Introduction

Mayor Donchak, members of the San Clemente City Council, local officials, citizens interested in San Onofre, and representatives of NRC, Good evening. Thank you for the invitation to speak to you tonight on behalf of the U.S. Nuclear Regulatory Commission to describe the oversight that the Nuclear Regulatory Commission provides to ensure the safe operation of the San Onofre Nuclear Generating Station and, to update you on the actions that NRC is taking after the reactor accidents in Japan.

With me tonight are Greg Warnick the SRI for the NRC at San Onofre, John Reynoso, the Resident Inspector at SONGS and Victor Dricks from the Region IV office. You know Greg, he has presented to the council before, has done an outstand job, and would do a marvelous job, perhaps better job than me in giving this presentation. So why am I here giving this presentation? It is because of my personal commitment to nuclear power plant safety and because of the importance of the topic for those who live and work in the vicinity of nuclear power plants.

I also understand the Council's interest for information about SONGS safety performance. I also realize that since the events in Japan, questions about the safety of nuclear power plants are on the minds of many, probably everyone in this room. These are legitimate questions. Undoubtedly, there are also some in this room who are concerned about the safety of nuclear power plants. Can the type of accident that occurred at Fukushima happen here? What provisions are in place to prevent nuclear power plant accidents from happening? I trust that the information I am going to provide tonight will be useful to the City Council and to the citizens who reside in the vicinity of SONGS. My focus tonight is to speak to what NRC does to ensure safety. I'm not here to convince anyone of the merits of or need for use of nuclear energy to produce electricity; that would be contrary to the statutory mission of the NRC. I'm here to inform about what NRC requires to be in place to ensure safe use of nuclear power.

Accordingly, I plan to provide a description of NRC, a summary of what happened in Japan, what NRC is doing after the events in Japan, an brief overview of SONGS safety performance, and some description of the of how SONGS is designed and built to prevent accidents in view of seismic and tsunami hazards. Then I will address questions.

NRC

What is the Nuclear Regulatory Commission? The Nuclear Regulatory Commission is an independent safety regulatory agency that was created from the Atomic Energy Commission by Congress in 1975. Reflecting the importance of the need for credible safety regulation, the "independent agency" feature was applied to the NRC to help ensure robust and credible safety regulation.

Federal law makes provision for the civilian use of radioactive materials, including commercial nuclear power plants. That said, NRC is prohibited by law from promoting the use of nuclear energy. Promotion resides with the Department of Energy. What does NRC do? We carry out the provisions of Federal Law to make sure that if someone decides to use nuclear energy, that it is done safely and in accordance with NRC regulations.

This safety mission is expressed in NRC's strategic plan as one of preventing the accident. The necessary outcomes of NRC's licensing and inspection programs are to prevent accidents and the release of radiation into the environment.

The NRC uses a challenging set of postulated accidents to determine the basic design of the facility and requires that this design also protect against maximum credible external events such as seismic

and tsunami or flooding. These events are not hypothetical. The facility is built to withstand them and operators are trained to respond.

The NRC uses an approach of Defense-in-Depth to prevent accidents. There are both diverse and redundant safety systems. The nuclear industry is required to use the highest standards of design, construction, oversight, and operation. Even with these high standards, the NRC does not rely on any one level of protection for maintaining public health and safety. So, every single reactor in this country, after accounting for site-specific threats –such as earthquakes, tornadoes, hurricanes, floods, or tsunamis– also has multiple physical barriers to prevent radiation releases.

NRC does not stop at prevention. NRC also requires every nuclear power plant to have measures to mitigate or reduce the consequences should an accident occur. In addition, failing all of the above, NRC also requires at every nuclear power plant emergency preparedness measures to implement actions offsite to protect the public. Should a very unlikely significant event occur, each plant has emergency preparedness plans, developed with the NRC, FEMA, and State and local officials, to appropriately respond. I am especially pleased to see that the local officials who dedicate themselves to this mission, the Inter-Jurisdictional Planning Committee, are here tonight to talk to you about their work.

So for the NRC, an agency that has the goal of preventing nuclear power plant accidents and preventing the release of significant amounts of radioactive material, watching the events in Japan unfold on world-wide television was sobering to say the least. The very thing that we have dedicated our professional careers to prevent was happening. It made little difference to us that it was in another country with a different regulatory structure. For NRC nuclear safety professionals it felt like it had happened in our own backyard

I traveled to Japan shortly after the accident to help coordinate technical assistance. From my perspective I could see the weight of the humanitarian disaster and the nuclear accidents as seen on the faces of the representatives of the Government of Japan and the Fukushima operator. The challenges that lay in front of them were, and are today, daunting.

It was impressed upon me and upon everyone in the NRC that the demands of nuclear safety and the importance of preventing nuclear power plant accidents compel us to double check our regulations for their adequacy. Not because we thought that U.S. nuclear power plants are unsafe, but to look with a critical eye to see if we have missed something, and to identify areas where we may need to strengthen our protection, mitigation, and emergency preparedness measures. These were the aims of the NRC's Near Term Task Force.

Japan

What happened in Japan? On March 11, 2011, a magnitude 9.0 earthquake off the northeastern coast of Japan precipitated large tsunamis which caused widespread destruction along several hundred miles of the Japanese coast. It left nearly 25,000 persons dead or missing; and over 250,000 displaced from their homes. This was a huge humanitarian disaster by any measure.

The earthquake caused the automatic shutdown of eleven nuclear power plants in the affected region and the loss of offsite electric power to the plants. While onsite sources of electric power functioned following the earthquake, at the Fukushima Dai-ichi plant, a tsunami flooded the onsite power sources and distribution system, removing all power to the site's cooling systems.

Over the next several days, the inability to restore cooling to Units 1, 2, and 3, which had been operating prior to the earthquake, resulted in severe core damage in all three reactors. Hydrogen generated from a chemical reaction between water and fuel cladding material migrated into the reactor building of Units 1, 3, and 4, becoming the source of explosions seen on TV. Damage to containments resulted in the release of radioactive material to the environment. The radioactive releases led to the evacuation of the public from the area out to 20 km from the plant in all directions, and long-term evacuation of residents as far as 40 km from the plant in some limited areas.

NRC Actions

NRC immediately joined the U.S. government response to provide assistance in the form of technical advice regarding U.S. interests and to coordinate technical advice to the government of Japan.

The NRC Chairman and Commissioners directed a task force of senior officials and other NRC staff conduct a “near term” review of U. S. reactor safety for dealing with Fukushima type scenarios. This is called the Near Term Task Force.

In order to support the task force with information about U. S. nuclear plants, the NRC staff developed and performed two inspections of all 104 reactors in the country. These inspections were intended to check provisions that had been put into place before the Japan accidents to protect the nuclear fuel in the event of occurrences that exceed the original design basis of each plant.

The first inspection evaluated protective measures that were put into place following the September 11, 2001 terrorist attacks. These measures provide the capability to protect nuclear fuel from damage in the event of large scale fire and destruction. These enhancements and strategies are directly applicable to prevent or mitigate the type of event that occurred in Japan.

On a national scale, the NRC identified a number of findings at some plants that indicated a need for corrective action. These included some portable pumps that would not operate or that didn’t have criteria laid out that specified what was needed to be operable, some training or procedural deficiencies, and some storage areas of emergency equipment that were susceptible to either seismic or flooding hazards.

Results of this inspection for SONGS were favorable. While some weaknesses were noted, none of these weaknesses would have precluded the ability of the plant workers to implement these strategies.

The second key area that NRC inspected covered reactor licensees’ implementation of their severe accident management guidelines. One of the lessons that U.S. industry and NRC learned after the Three Mile Island accident was that accidents are not merely theoretical, they can happen. Accordingly, the industry and NRC undertook significant research into what happens during a severe accident. One of the products of this research was severe accident management guidelines. These guidelines provide direction in the event of a severe accident. These guidelines were an industry initiative and NRC wanted to verify what was in place. I would note, these guidelines, already existing in U.S., were part of the technical advice provided by U.S. to Japan after March 11.

NRC inspections found that the SAMG program, even though not mandated, had been effectively implemented at San Onofre.

NTTF Report

The NTTF structured its review in the areas of preventing the accidents (protection), mitigating the accident, and emergency preparedness. The NTTF also had recommendations addressing the overall NRC regulatory framework and the reactor oversight process.

Specifically, the Task Force proposed improvements in such areas as loss of power, earthquakes, flooding, spent fuel pools, venting and preparedness. It said a "patchwork of regulatory requirements" developed "piece-by-piece over the decades" should be replaced with a "logical, systematic and coherent regulatory framework" to further bolster reactor safety in the United States.

The report has been given to the five members of the Nuclear Regulatory Commission who are responsible for making decisions regarding the Task Force's recommendations.

Perhaps the most important conclusion of the report is that commercial nuclear power plants in the U.S. do not pose an imminent risk. While declaring that "a sequence of events like the Fukushima accident is unlikely to occur in the United States" and that plants can be operated safely, the Task Force also recognized that "an accident involving core damage and uncontrolled release of radioactivity to the environment, even one without significant health consequences, is inherently unacceptable." Thus, the

Task Force developed a set of 12 recommendations – many with both short and long term elements – to increase safety and redefine what level of protection of public health is regarded as adequate. It also recommended additional study of some issues.

Of direct relevance to San Onofre, the task force recommended that the NRC issue orders to its reactor licensees to re-evaluate the seismic and flooding hazards at their sites and, if necessary, update the design basis to protect against the updated hazards. It also recommended ordering licensees to walk down their plants with an eye to seismic and flood protection features to evaluate their adequacy and to upgrade to the revised hazards accordingly.

The task force also recommended that the NRC initiate rulemaking to require licensees to re-confirm seismic and flooding hazards every ten years and address any new and significant information identified. This would keep U.S. reactor plants adequately prepared for any reasonably assumed hazard from either earthquake, tsunami wave, or other flooding hazard.

The task force also issued several recommendations related to the safety of spent fuel stored outside of the reactor vessel. It recommended orders to install safety-related instrumentation at spent fuel storage pools that would reliably indicate the water level, temperature and area radiation level. It also recommended that licensees be required to provide reliable AC power to the spent fuel makeup system. Orders to require licensees to have seismically-qualified means of spraying water into the spent fuel pools were also recommended. Once again, the task force recommended rulemaking to formalize these requirements following the orders.

Note that the task force did not make a recommendation to have licensees transfer spent fuel from storage pools into dry cask storage. The task force concluded that the current design of the spent fuel pools, along with the enhancements I just mentioned, provide an equivalent level of safety to dry cask storage. The fuel that could be removed to dry casks, typically done after five years when it has cooled down to about 200 degrees Fahrenheit, does not significantly add to the chance of either boiling the spent fuel pool dry or creating a fire hazard. The spent fuel pools at SONGS are typically kept at approximately room temperature and are cooled by safety-related pumps. NRC does not require

reactor licensees to move fuel to dry cask storage. But many plants – including SONGS - have built dry cask storage facilities as spent fuel pools have approached capacity.

This effort will most likely require some extensive modifications to the sites and their installed electrical components. In the interim, the task force recommended that the NRC order its reactor licensees to protect the equipment that was ordered into place following September 11th to ensure its availability and operability in the wake of external events such as occurred at Fukushima.

For the loss of all a/c electrical power, the task force has several recommendations aimed to lengthen the time that nuclear power plants can protect the reactor and spent fuel pool with no power. The extended length of time that Fukushima had no a/c power directly contributed to the accident.

Several other recommendations to enhance reactor safety were offered by the task force. Such areas as enhanced containment overpressure protection for boiling water reactors, pursuit of insights for combustible hydrogen gas control, enhancements to onsite emergency response capabilities in the face of severe external events or events affecting multiple reactor units, and a strengthened NRC oversight role over licensees' emergency and severe accident mitigation procedures are some of these.

The commissioners established a steering committee of senior managers to analyze the task force's recommendations. It is my privilege to be a member of this committee.

The NRC steering committee has accepted all the recommendations of the task force and we reported this to the Commission on September 14th. I encourage all to go to the NRC's website where you can view this meeting. On October 11th, we will meet with the Commissioners again to outline what our prioritization will be for pursuing the various actions to which we have committed.

Overview of San Onofre Performance

Twice a year each plant's performance is formally reviewed by NRC senior management. The last assessment was conducted in August 2011. The overarching conclusion from the assessment was that SONGS is being operated safely and showing an improving trend of performance in all of the current areas of regulatory concern. The results of this assessment were sent to the licensee on September 1, and are publicly available.

I am aware that the performance of SONGS during the past few years has caused some concern among members of the community. Concerns about the safety culture at the site, or the willingness of plant workers to raise safety issues, were troubling. Accordingly, we have looked hard at these areas.

I'll note that the NRC's reactor oversight process is designed to identify performance deficiencies at a low level with the goal to get them fixed before they become worse. This is what you've seen in our inspection and assessment results at San Onofre. When you see a high number of inspection findings and evidence that they are being resolved it ought to give you some idea about how well NRC's oversight process is working. Today at San Onofre, we are seeing the performance issues, on balance, being resolved but there is still room for improvement. We are watching closely.

Operating Experience

The NRC reviews operating experience to evaluate and amend our requirements when necessary. The most significant nuclear event in this country was the Three Mile Island accident in 1979. As a result of

those lessons learned, the NRC made significant changes to our regulations, including enhanced emergency planning and emergency operating procedures, hydrogen control requirements to prevent explosions inside containment, and creating the Resident Inspector Program. There are at least two full-time NRC inspectors at each plant with full access to the facility day or night.

San Onofre Design for Earthquake and Tsunami

Understandably, in light of events that occurred earlier this year at the Fukushima Dai-ichi nuclear plant in Japan, many people have wondered if such an accident could occur here. Of specific interest are SONGS' capability to prevent an accident in the event of seismic and tsunami events.

NRC regulations require that the design of nuclear power plants in the United States draws extensively upon historical data at each specific site revealed in the geological record to ensure that plants are built to be able to withstand the most severe earthquakes recorded or predicted by the seismic characteristics of the area. This is true for SONGS.

Geologists speak of ground acceleration rather than the conventionally used Richter scale because that represents the actual force experienced at a specific site regardless of how far away or how strong a quake is. A small earthquake a mile from a nuclear plant can create more force on site than a larger, more remote quake.

San Onofre is designed and built to withstand a ground motion at the site of .67g. This number was arrived at by evaluating the ground motion at SONGS from a maximum nearby earthquake, then doubling that number for margin to get .67g. Based on the geology of the area and historical records, a maximum magnitude of 7.0 from nearby faults was chosen, which would result in ground motion at SONGS of about .32g. The NRC recognizes that some seismic studies, which do not have widespread agreement within the geologic community, indicate a larger 7.1 to 7.6 magnitude earthquake could occur. Even with the larger earthquake estimate, the added design margin ensures San Onofre would be maintained in a safe shutdown condition.

San Onofre is protected from tsunami by a seawall built to a height of 30 feet above a referenced sea level. Historical record as well as evaluation of the geology of this region shows that the maximum expected increase in wave height from a nearby undersea earthquake or distant, trans-Pacific earthquake is just over 6 feet (6.3 feet). If the tsunami were to occur at the worst possible initial conditions of extreme high tide (9.3 feet) during a maximum storm surge (+11.4 feet), the total wave height would be 27 feet. These measurements are referenced to a tidal datum for consistency, where 0 feet is the annual average of the lowest low daily tide. There has been some confusion with respect to the height of the wall as being only 14 feet – that is only accurate in that the pedestrian walkway on the oceanside of the seawall is 14 feet below the top of the seawall.

Historic tsunamis on the northern coast of Japan, as well as the subduction zone geology, would have called for a higher seawall than what was actually designed and built. The Fukushima plant was designed for a tsunami height of 18 feet although there was historical evidence of tsunamis in the area of much greater heights than that. SONGS is designed for a 30 foot wave height, and best estimates expect a maximum tsunami height of 27 feet. The historical record does not show wave heights exceeding this amount in southern California.

I know that in southern California there are questions about emergency planning and so I would like to address that issue. Following the accident at Fukushima, the U.S. State department issued an advisory that all citizens within 50 miles of the plant evacuate. That 50-mile evacuation recommendation created some controversy here in the U.S. because our planning is based on a 10-mile evacuation zone. The

50-mile zone was recommended because of the severity of the accident involving three reactors and two spent fuel pools and incomplete information we were receiving concerning it. The potential existed for a large offsite release of radioactive material. Consequently, the NRC decided that a fifty mile evacuation recommendation was appropriate. Here in the U.S., the 10-mile zone is considered adequate for planning purposes. It could be adjusted outward if the need arose.

One of the reasons I've chose to come here tonight is because of your interest in matters relating to the safety of San Onofre. I appreciate that interest and thank you for kind attention. NRC, as an agency, is committed to being open about what we are doing and how we are doing our work. I encourage you to go to the NRC's website, to learn about what we are doing.

In addition, NRC needs your input. As we move forward to implement the decisions of the Commission for each item there will be public meetings, with capability for remote participation and opportunity for public comment on what you think. The dates and times of these meeting will be posted on the NRC's website once they are scheduled.

In closing, it would be easy for me to tell you that since it has been 32 years since we've had a reactor accident in the U.S. that everything is rosy, but nuclear safety cannot be tied up with a neat, tight bow. I think that James Reason, the author of "Managing the Risks of Organizational Accidents," said it best when he likened the safety of hazardous, complex technologies to a war. "…it is not a war that is won with one final battle achieving victory, it is guerilla warfare." Reason emphasizes that "A lengthy period of time with no accident or significant event does not signal the coming of peace in the safety war," it is rather a sign of "a period of heightened danger," and a time to "renew focus on and to strengthen safety defenses."

This is where the NRC finds itself today – with a renewed focus on safety and looking to strengthen safety defenses.

More to the point; after the accidents in Japan, The Commission will need to take the recommendations of the Near Term Task Force report and decide what measures need to be strengthened and what measures need to be added to define what constitutes adequate protection for the public.

Thank you for your attention and interest. I am happy to answer questions or provide clarification on my remarks.

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