNLIKE the OSGs -- and (as we all now know) not only unworkable but UNSAFE. In this writer's opinion, SCE's actions have reached the level of criminal negligence, since the lives and livelihoods of almost 9 million people who live and work within 50 miles of the plant are at stake. Where an abundance of caution should have been used, SCE instead was focused on shareholder profits.

SCE's actions satisfy all five requirements listed above to prove fraud.

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First: A false statement of a material fact.
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Edison claimed, falsely, that the RSGs were a "like-for-like" replacement, and therefore they did not need to go through a public review process. While Edison publicly disclosed that the RSGs would be made with a different alloy (Inconel 690), they only said it was more resistant to stress corrosion cracking (SCC), fretting, and other forms of fatigue than the alloy used

in the tubing of the OSGs (Inconel 600). These problems had plagued the industry's first generation of steam generators and led to the permanent shutdown of SanO Unit 1 in 1992. However, left unsaid about the new alloy was another important property: Inconel 690's heat transfer coefficient is about 10% lower than Inconel 600's, which necessitated numerous additional changes to the RSGs in order for them to generate the same amount of steam as the original OSG design. These unproven changes were kept hidden from the public, but are now known to have included:

A) Much tighter spacing of the steam generator tubes to approximately 3/4 inch (versus about one inch in the OSGs), with a new triangular spacing pattern (versus a square spacing pattern in the OSGs).

B) Reducing the distance between each tube in the U-bend region to as little as 0.05 inches between some of the tubes. The industry norm is between 0.35 and 0.55 inches; the design (intended) spacing was 0.25 inches. This tighter packing of the tubes allowed them to clang into each other more easily, which increased wear damage (the rupture on January 31, 2012 which disabled Unit 3 was in the u-bend region of the tube bundle).

C) Adding over 370 tubes per steam generator, which also, along with the tighter spacing of the tubes, reduced the available flow area of the secondary coolant loop.

D) Lengthening of the tubes by an average of nearly 2 1/2 feet per tube, which had several detrimental effects, including allowing the longer tubes to vibrate at a lower level of turbulence, and reducing the open space above the u-bend of the tubes, which prevented the steam from properly exiting the top of the u-bend region before entering the swirl vane moisture separators. This may have increased the "Mitsubishi Flowering Effect," further weakening the tubes, especially just above the tube support plate (TSP) located at the top of the straight portion of the tubes at the base of the u-bends.

E) The reduced space available in the secondary coolant loop altered the flow characteristics of the steam/water mixture in that loop. Proper flow is required to transfer heat away from the primary coolant loop, which flows through the reactor at about 2,500 gallons per second, at about 2200 pounds per square inch of pressure, and exits the reactor at about 600 degrees Fahrenheit. These design changes caused steam "dry-out" (too much steam (more than about 99.6%) and not enough water (less than about 0.4%)) in the steam/water secondary coolant loop mixture. The dry-out conditions resulted in heat being transferred less efficiently, which in turn, also changed the flow characteristics of the RSGs. The net result was significantly increased flow rate of the secondary coolant loop's steam/water mixture within the U-tube bundle, and simultaneously, significantly reduced damping of any tube movement that occurred for any reason.

F) Removal of a "stay cylinder" in the center of the steam generators (to make more room for additional u-tubes) may have allowed an increase in vibration and thus, fatigue.

Among other effects, these changes reduced the normal 'nucleate boiling' on the outer surfaces of the tubes due to excessively dry steam. This in turn caused additional thermal stress, cavitation, and fatigue when the remaining bubbles of steam "exploded" on the hot, dry tube surfaces. Damage from this phenomenon is not easily diagnosed and has not been properly inspected for, yet SCE is now putting pressure on NRC to restart the reactor by claiming to have done a "thorough" inspection of all the tubes -- even though much better inspection equipment is available which SCE has decided not to use. Fatigue damage specifically has barely been inspected for (tube-to-tube wear has been concentrated on, instead).

Edison also claimed that all four RSGs (two per reactor) were virtually identical, yet they now claim that small differences in manufacturing procedures make Unit 2's RSGs sufficiently different to be safely restarted. In reality the manufacturing differences were not

significant; the operational differences between the two reactors were why Unit 3 suffered more extensive damage, faster, than Unit 2.

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Second: Knowledge on the part of the defendant that the statement is untrue.
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A) SCE required MHI to withhold certain safety improvements specifically to prevent a thorough NRC review process that would have also allowed public scrutiny of their new steam generator design. Thus, they were well aware that their claim that "safety is their highest priority" is blatantly untrue.

B) SCE has repeatedly stated that the nuclear waste problem is not a problem because of "Yucca Mountain." But the proposed Yucca Mountain storage facility was never a viable solution to the nuclear waste problem and was never even close to being placed into service, due to both the geology of Yucca Mountain specifically (earthquake faults, water seepage, etc.) and due to the intractable, destructive nature of nuclear waste generally. The fact is, ionizing radiation (by definition) can destroy any containment you put it in. Furthermore, vermin will move the waste away from the dump site, as will flowing groundwater, and the radiation will continue to be hazardous for many millennia.

C) SCE falsely claims that SanO can help reduce global warming because, according to them, it does not release greenhouse gases. This is untrue: The nuclear fuel cycle is extremely carbon-intensive during mining, milling, and enrichment of the uranium oxide fuel, during construction of the reactor (along with all its replacement parts), and during the decommissioning process. Carbon emissions occur throughout the operating life of the reactors as well, as approximately 1,500 people work at the plant, drive to work, etc.. After decommissioning, the radioactive trash (spent fuel) continues to release ozone-damaging and DNA-damaging ionizing radioactive particles, along with thermal heat. Guards, guns, and guard dogs will be needed for thousands of generations, at a cost of tens of millions of dollars per year per reactor. For these reasons nuclear power is not a solution to global warming, but instead is a significant part of the problem.

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Third: Intent on the part of the defendant to deceive the alleged victim.
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A) SCE stated to the NRC on 4/5/2013 that Southern California "needed" SanO for grid stability, voltage support, and to address customer demand for electricity. Yet the California Independent System Operator (Cal-ISO) has shown that there is plenty of electricity available and furthermore, SCE has undertaken NO attempt to replace SanO's electricity with clean, green alternatives in the 16 months since the tube rupture made it apparent that Unit 3 could never, and Unit 2 should never, come back online in their present condition. In fact SCE appears to be attempting, through their inaction, to CAUSE blackouts this summer in order to justify their claim that SanO is "needed." The reality is that nuclear power plants are notorious for not staying online, and with only one reactor (at most) operating, an alternative energy plan SHOULD HAVE ALREADY been put in place. Yet no such plan is being implemented, as SCE keeps stalling while hoping for an extraordinarily hot summer, along with maybe a few downed high-power transmission lines. Any blackouts or brownouts, regardless of their cause, will be pointed to as "proof" that SanO is needed, even though they might have occurred anyway, and SanO might have gone down for a variety of reasons anyway. What SoCal really needs is additional wind energy, solar energy, demand response, and other clean alternatives.

B) SCE's claim that grid stability will be compromised by too high a percentage of renewable energy has been proven false by, for example, Portugal's success with turning to renewables (now over 70%), and Germany's (over 25%). Germany's goal is 45% renewable energy by 2030,

and 80% to 100% renewable energy by 2050. California can and should be a global leader in renewable energy.

C) SCE stated on 4/8/2013 that: "Operating [Unit 2] at 70 percent power prevents conditions that caused the tube-to-tube wear in Unit 3 that resulted in the nuclear plant being shut down since January 2012." This is a misleading statement and a misrepresentation of fact. Firstly, SCE is only speculating and does not know for sure that Fluid Elastic Instability (FEI) can be prevented at 70% power. Secondly, SCE is completely ignoring dangerous tube behavior that can occur during operational transients (such as the opening or shutting of valves, start-up, shut-down, etc.), tsunamis, earthquakes, and/or during a Main Steam Line Break (MSLB) condition. Thirdly, describing a 70% power reduction at the turbine, while operating the reactor at approximately 100% (normal) power (which is the true intent of SCE's plan) is very misleading, and is intended to lull the public into thinking Unit 2 will just limp along quietly with no safety problems.

D) SCE, in attempting to justify restart of Unit 2, claimed to the public and the media that new "acoustic listeners" would help SCE avoid a repetition of the January 31, 2012 tube rupture and leak. But this claim was proven false when NRC questioning revealed that the listeners would only provide data to be analyzed later and would offer no real-time protection or early warning about tube wear problems. This was a purposeful obfuscation on the part of SCE to hoodwink the public into thinking SCE would be able to tell beforehand if there is tube damage which might cause a rupture. They can't tell, as proven by the fact that Unit 2 had one tube with 90% tube wall wear, and numerous tubes that had exceeded their safety limitation of 35% tube wall wear, and SCE had no knowledge of this fact until Unit 2's RSGs were re-inspected more carefully after the radiation leakage was discovered in Unit 3.

E) In 2004 when they applied to the CPUC to force ratepayers to cover the cost of the RSGs, SCE claimed that the project would somehow save about a billion dollars for ratepayers over a 20 year period -- about 50 million dollars a year. It has already cost ratepayers far more than that, and continues to cost ratepayers nearly 70 million dollars each MONTH while we wait to have a decision about restart. The RSGs in Unit 3 ran for less than a year and can never be used again, and the RSGs in Unit 2 ran for less than 2 years and should also never be used again. SCE should have foreseen these problems specifically, and other problems generally, and included such costs in their analysis. If they had, no one would have approved the replacement steam generator project.

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Fourth: Justifiable reliance by the alleged victim on the statement.
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A) Despite numerous activists and experts outside the nuclear industry (and their too cozy federal regulators) using sound engineering principles to explain why Unit 2 should not be restarted (John Large, Joram Hopenfeld, Arnie Gunderson, Michel Pettigrew and others), the vast majority of SoCal's population only hears what SCE says and the media repeats, because SCE has an enormous PR budget (paid for by the ratepayers). After all, SCE has the nuclear experts, right? (Who just happen to include the ones that designed the defective RSGs.) In actuality, the above-mentioned gentlemen are among the world's leading experts in nuclear reactor steam generators. Not one of them believes Unit 2 can be restarted safely with the current pairs of steam generators.

B) SCE has, through careful wording of their statements to the NRC, attempted (and largely succeeded) in convincing the NRC that a restart may be possible, despite the known (and unknown) tube damage that has already occurred. The public -- the victim -- is being hoodwinked by SCE and NRC "experts" who toss technical statements back and forth, asserting that neither of them will allow an unsafe restart -- and yet, as outside experts have shown, that is the only kind of restart that is possible. SCE is counting on the public to believe that NRC will oversee SCE properly, and since the majority of the public is unaware of the

"regulatory capture" that has occurred within the NRC, SCE may get their wish. Meanwhile, the actions of SCE and NRC are quietly being investigated by a number of federal and state oversight groups: The Security and Exchange Commission, the Atomic Licensing Review Board, the NRC Inspector General's office, the CPUC and others.

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Fifth: Injury to the alleged victim as a result.
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A) There are nearly nine million people who live and work within 50 miles of San Onofre. They might all be affected by a restart decision if there is a meltdown, which might cost more than a trillion dollars and permanently displace millions of people, along with causing hundreds of thousands of deaths. Such enormous numbers are indicated not only by the actual events around Chernobyl and Fukushima, which, bad as they were, were not as bad as they could have been or could be at SanO, but also, by the figures cited in the 1982 federal report known as CRAC-2 (a report which seriously underestimated the average number of meltdowns the world would experience over time, as well as the size of populations around the plants, time needed to evacuate, and damage to human health from radiation).

B) If there is an accident, the federal Price-Anderson Act of 1957 will prevent victims from obtaining reasonable compensation from SCE for damages and injuries that will result. The act limits nuclear industry liability for an accident to about 12 billion dollars.

C) Even if there is no meltdown of the reactor, restarting it will result in increasing the amount of spent fuel stored on site (or stored somewhere), the costs and risks of which will be borne by future generations of citizens, not SCE. The lethality of the waste will continue for hundreds of thousands of years as radioactive decay products transform from one radioactive element to another, and another (sometimes dozens of steps), until a stable element is reached.

D) Even if there is no accident, all of SCE's projections of future savings for the ratepayer are based on wishful thinking: SCE hopes that SanO will operate successfully for the next 20 (or 40) years, but there is no guarantee that other problems will not arise, and nor is there any assurance that safety changes expected to be required over the next few years due to lessons learned from the Fukushima accident will not make operating SanO even less cost-effective than it would be anyway.

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In Summation:
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Southern California Edison has committed fraud against the people of Southern California. It is time that both the California Public Utilities Commission and the State Attorney General put a stop to SCE's unlawful practices. SCE continues to propose restarting Unit 2 with damaged and defective steam generators, which poses a serious and substantial risk to all Southern Californians. Relief for the ratepayers is demanded by immediately starting the decommissioning process for the "San Onofre Nuclear Waste Generating Station."

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