UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

February 16, 2012

MEMORANDUM TO: Elmo E. Collins, Regional Administrator

THRU: Kriss Kennedy, Director, Division of Reactor Projects

FROM: Ryan Lantz, Chief, Reactor Projects Branch D

SUBJECT: MANAGEMENT DIRECTIVE 8.3 EVALUATION FOR THE STEAM GENERATOR TUBE LEAK AT SAN ONOFRE, UNIT 3, ON JANUARY 31, 2012

Pursuant to Regional Office Policy Guide 0801, "Documenting Management Directive 8.3 Reactive Team Inspection Decisions," the enclosed table provides the Management Directive 8.3 evaluation for determining whether additional inspection should be conducted at San Onofre Nuclear Generating Station, Unit 3, for the event described below. No deterministic criteria were met.

On January 31, 2012, at 3:05 p.m. (PST), main control room operators at San Onofre Unit 3 received a secondary plant system radiation alarm (air ejectors, then blowdown radiation monitor alarm). The operators responded in accordance with their abnormal operating instruction for RCS leakage and diagnosed a steam generator tube leak from the #2 (EO88) steam generator. The operators evaluated the leakage to be about 82 gallons per day (GPD), or .06 gallons per minute (GPM), using a mass balance calculation.

At 4:10 p.m., licensee management decided to conduct a rapid plant shutdown, due to meeting 2 criteria in their abnormal operating instruction. The first was a primary to secondary leak rate exceeding 75 GPD. The second was an observed increase in leakage of more than 30 GPD/hour. At 4:30 p.m., as directed by plant procedures, the operators conducted a rapid power reduction to 35 percent power, then manually tripped Unit 3 at 5:31 p.m. Note: The leak rate did not exceed the Technical Specification 3.4.13 limit of 150 GPD, which would require completion of a shutdown in 10 hours.

Due to the manual reactor trip, the operators then entered their Emergency Operating Instructions (EOPs) Standard Post-trip Actions – which resulted in a diagnosis of Steam Generator Tube Rupture. The operators then followed this EOP to isolate the affected steam generator at 6:00 p.m. and continue cool down of the plant using the unaffected steam generator.

The cool down was conducted by using main steam bypass from the #1 (EO89) Steam Generator to the main condenser. Mode 4 (RCS Tav < 350 degrees) was achieved at approximately midnight (about 6 hours after isolation of the steam generator).
Cool down has continued and as of February 6, 2012, Unit 3 is in Mode 5, cold shutdown, at 75 degrees, on shutdown cooling.

From the time the leak occurred, to the time the steam generator was isolated, a small, monitored release to the environment via the monitored release path (Air ejector vent stack) occurred. The licensee has quantified the release at 3.9E-4 Curies. SCE's license permits continuous releases from this vent path not to exceed a dose of 500mr/year, which is more than 1mr/day. 3.9E-4 Curies is equivalent to 7E-7mr, a very small percentage of even the allowed release. This would not result in any potential exposures to the public.

The NRC received notification of this occurrence at 4:10 p.m. from the resident inspector staff. NRC resident inspectors were on site and responded to the main control room to monitor licensee activities during the event. No EAL criteria were met for this event. NOUE criteria for RCS leakage is 25 GPM, and for secondary radiation levels is 4E5 micro curies/s. The maximum measured radiation release during this event was 3.6 micro curies/s, still 5 orders of magnitude below the limit.

Recommendation: Since this is a steam generator tube leak, from a newly installed steam generator after 1 year of power operation, and the infrequency of such events in the industry, an event follow-up focused baseline inspection is recommended to review the licensee's response to the initial indications of the tube leak, and verify the licensee's actions are appropriate to assess the material condition of the Unit 3 steam generators and actions needed to ensure integrity of the steam generator tubes. DRS will have the lead on this event follow up inspection.

Concur with Recommendation: **/RA/**
Elmo E. Collins, Regional Administrator, Region IV

Enclosure:
MD 8.3 Decision Documentation Form

cc w/attachment via e-mail:
A. Howell, DRA
K. Kennedy, D:DRP
T. Pruett, DD:DRP
A. Vegel, D:DRS
T. Blount, DD: DRS
M. Herrera, IRTS
M. Markley, NRR
S. West, RIII,DRP
R. Croteau, RII, DRP
J. Tappert, RI, DRP

R:_MD 8.3 Decisions\2012

SUNSI Rev Compl.	☑ Yes ☐ No	ADAMS	☑ Yes ☐ No	Reviewer Initials	REL
Publicly Avail: Keyword: MD3.4/A.7	☐ Yes ☑ No	Sensitive	☑ Yes ☐ No	Sens. Type Initials	REL

RIV:C/DRP/PBD	DRS/SRA	D:DRS	D:DRP
RELantz	N/A	AVegel	KKennedy
/RA/	***N/A***	***/RA/***	***/TPruett for/***
2/8/12	N/A	2/9/12	2/9/12

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MD 8.3/IMC 0309
DECISION DOCUMENTATION FORM
(Deterministic – only Criteria Analyzed)

PLANT	San Onofre, Unit 3	**EVENT DATE**	1/31/2012
RESPONSIBLE BRANCH CHIEF	Ryan Lantz	**EVALUATION DATE**	2/6/2012

BRIEF DESCRIPTION OF THE SIGNIFICANT OPERATIONAL EVENT OR DEGRADED CONDITION

On January 31, 2012, at 3:05 p.m. (PST), main control room operators at San Onofre Unit 3 received a secondary plant system radiation alarm (air ejectors, then blowdown radiation monitor alarm). The operators responded in accordance with their abnormal operating instruction for RCS leakage and diagnosed a steam generator tube leak from the #2 (EO88) steam generator. The operators evaluated the leakage to be about 82 gallons per day using a mass balance calculation (.06 gpm).

At 4:10 p.m., licensee management decided to conduct a rapid plant shutdown, due to meeting 2 criteria in their abnormal operating instruction. The first was a primary to secondary leak rate exceeding 75 GPD. The second was an observed increase in leakage of more than 30 GPD/hour. At 4:30 p.m., as directed by plant procedures, the operators conducted a rapid power reduction to 35 percent power, then manually tripped Unit 3 at 5:31 p.m. Note: The leak rate did not exceed the Technical Specification 3.4.13 limit of 150 GPD, which would require completion of a shutdown in 10 hours.

Due to the manual reactor trip, the operators then entered their Emergency Operating Instructions (EOPs) Standard Post-trip Actions – which resulted in a diagnosis of Steam Generator Tube Rupture. The operators then followed this EOP to isolate the affected steam generator at 6:00 p.m. and continue cooldown of the plant using the unaffected steam generator.

The cooldown was conducted by using main steam bypass from the #1 (EO89) Steam Generator to the main condenser. Mode 4 (RCS Tav < 350 degrees) was achieved at approximately midnight (about 6 hours after isolation of the steam generator). Cooldown has continued and currently, Unit 3 is in Mode 5, cold shutdown, at 150 degrees, on shutdown cooling.

From the time the leak occurred, to the time the steam generator was isolated, a small, monitored release to the environment via the monitored release path (Air ejector vent stack) occurred. The licensee has quantified the release at 3.9E-4 Curies. SCE's license permits continuous releases from this vent path not to exceed a dose of 500mr/year, which is more than 1mr/day. 3.9E-4 Curies is equivalent to 7E-7mr, a very small percentage of even the allowed release. This would not result in any potential exposures to the public.

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Y/N	DETERMINISTIC CRITERIA
N	**a. Involved operations that exceeded, or were not in, the design basis of the facility**
	Remarks- T/S Limit of 150 GPD not exceeded
N	**b. Involved a major deficiency in design, construction, or operation having potential generic safety implications**
	Remarks-
N	**c. Led to a significant loss of integrity of the fuel, primary coolant pressure boundary, or primary containment boundary of a nuclear reactor**
	Remarks-
N	**d. Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event**
	Remarks-
N	**e. Involved possible adverse generic implications**
	Remarks-
N	**f. Involved significant unexpected system interactions**
	Remarks- .
N	**g. Involved repetitive failures or events involving safety-related equipment or deficiencies in operations**
	Remarks-
N	**h. Involved questions or concerns pertaining to licensee operational performance**
	Remarks-

REACTOR SAFETY	
Y/N	**IIT Deterministic Criteria**
N	**Led to a Site Area Emergency**
	Remarks:
N	**Exceeded a safety limit of the licensee's technical specifications**
	Remarks:
N	**Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission**
	Remarks:
Y/N	**SI Deterministic Criteria**
N	**Significant failure to implement the emergency preparedness program during an actual event, including the failure to classify, notify, or augment onsite personnel**
	Remarks:

RADIATION SAFETY	
Y/N	**IIT Deterministic Criteria**
N	**Led to a significant radiological release (levels of radiation or concentrations of radioactive material in excess of 10 times any applicable limit in the license or 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, when averaged over a year) of byproduct, source, or special nuclear material to unrestricted areas**

	Remarks: There was an unplanned, monitored release that was extremely small and well within regulatory release and exposure limits.
N	**Led to a significant occupational exposure or significant exposure to a member of the public. In both cases, "significant" is defined as five times the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)**
	Remarks:
N	**Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use, which resulted in the exposure of a significant number of individuals**
	Remarks:
N	**Involved byproduct, source, or special nuclear material, which may have resulted in a fatality**
	Remarks:
N	**Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission**
	Remarks:
Y/N	**AIT Deterministic Criteria**
N	**Led to a radiological release of byproduct, source, or special nuclear material to unrestricted areas that resulted in occupational exposure or exposure to a member of the public in excess of the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)**
	Remarks:

N	**Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use and had the potential to cause an exposure of greater than 5 rem to an individual or 500 mrem to an embryo or fetus**
	Remarks:
Y/N	**SI Deterministic Criteria**
N	**May have led to an exposure in excess of the applicable regulatory limits, other than via the radiological release of byproduct, source, or special nuclear material to the unrestricted area; specifically** • **occupational exposure in excess of the regulatory limits in 10 CFR 20.1201** • **exposure to an embryo/fetus in excess of the regulatory limits in 10 CFR 20.1208** • **exposure to a member of the public in excess of the regulatory limits in 10 CFR 20.1301**
	Remarks:
N	**May have led to an unplanned occupational exposure in excess of 40 percent of the applicable regulatory limit (excluding shallow-dose equivalent to the skin or extremities from discrete radioactive particles)**
	Remarks:
N	**Led to unplanned changes in restricted area dose rates in excess of 20 rem per hour in an area where personnel were present or which is accessible to personnel**
	Remarks:
N	**Led to unplanned changes in restricted area airborne radioactivity levels in excess of 500 DAC in an area where personnel were present or which is accessible to personnel and where the airborne radioactivity level was not promptly recognized and/or appropriate actions were not taken in a timely manner**

	Remarks:
N	**Led to an uncontrolled, unplanned, or abnormal release of radioactive material to the unrestricted area** • **for which the extent of the offsite contamination is unknown; or,** • **that may have resulted in a dose to a member of the public from loss of radioactive material control in excess of 25 mrem (10 CFR 20.1301(e)); or,** • **that may have resulted in an exposure to a member of the public from effluents in excess of the ALARA guidelines contained in Appendix I to 10 CFR Part 50**
	Remarks: The release was unplanned, however it was monitored through a pathway that is licensed for continuous release. The licensee estimated the additional exposure due to this release to be extremely small, in the order of 1e-7mr.
N	**Led to a large (typically greater than 100,000 gallons), unplanned release of radioactive liquid inside the restricted area that has the potential for ground-water, or offsite, contamination**
	Remarks:
N	**Involved an emergency or non-emergency event or situation, related to the health and safety of the public or on-site personnel or protection of the environment, for which a 10 CFR 50.72 report has been submitted that is expected to cause significant, heightened public or government concern**
	Remarks:
RESPONSE DECISION	
USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION	

DECISION AND DETAILS OF THE BASIS FOR THE DECISION:	
No Deterministic criteria were met. Since this is a steam generator tube leak, from a newly installed steam generator after 1 year of power operation, and the infrequency of such events in the industry, an event follow-up focused baseline inspection is recommended to review the licensee's response to the initial indications of the tube leak, and verify the licensee's actions are appropriate to assess the material condition of the Unit 3 steam generators and actions needed to ensure integrity of the steam generator tubes. DRS will have the lead on this event follow up inspection.	
BRANCH CHIEF REVIEW: Ryan Lantz **/RA/**	DATE: 2/7/12
DIVISION DIRECTOR REVIEW: Kriss Kennedy **/RA/**	DATE: 2/9/12