

Can San Onofre Still Lead to a Nuclear Emergency?

The San Onofre Nuclear Generating Station (SONGS) has been a long time monument to the Southern California coastline. Along with producing energy for the region, it also posed a very slight risk for a nuclear emergency. That risk is now further reduced since SONGS was decommissioned in 2013 (with the only remaining active nuclear power plant in California being the Diablo Plant located near San Luis Obispo.) Although SONGS hasn't produced power in the last several years, it continues to have on-site spent uranium nuclear fuel, which was originally stored in steel-lined pools ("spent fuel pools"), and ultimately transferred into airtight, concrete reinforced steel containers ("dry cask storage") for long term storage. Dry cask storage of the nuclear fuel rods continues on-site in San Clemente until the US Department of Energy finds and develops a proper site for long-term storage.

The concern for a nuclear emergency, although extremely low, is still present as long as fuel is in the spent fuel pools and as long as we are in the ever-present risk of earthquakes, tsunamis, and even terrorist events. SONGS was built to withstand a 7.0 earthquake directly beneath the reactors, yet the closest fault is the Cristianitos fault, an inactive fault that runs along Oso Creek in the Laguna Niguel/San Juan Capistrano areas. The containment domes that we see off the San Diego Freeway are made of 4-8 foot thick post-tensioned, steel rebar-reinforced concrete with an internal steel liner. Not only are these domes designed to prevent a radiation leak; they have also been designed to withstand a terrorist attack. It is said that a 9/11-type attack or a missile attack would not breach the reactors or the generators that serve as back-up power.

Revisiting the Fukushima Power Plant

The "mega-earthquake" (measuring 9.0 on the Richter scale) that struck Japan in March 2011, and the resulting tsunami that destroyed the Fukushima Daiichi Nuclear Power Plant is an example of what can happen to an active nuclear power plant. That nuclear disaster highlights a very important issue that we, as Nellie Gail residents, must consider: a nuclear emergency. The close proximity SONGS to Nellie Gail Ranch should heighten our awareness that any type of nuclear emergency will likely affect the residents of Nellie Gail.

The Level 7 meltdown from the Fukushima Daiichi Nuclear Power Station brought to light some of the weaknesses in their nuclear power system. Most evident was the complete collapse of the back-up systems needed for safely powering down the reactors, a catastrophic failure due to the ensuing tsunami that struck the coastline. SONGS is protected by a 30-foot high tsunami wall, with the California tsunami inundation map showing a maximum credible tsunami of between 19.9 feet and 22.9 feet (the tsunami that struck Fukushima was estimated to be 23 feet in height.)

The design of the reactors at SONGS are also different when compared with Fukushima, having multiple redundancies, and having protected and elevated back-up diesel generators capable of running for at least 7 days, more than sufficient time to power down the two active reactors.

Orange County's Nuclear Emergency Response

Despite these numerous safeguards, preparation and planning for the unexpected and improbable nuclear emergency is a mandate from the Nuclear Regulatory Commission, State of California and the Orange County Emergency Operations Center (EOC).

Emergencies at SONGS are classified as follows:

- Unusual Event- something occurred that could lower plant safety but no release of radioactive material,
- Alert- something occurred that did lower plant safety and if radioactive material was released, it would have been well below safe exposure guidelines per the EPA,
- Site Area Emergency- an event was occurring or had occurred that created a failure or a plant system that if there was a release of radioactive material, it was in an amount that exceeded EPA safety standards but the release only occurred inside an immediately adjacent to the plant, and
- General Emergency- the highest level of emergency where damage to the nuclear reactor fuel is imminent or has occurred and could release radioactive material that exceeds EPA guidelines beyond the plant site.

Radiation Release

In the event of a radioactive release, one cannot smell, feel, or see radioactive particles. They may be attached to dust particles from an explosion or they may be invisibly released into the air, traveling wherever the winds may blow (fortunately, the prevailing winds near SONGS typically blow in an east by southeast direction, away from Nellie Gail Ranch.) Unless you possess a Geiger counter, you will not be able to determine with any accuracy the presence of radiation. Thus, it is extremely important to obtain the most up to date information regarding any nuclear emergency through the county's Emergency Alert System (EAS) by utilizing your radio, TV or the Nellie Gail Emergency Communication System set up by your Block Captains, Area Coordinators and the Command Center. It is important to note that the Nellie Gail Command Center can be in direct contact with Orange County's Emergency Communication System.

How close is Nellie Gail to SONGS?

Nellie Gail is located 16 miles from SONGS, well within the Public Education Zone of SONGS, defined as being between a 10-20 mile radius from SONGS. Those of us in the Public Education Zone have a low probability of ever needing to evacuate but we may be instructed to "shelter in place" in the event of a General Emergency.

During an actual emergency, you should monitor the Emergency Alert System as instructions from Orange County's EOC will be broadcasted to all who live within the 20 mile radius of SONGS. You will be advised of the level of the emergency and you will be instructed to either evacuate or to "shelter in place."

If the recommendation is to evacuate, you should grab your "go bag" (contents of which were discussed in a prior *Pony Express* article) and leave immediately, most likely in a northern direction. Do not drive south or east as the prevailing winds in our area tend to blow in those directions and doing so could put you in the path of the nuclear fallout.

Shelter in place.

If the recommendation is to "shelter in place," one should immediately take the following steps, delegating some of these activities to other family members:

- turn off the fan in your house,
- seal all the exterior doors and windows with plastic sheeting, duct tape, towels, etc.,
- seal ventilation fans in the kitchen and bathrooms,
- seal any attic access points,
- fill your tubs and any other containers with as much water as possible,
- close all fireplace dampers or seal off all fireplaces with plastic sheeting,
- stay indoors, preferably in an interior room away from exterior doors and windows,
- if you must go outside, enter and exit through your garage, shedding your exposed clothing in the garage and placing it in a sealed plastic bag before re-entering the house,
- if you must drive or later decide to evacuate, load your car from within the garage, place the car vent on "recirculate" instead of "fresh air" and travel up wind from the source (again, probably north,)
- limit your food consumption to what you already have within your house and refrigerator, refraining from cooking foods if at all possible,
- limit your water use to the water you have stored in your earthquake kit, or other sources of stored water. Do not use your tap water if so instructed.

Generally, an order to shelter in place will only be in effect for 1-2 days as the winds will have carried radioactive particles away, and the radioactive decay that naturally occurs will significantly reduce the radioactivity of the particles.

Continue to monitor your radio as the EOC, through the Emergency Alert System, will notify you when it is safe to go outside and return to normal activity.

What about Potassium Iodide pills?

In the unlikely event that a radioactive leak occurs at SONGS, radioactive iodine is one of the major radioactive particles released. Iodine is a necessary element in normal thyroid function, and thus has an affinity to the thyroid gland. Exposure to radioactive iodine can cause high concentrations to accumulate into the thyroid gland, leading to thyroid cancer. Potassium Iodide pills are available without a prescription, and if taken appropriately (immediately after a leak is announced, and

daily until given the all clear) it can reduce one's risk for thyroid cancer. It does so by saturating the thyroid gland with non-radioactive iodine leaving the thyroid gland unable to take up any radioactive iodine that one may be exposed to.

All households within a 10-mile radius of SONGS have either been issued Potassium Iodide pills, or they have immediate access to it through their city's emergency preparedness department. As we live in the Public Education Zone, it is recommended that you add this to your Earthquake Kit with sufficient supplies for your entire family. These are available at your local pharmacy, or on line at a variety of sources. Potassium Iodide pills should only be taken, however, if instructed to do so through the Emergency Alert System.

The likelihood of a general nuclear emergency occurring at SONGS is extremely small, now even smaller with it no longer being an active power plant. We are also fortunate to have redundancies and safeguards far beyond Japan's Fukushima plant. Despite this small chance of an emergency, it is prudent to be knowledgeable of all potential risks in our area and to prepare for these risks. Learning some of the simple techniques described above will protect you and your family from this type of emergency. Remember, failing to prepare is preparing for failure.