Commission review expires: 2/23/87

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UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

'87 JAN 29 P4:42

OFFICE OF INSPECTION AND ENFORCEMENT James M. Taylor, Director

In the Matter of)		
SOUTHERN CALIFORNIA EDISON COMPANY)	Docket Nos.	50-206
(San Onofre Nuclear Generating)		50-361
Station, Units 1, 2 & 3))		50-362
)		

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DIRECTOR'S DECISION UNDER 10 CFR 2.206

INTRODUCTION

By Petition dated May 27, 1986, the City of Laguna Beach, California (Petitioner) requested, pursuant to 10 CFR 2.206, that the Nuclear Regulatory Commission (NRC) extend the 10-mile radius of the emergency planning zone for the San Onofre Nuclear Generating Station to include South Laguna and Laguna Beach.

The bases for the action requested in the Petition are concerns about the lack of emergency planning for Laguna Beach, the topography of the South Orange County coastline as it relates to the transportation network, and the effect on the residents of Laguna Beach as others who live to the south drive through Laguna Beach as part of an evacuation procedure. The Petition also referred to the "recent circumstances in the Soviet Union" as a basis for reconsidering the emergency planning zone issue for San Onofre.

Notice of receipt of the Petition indicating that a final decision with respect to the requested action would be forthcoming at a later date was published in the Federal Register on July 23, 1986 (51 FR 26484). Because the Petition

8702030117 870129 PDR ADOCK 05000206 PDR involved matters related to offsite emergency planning, the NRC requested the assistance of the Federal Emergency Management Agency (FEMA) in responding to the issues raised in the Petition. $\frac{1}{}$ The FEMA response, dated October 21, 1986, is attached to this document. In addition to the response from FEMA, the Southern California Edison Company (Edison or licensee) provided a response to the Petition. The licensee's response of October 3, 1986 is attached also.

DISCUSSION

The size of the emergency planning zones (EPZs) for commercial nuclear power plants is established by NRC regulations. The EPZs are defined as the areas for which planning is needed to ensure that prompt and effective actions can be taken to protect the public in the event of an accident. The choice of the size of the EPZs (about 10 miles in radius for the plume exposure pathway and about 50 miles in radius for the ingestion pathway) represents a judgment on the extent of detailed planning which must be performed to ensure adequate protective action and is based on an in-depth study of the technical issues by a joint NRC/EPA Task Force. $^{2}/$

¹/FEMA, by Presidential directive, has been assigned the responsibility for assessing the adequacy of offsite emergency plans for the area surrounding a nuclear plant. The NRC is responsible for assessing the adequacy of onsite emergency plans and has the final licensing authority.

²/"Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," NUREG-0396/EPA 520/1-78-015, December 1978.

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The size of the plume exposure pathway EPZ for San Onofre was litigated in the emergency planning portion of the licensing proceedings. In that portion of the proceedings, the intervenors contended that, in determining the exact size of the EPZ, emergency planning officials failed to consider specific local conditions including topography, land characteristics, population and evacuation routes. In support of its position that the EPZ had been properly determined, the licensee introduced an evacuation time analysis report ³/ that specifically considered the effect of local topography in determining the traffic capacity of roadways designated as evacuation routes. The Licensing Board's decision, issued in May 1982, found that the boundaries of the EPZ for San Onufre were drawn in accordance with relevant local conditions and comply with the appropriate emergency planning regulations. <u>Southern California Edison Co.</u> (San Onofre Nuclear Generating Station, Units 2 and 3), LBP 82-39, 15 NRC 1163, 1228, aff'd ALAB 717, 17 NRC 346 (1983) <u>See also</u> ALAB 680, 16 NRC 127, 132 (1982).

The FEMA and licensee responses (Attachments 1 and 2, respectively) provide information on emergency planning for Laguna Beach and South Laguna. The California State Nuclear Power Plant Emergency Response Plan and the Orange County Incident Response Plan for San Onofre Generating Station identify a

-3-

³/"Analysis of Time Required to Evacuate Transient and Permanent Population from Various Areas within the Plume Exposure Pathway Emergency Planning Zone, San Onofre Nuclear Generating Station," by Wilbur Smith and Associates, July 1981. (This study has subsequently been updated in June 1982 and November 1985).

public education zone (PEZ) which is defined as that area outside and adjacent to the plume exposure pathway EPZ extending for a distance of approximately 20 miles from the plant. As described in the Orange County plan, the PEZ for San Onofre encompasses the communities of Laguna Beach, Laguna Hills, Laguna Niguel, South Laguna, El Toro, and Mission Viejo in Orange County. The PEZ was established by the State of California to ensure that the public would be informed in advance about how it would be notified of an emergency and what protective actions, if any, should be taken. The California plan requires Edison to create a public education program for the PEZ. As part of this program, Edison annually distributes an "Emergency Information Handbook" which includes information on the levels of emergency that could arise, emergency planning for San Onofre, notification methods, and the steps the public can take to avoid or greatly reduce the potential effects of a radioactive release.

FEMA reports that the State of California Master Mutual Aid Agreement provides for support from adjacent jurisdictions and would be implemented during an emergency. Orange County would coordinate mutual aid between jurisdictions within Orange County, including the cities of Laguna Beach and South Laguna. FEMA notes that under this arrangement both communities would be protected in a radiological emergency at San Onofre. In a letter to FEMA dated September 22, 1986, the Director of the State of California Governor's Office of Emergency Services

-4-

states: "The position taken by the State of California is unchanged; we feel the existing emergency planning zone around San Onofre is adequate and the residents of the City of Laguna Beach are adequately protected."

On the basis of an evaluation of emergency planning information for the State of California and Orange County, FEMA concludes that offsite radiological emergency preparedness at San Onofre for the current plume exposure EPZ is adequate to provide reasonable assurance that appropriate measures can be taken to protect the public in the event of an emergency; the level of offsite planning and preparedness provided for the cities of Laguna Beach and South Laguna in the existing emergency response plans for Orange County and the State of California is adequate; and these plans seem adaptable to supporting response activities beyond the current EPZ boundaries if it would ever be necessary to expand the response base.

The NRC is currently engaged in evaluating the consequences and implications of the accident at the Chernobyl nuclear plant in the Soviet Union, particularly as they relate to U.S. nuclear regulatory policies and practices, including emergency planning. Reviews performed to date of the accident and the Chernobyl plant design have not identified any aspects of the accident which show a clearcut nexus to U.S. commercial nuclear power plants. NRC studies, in coordination

-5-

with many other ongoing national and international activities, are receiving priority attention to either confirm that the Commission's current regulatory practices and policies are sound or to identify improvements. Any new requirements arising from these investigations, including emergency planning requirements, will be carefully evaluated by the Commission. At this time, it is too early to determine whether any changes to current emergency planning regulations will be required.

CONCLUSION

For the reasons discussed above, I find no substantial basis for taking the action requested by the Petition. The NRC supports the FEMA conclusion that the current plume exposure pathway EPZ for San Onofre is adequate and that Laguna Beach and South Laguna, which lie within the public education zone for San Onofre, are adequately addressed in the existing emergency plans for Orange County and the State of California. Accordingly, the Petitioner's request for action pursuant to 10 CFR 2.206 is denied. As provided in 10 CFR 2.206(c), a copy of this Decision will be filed with the Secretary for the Commission's review.

James M. Taylor Director

Office of Inspection and Enforcement

Dated at Bethesda, Maryland this 29th day of January 1987

-6-

sttachment 1



Federal Emergency Management Agency

Washington, D.C. 20472

OCT 2 1 1986

MEMORANDUM FOR: Edward L. Jordan

Director, Division of Emergency Preparedness and Engineering Response Office of Inspection and Enforcement U.S. Nuclear Regulatory Commission

FROM:

alter Alton

Assistant Associate Director Office of Natural and Technological Hazards Programs

SUBJECT: Petition to Expand the Emergency Planning Zone for San Onofre

This is in response to your memorandum of August 6, 1986, requesting assistance from the Federal Emergency Management Agency (FEMA) in responding to concerns expressed by the Mayor of the City of Laguna Beach, California in a petition filed pursuant to 10 CFR 2.206. The petition specifically requests an expansion of offsite radiological emergency planning for the San Onofre Nuclear Generating Station to include the Cities of Laguna Beach and South Laguna, California.

The State of California Emergency Services Act provides the legal basis for the emergency planning and preparedness programs of counties and cities within the State. The State of California Master Mutual Aid Agreement, which provides for support from adjacent jurisdictions, would be effected during a radiological emergency at the San Onofre Nuclear Generating Station. Orange County would coordinate mutual aid required between jurisdictions within Orange County, including the Cities of Laguna Beach and South Laguna. Therefore, under this arrangement, both communities would be protected in a radiological emergency at San Onofre.

The following planning considerations are quoted directly from the County of Orange Incident Response Plan for San Onofre Nuclear Generating Station and do address the Cities of Laguna Beach and South Laguna:

*(1) Emergency Planning Zone (EPZ) - is that area of land that extends approximately in a ten-mile radius from the SONGS site. Due to jurisdictional boundaries and topography considerations, this ten-mile planning radius has been expanded to include the City of San Clemente and City of San Juan Capistrano, as well as Dana Point, Capistrano Beach, Doheny Beach State Park, and San Clemente State Park. In the event of an incident at SONGS, this area is considered to be more at risk. Planning, procedures, and protective actions described herein are primarily concerned with this area. See Figure 10.

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(2) Public Education Zone - is that area outside and adjacent to the Emergency Planning Zone. It encompasses the communities of Laguna Beach, Laguna Hills, Lauguna Niguel, South Laguna, El Toro, and Mission Viejo in Orange County. The zone was established to ensure that the public would be informed in advance how it would be notified of an emergency and what protective actions, if any, should be taken. The only protective action which the public in this zone may be asked to take is sheltering. Evacuation is not considered a necessary protective action because the distance from San Onofre reduces any hazard beyond the 10-mile zone so significantly that this precaution becomes unnecessary. See Figure 11."

The State of California and County of Orange radiological emergency response plans were formally submitted to the Federal Emergency Management Agency, Region IX, in November 1985 for review and approval in accordance with 44 CFR 350. Based upon the Region IX RAC review, the plans are currently being updated and will be resubmitted to FEMA for review.

The State of California, and Orange and San Diego Counties, which are located in the plume emergency planning zone, have participated in the five offsite emergency preparedness exercises that have been conducted, with the latest exercise held September 10, 1986. There are currently no deficiencies or areas that require corrective actions in offsite radiological emergency preparedness.

Attached is a letter dated September 22, 1986, from the State of California Governor's Office of Emergency Services to FEMA Region IX. As stated in the letter, "The position taken by the State of California is unchanged; we feel the existing emergency planning zone around San Onofre is adequate and the residents of the City of Laguna Beach are adequately protected."

FEMA considers that offsite radiological emergency preparedness at San Onofre for the current EPZ is adequate to provide reasonable assurance that appropriate measures can be taken offsite to protect the health and safety of the public living in the vicinity of the site in the event of a radiological emergency. FEMA also considers that the level of offsite planning and preparedness provided for the Cities of Laguna Beach and South Laguna in the existing emergency response plans for Orange County and the State of California, is adequate to meet the guidance of NUREG-0654/FEMA-REP-1, Rev. 1. Furthermore, based on the existing mutual aid structure, these plans seem adaptable to supporting response activities beyond the current EPZ boundaries.

If you have any questions, please contact Mr. Robert S. Wilkerson, Chief, Technological Hazards Division, at 646-2860.

Attachments As Stated

The State of California Emergency Services Act provides the basis for the emergency preparedness programs of counties and cities within the state. Governement at all levels is responsible for providing continuity of effective leadership and authority, direction of emergency operations, and management of recovery. The State of California Master Mutual Aid Agreement would be effected during a radiological emergency at the San Onofre Nuclear Generating Station. By that agreement, mutual aid between jurisdiction with the County of Orange will be coordinated by the Operational Area Coordinator, or designee, for Orange County. Those jurisdictions are identified in the County of Orange, <u>Incident Response Plan for San</u> <u>Onofre Nuclear Generating Station</u>, as follows (Page 32, Item g. Offsite Areas of Concern):

- "(1) Emergency Planning Zone (EPZ) is that area of land that extends approximately in a ten-mile radius from the SONGS site. Due to jurisdictional boudaries and topography considerations, this ten-mile planning radius has been expanded to include the City of San Clemente and City of San Juan Capistrano, as well as Dana Point, Capistrano Beach, Doheny Beach State Park, and San Clemente State Park. In the event of an incident at SONGS, this area is considered to be more at risk. Planning, procedures, and protective actions described herein are primarily concerned with this area. See Figure 10.
- "(2) <u>Public Education Zone</u> is that area outside and adjacent to the Emergency Planning Zone. It ecompasses the communities of Laguna Beach, Laguna Hills, Laguna Niguel, South Laguna, El Toro, and Mission Viejo in Orange County. The zone was established to ensure that the public would be informed in advance how it would be notified of an emergency and what protective actions, if any, should be taken. The only protective action which the public in this zone may be asked to take is sheltering. Evacuation is not considered a necessary protective action because the distance from San Onofre reduces any hazard beyond the 10-mile zone so significantly that this precaution becomes unnecessary. See Figure 1."

Draft radiological emergency response plans for the State of California and the County of Orange were unofficially reviewed by the Regional Assistance Committee, Region IX. The plans were formally submitted to the Federal Emergency Management Agency, Region IX, during November 1985 for review and approval in accord with 44 CFR 350. Based on exercise findings and unofficial comments of the Regional Assistance Committee, Region IX, to the state and local offsite jurisdictions, the plans are currently being updated and resubmitted to the Federal Eme-gency Management Agency for consideration in the 44 CFR 350 process. It should be noted that the draft planning documents were exercised during 1981, 1982, 1983, and 1985. Each of the exercises resulted in findings for corrective actions identified as not detracting from the overall capability demonstrated by the State and county to protect the health and safety of the public in the event of a radiological emergency. A Public Meeting was conducted on may 18, 1981, to provide the public with an opportunity to comment on the plans and exercises activities.

The Alert and Notification (siren) System was completed during 1981 and tested during 1981 and 1982. A formal alert and notification demonstration and public telephone survey was conducted on September 28, 1983 and approved by report dated January 5, 1984. A test and maintenance system is inplace that includes annual testing of the sirens. The most recent annual test was conducted on September 11, 1986. All 50 sirens were successfully activated. The siren maintenance program from September 11, 1985 to September 11, 1986 . (including bi-233kly silent, quarterly growl, and the annual test) resulted in an annual siren operability of 97.64%.

An informational handbook and an Emergency Broachure have been distributed to residents within the emergency planning zone and the public education zone annually since 1982. A system is inplace to provide these materials to each new resident making application for utilities within those zones.

Based on the information above and that provided by the State of California (attached), the Federal Emergency management Agency, Region IX, feel that the adequacy of offsite preparedness for San Onofre with respect to the issue of the size of the current EPZ based on plan reviews and exercise observations performed to date is adequate to reasonably assure that appropriate measures can be taken offsite to protect the health and safety of the public living in the vicinity of the site in the event of a radiological emergency.





Southern California Edison Company P 0 802 4150 SAN CLEMENTE. CALIFORNIA 92672

F C BUD JACKLEY MANAGES SUCLEAR AFFAIRS AND EWERGENCT PLANN NG

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September 26, 1986

Susan Elkins FEMA Region IX Building 105, Presidio San Francisco, California 94129

Dear Susan:

On September 11, 1986 we fulfilled our annual FEMA requirement by conducting a full scale test of our Community Alert and Notification Siren System.

All 50 sirens were successfully activated for both tests. The second activation of the sirens additionally tested the remote control panel at Orange County (for activation of San Juan Capistrano sirens) successfully.

Our annual siren maintenance program, which is from annual siren test September 11, 1985 to September 11, 1986 and includes bi weekly silent, quarterly growl, and the annual test, resulted in an annual siren operability of 97.64%.

Should you have additional questions, please contact me or Jack Wallace.

Sincerely, Ballelin

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September 22, 1986

Mr. Robert L. Vickers Regional Director Federal Emergency Management Agency Region IX Euilding 105 Presidio of San Francisco, California 94129

Dear Mr. Vickers:

In response to your letter dated August 22, 1986 regarding the request by the City of Laguna Beach to extend the Emergency Planning Zone (EPZ) for the San Onofre Nuclear Generating Station to include the City of Laguna Beach, I have prepared the following response.

The position taken by the State of California is unchanged; we feel the existing emergency planning zone around San Onofre is adequate and the residents of the City of Laguna Beach are adequately protected. Our position is based on the following:

- Technical studies, completed in 1980, of postulated accidents at San 1. Onofre considered specifics on the San Onofre reactors, site-specific meteorological data, demography, topography, and public health impact.
- 2. Review and approval by the Governor's Emergency Council of the County of Orange Incident Response Plan for San Onofre Nuclear Generating Station. Although the plan does not specifically address the Laguna Beach area, it is adaptable to include Laguna Beach.
- The San Onofre exercise findings have always indicated an above-average 3. level of offsite preparedness.
- 4. All residents of the City of Laguna Beach receive annual brochures detailing evacuation routes and protective actions.

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State of California

GOVERNOR'S OFFICE OF EMERGENCY SERVICES

> 2800 MEADOWVEW ROAD SACRAMENTO, CA USUJ2

B16 42"

Mr. Vickers Page 2 September 22, 1986

5. The City of Laguna Beach's existing emergency plan addresses:

- Evacuation of residents with warning and without warning. During an emergency at San Onofre Nuclear Generating Station, warning would be accomplished by the use of the Emergency Broadcast System with augmentation from fire and law enforcement agencies.
- Coordination with Orange County for emergency support.

Although the residents of the State of California have reason to be concerned about the Chernobyl incident, they must consider the construction differences. Our technical studies, which served as the basis for the Emergency Planning Zones, analyzed United States reactors.

I hope this information is beneficial as you prepare your response to the Nuclear Regulatory Commission.

Sincerely. 71 ald

ILLIAM M. MEDIGOVICH

Attachment 2

- An.

Southern California Edison Company

P O BOX 800 2244 WALNUT GROVE AVENUE ROSEMEAD CALIFORNIA 91770

M O MEDFORD MANAGER OF NUCLEAR ENGINEERING AND LICENSING

October 3, 1986

TELEPHONE

Office of Nuclear Reactor Regulation Attention: Mr. Harold R. Denton, Director U. S. Nuclear Regulatory Commission Washington, D. C. 20555

Gentlemen:

Subject: Docket Nos. 50-206, 50-361 and 50-362 Request for Comments on 2.206 Petition by Laguna Beach San Onofre Nuclear Generating Station Units 1, 2 and 3

By NRC letter dated August 25, 1986, SCE was provided with a copy of the subject petition and requested to provide comments regarding the concerns raised by the petitioner. Accordingly, find enclosed a document that details SCE's response to the concerns raised in the subject petition.

If you have any questions, please let me know.

Very truly yours

M. O. Meland Estimen

cc: J. B. Martin, Regional Administrator, NRC Region V

F. R. Huey, USNRC Sentor Resident Inspector, SONGS 1, 2 and 3

G. W. Knighton, Director PWR Project Directorate No. 7

G. E. Lear, Director, PWR Project Directorate No. 1

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11	RESPONSE OF SOUTHERN
12	CALIFORNIA EDISON COMPANY TO 2.206
13	PETITION FILED BY CITY OF
14	LAGUNA BEACH
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24	
25	
26	

1		TABLE OF CONTENTS	
2			Page
3			
4	1.	INTRODUCTION	1
5	2.	THE PROPER BOUNDARIES OF THE EPZ HAVE BEEN LITIGATED PREVIOUSLY	2
6 7	3.	THERE IS NO ABSENCE OF EMERGENCY PLANNING FOR LAGUNA BEACH OR	6
8		SOUTH LAGONA	
9	4.	CHERNOBYL DID NOT RAISE ANY UNRESOLVED SAFETY ISSUES	8
10	CONCLUSIO	N	9
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
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25			
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1. INTRODUCTION

Pursuant to the request of the Nuclear Regulatory
Commission dated August 25, 1986, Southern California Edison
Company ("Edison") hereby submits its response to the 10
C.F.R. 2.206 petition of the City of Laguna Beach
("Petitioner" or the "City") to expand the ten mile radius of
the Emergency Planning Zone ("EPZ") for the San Onofre Nuclear
Generating Station to include South Laguna and Laguna Beach.

In its petition, the City asserts four bases to 9 support its request to expand the EPZ: the topography of the 10 South Orange County coastline as it relates to the 11 transportation network; the effect of emergency evacuation on 12 the citizens of Laguna Beach; the lack of emergency planning 13 for Laguna Beach; and the "recent events in the Soviet 14 Union." Notice of Petition of City of Laguna Beach, 51 Fed. 15 Reg. 26484 (July 23, 1986). As is shown below, none of the 16 bases asserted presents a significant unresolved safety issue 17 that would warrant granting the petition. Moreover, the 18 adequacy of emergency planning at San Onofre was fully 19 litigated in the course of operating license proceedings in 20 the fall of 1981 (the "hearings"). The existing 10 mile EPZ 21 was approved by the NRC Staff and the Atomic Safety and 22 Licensing Board as well as the California Office of Emergency 23 Preparedness (OES), the state agency responsible for emergency 24 planning in the vicinity of nuclear power plants. There has 25 been no material change in circumstances which would warrant 26

re-examination of these previously litigated issues.
 Petitioner's request should be denied.

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2. THE PROPER BOUNDARIES OF THE EPZ HAVE BEEN LITIGATED PREVIOUSLY.

A petition pursuant to section 2.206 should be 5 granted only when the petitioner identifies a "significant 6 unresolved safety issue or a major change in facts material to 7 the resolution of major environmental issues". See In the 8 Matter of Public Service Company of Indiana, Inc. (Marble Hill 9 Nuclear Generating Station Units 1 and 2), DD-79-17, 10 NRC 10 613, 615 n.3 (1979). Section 2.206 procedures should not be 11 used as "a vehicle for reconsideration of issues previously 12 decided . . . " In the Matter of Consolidated Edison Company 13 of New York, Inc. (Indian Point Units 1-3), CLI-75-8, 2 NRC 14 173, 177 (1975). It is well-established that this prohibition 15 extends to the relitigation of contentions previously rejected 16 by a Licensing Board, when there has been no change in 17 circumstances since the date of the Board's action. In the 18 Matter of Philadelphia Electric Company (Limerick Generating 19 Station, Units 1 & 2), DD-84-13, 19 NRC 1137, 1141 (1984). 20 The emergency planning portion of the San Onofre 21 licensing proceedings took place from August 25 -22 September 29, 1981. Contention 3, which was litigated by the 23

24 parties in this portion of the hearings, addressed whether 25 specified local conditions, including evacuation routes and 26 topography, had been properly considered in adopting a 10 mile

EPZ.1/ In support of its position that the EPZ had been 1 properly determined, Edison introduced a report by Wilbur 2 Smith and Associates entitled "Analysis of Time Required to 3 Evacuate Transient & Permanent Population from Various Areas 4 within the Plume Exposure Pathway Emergency Planning Zone." 5 ("Smith Report")2/ That report specifically considered the 6 effect of local topography in determining the traffic capacity 7 of roadways designated as evacuation routes, one of the same 8 issues that Petitioner now asserts in support of its request 9 to expand the EPZ. See Smith Report, pp. 3-5, 39-50. 10

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1/ Contention 3 provided:

The emergency response plans fail to meet the 13 requirements of 10 C.F.R. §50.47(c)(2) because local emergency planning officials have arbitrarily 14 established the boundaries of the Plume Exposure EPZ in that they have mechanically applied a 10 mile 15 boundary and that the Interagency Agreement (IAEP) among all local jurisdictions defines the EPZ by 16 drawing compass lines on a map of the area. In determining the exact size of the EPZ, emergency 17 planning officials have failed to consider the following local conditions: 18

191. topography
2. meteorology203. evacuation routes
4. demography215. jurisdictional boundaries

6. SAI report

7. land characteristics

23 In the Matter of Southern California Edison Company (San Onofre Nuclear Generating Station, Units 2 & 3) 24 LBP-82-39, 15 NRC 1163, 1176-77 (1982).

25 2/ The cited pages of the Smith Report are attached here to 26 as Exhibit 1. Moreover, by raising the issue of whether a 10 mile boundary
 was proper for the San Onofre EPZ, Contention 3 also required
 the parties to litigate whether emergency planning was needed
 for locations beyond that distance, including Petitioner
 Laguna Beach and South Laguna.

In its initial decision issued in May 1982, the 6 Licensing Board found that the 10 mile boundaries of the EPZ 7 for San Onofre "were drawn in accordance with relevant local 8 conditions and comply with 10 CFR 50.47(c)(2)." 15 NRC 1163, 9 1228. Thus, the Licensing Board found that local emergancy 10 planning officials had properly considered the need for 11 emergency planning within and without the 10 mile area and the 12 effect of local topography and evacuation routes in 13 determining the boundaries for San Onofre's EPZ. 14

Not only was the 10 mile EPZ accepted by the NRC 15 Licensing Board, it was also approved by the California Office 16 of Emergency Services ("OES"), the state agency responsible 17 for overseeing emergency planning in the vicinity of nuclear 18 power plants in California. See Transcript of Operating 19 License Hearings for San Onofre Nuclear Generating Station, 20 Units 2 and 3, p. 10129-30. 3/ (Hereinafter cited as "Tr.") 21 During the hearings, witnesses from OES stated that 22 the agency did not believe it was necessary to extend the EPZ 23 beyond the 10 mile boundary. John Kearns, Deputy Director of 24

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^{26 &}lt;u>3</u>/ A copy of all Transcript pages cited are attached hereto as Exhibit 2.

OES, testified that the agency had concluded that 1 "approximately 10 miles was certainly adequate for planning 2 around the San Onofre plant." (Tr. 10129-30, 10163.) 3 Dr. Mary Frances Reed, Chief of the Nuclear Power Plant 4 Planning Section at OES, testified that no specific 5 arrangements were necessary for the general public outside the 6 10 mile EPZ. (Tr. 10198-99, 10276.) 7

The City of Laguna Beach is aware of the state's 8 approval of the 10 mile EPZ. In June 1982, Sally R. Bellerue, 9 then Mayor of the City, wrote to then California Governor 10 Brown apparently requesting information regarding 11 emergency planning for Laguna Beach. In response to that 12 letter, John Kearns of OES informed Ms. Bellerue that OES had 13 studied the effects of a serious nuclear power plant accident 14 at San Onofre, and that, based on the results of that study, 15 had determined that detailed emergency planning was not 16 necessary in the area beyond the 10 mile boundary. Letter of 17 John Kearns, Deputy Director, OES to Sally R. Bellerue, Mayor 18 of Laguna Beach, California dated July 20, 1982 (hereinafter 19 cited as "Kearns Letter").4/ 20

Both the federal and state agencies charged with 21 responsibility for assuring proper emergency planning have 22 therefore thoroughly examined the local conditions and have 23 determined that a 10 mile EPZ adequately considers local 24

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4/ A copy of the Kearns Letter is attached hereto as Exhibit 3. 26

emergency response needs and capabilities in the event of a
release at San Onofre. Petitioner has not and cannot suggest
that these local conditions have changed since the NRC staff,
the Licensing Board and the OES approval. Petitioner should
therefore not be permitted to use a 2.206 petition to
relitigate these previously decided issues. See Consolidated
Edison Company, supra.

3. THERE IS NO ABSENCE OF EMERGENCY PLANNING FOR LAGUNA BEACH OR SOUTH LAGUNA.

10 Petitioner also asserts an absence of emergency 11 planning for Laguna Beach and South Laguna as a basis for 12 expanding the EPZ. As demonstrated <u>supra</u>, this issue was 13 fully examined in the licensing proceedings. Moreover, as is 14 shown below, there is not an absence of emergency planning for 15 Laguna Beach or South Laguna; rather the necessary level of 16 emergency planning is already available.

Although Laguna Beach and South Laguna are outside 17 the EPZ, both are within the extended Public Education Zone 18 created by the California State Nuclear Power Plant Emergency 19 Response Plan (the "Plan"). That Plan requires Edison to 20 create a public education program for an area extending to 20 21 miles from the plant. See Kearns Letter, supra. As part of 22 this education program, Edison distributes annually an 23 "Emergency Information Handbook"5/ (the "Handbook"), which 24

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26 5/ A copy of the Handbook is attached hereto as Exhibit 4.

provides the public with information regarding the levels of 1 emergency that could arise, emergency planning at San Onofre 2 and the steps the public can take to avoid or greatly reduce 3 the potential effects of a radioactive release. See Handbook 4 at 2. The Handbook informs residents in the Public Education 5 Zone that in the event of a general emergency at San Onofre, 6 notification would be made by news broadcasts and, if 7 necessary, by public address systems operated on a street by 8 street basis. The Handbook also lists the radio and 9 television stations that would provide the necessary 10 information and instructions. If it were necessary to expand 11 the response base for San Onofre, the existing channels of 12 information could be adapted to support response activities 13 beyond the current boundaries. 14

In addition to the emergency planning provided for 15 Laguna Beach and South Laguna by the Public Education Zone, 16 additional preparedness is also provided by the overall 17 response plan of Orange County. The County has a 18 twenty-volume emergency plan which provides general response 19 guidance. That guidance would be available to the citizens of 20 Laguna Beach and South Laguna in the event of a radioactive 21 release. 22

The public education program for the citizens of Laguna Beach and South Laguna and the general emergency plan for Orange County demonstrate that Fetitioner's concern over the lack of emergency planning is misplaced. Both the NRC and

the State have already determined the level of emergency 1 planning each believes necessary for Laguna Beach and South 2 Laguna and the more stringent requirements of the State Plan 3 have been fully complied with. Petitioner has presented no 4 new information that suggests any reason why the public 5 education program is inadequate. There is no significant 6 unresolved safety issue and Petitioner's mere assertion to the 7 contrary should not serve as a basis for granting the 8 9 requested action.

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CHERNOBYL DID NOT RAISE ANY UNRESOLVED SAFETY ISSUES.

Petitioner's final basis for its request that the Commission reconsider emergency planning at San Onofre is "recent events in the Soviet Union," a reference to the April, 1986 accident at the Chernobyl nuclear power plant. The city cites no basis for concluding that events at Chernobyl require additional emergency planning in Laguna Beach.

18 The accident potential for San Onofre was fully 19 investigated as part of the plant's licensing proceedings. 20 All credible accidents were examined for their potential 21 effect on the offsite population. The results of that 22 investigation were the basis for determining the boundaries of 23 the existing EPZ.

The accident at Chernobyl does not change the accident potential at San Onofre. There is no basis to contend that because of the accident which occurred at

1	Chernobyl, the effects of a postulated release at San Onofre
2	require a modification of San Onofre's emergency plans. There
3	is therefore no "significant unresolved safety issue" that
4	would warrant the action requested by Petitioner. See Public
5	Service Company of Indiana, Inc., supra.
6	
7	CONCLUSION
8	For the foregoing reasons, the petition of Laguna
9	Beach should be denied.
10	Dated: October 6, 1986
11	Respectfully submitted,
12	DAVID R. PIGOTT CATHERINE K. O'CONNELL
13	ORRICK, HERRINGTON & SUTCLIFFE
14	CHARLES R. KOCHER JAMES A. BEOLETTO
15	SOUTHERN CALIFORNIA EDISON COMPANY
16	1.100.1
17	David R. Pigott
18	Attorneys for Southern California Edison Company
19	
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Analysis of Time Required to Evacuate Transient and Permanent Population from Various Areas Within the Plume Exposure Pathway Emergency Planning Zone

San Onofre Nuclear Generating Station

Revision 2

by

Wilbur Smith and Associates

...

the northern section of the United States Marine Corps Base (Camp Pendleton). Although the 10-mile radius actually bisects San Juan Capistrano, Dana Point and Ortega, the entire area and population of these communities have been included within the EPZ and incorporated within the emergency response plans for the local agencies. This expanded planning area is hereinafter referred to as the "extended EPZ."

<u>EPZ Population</u> - Within the extended EPZ boundary there are five urbanized areas representing an estimated resident population of approximately 79,600. In Orange County, the area within the extended EPZ boundary contains an estimated resident population of 62,400, or 78 per cent of the EPZ population. The remaining EPZ resident population (17,200) is located in San Diego County within the Camp Pendleton United States Marine Corps Base.

It is estimated that approximately 32,150 non-residents visit the area on a peak weekend day during the summer. This transient population is generally concentrated in or near the state and local beach recreation areas. Also included in the transient population segment are local workers who reside outside the study area. Estimated 1980 resident and transient populations are summarized in Table 1 for identifiable areas within the EP2. Daytime summer weekend population distribution by 22.5° Sector is summarized in Appendix A for the San Onofre EP2.

<u>Major Transportation Facilities</u> - One interstate route (I-5) and two state routes (S.R. 1 and S.R. 74) serve the area within the extended EPZ limits. Interstate Route 5, (San Diego Freeway) is the primary north-south route serving traffic between Orange and San Diego Counties.

State Route 1 (Pacific Coast Highway) provides secondary north-south access within the EPZ north sector. State Route 74

-3-

1980 POPULATION ESTIMATES

AREA	RESIDENT	TRANSIENT POPULATION
San Clemente	27,200 ^(a)	14,900 ^(a)
San Juan Capistrano	18,500 ^(c)	1,000 ^(b)
Capistrano Beach	6,200 ^(d)	1,400 ^(b)
Dana Point	10,500 ^(d)	1,600 ^(b)
Doheny State Beach	o (e)	5,750 ^(f)
San Clemente State Beach	• (e)	2,500 ^(f)
San Onofre State Beach	0 ^(e)	4,500 ^(f)
Camp Pendleton Enlisted Men's Beach Club	* (g)	500 ^(h)
Camp Pendleton (1)	17,200 ^(g)	N.A.
TOTAL	79,600	32,150

1- 1	-	
(8)	Source:	San Clemente Public Works and Planning Department.
(b)	Based on	Chamber of Commerce visitation figures.
(c)	San Juan	Capistrano Public Works and Planning Department.
(d)	Source:	Orange County Environmental Management Agency.
(e)	Source:	California Department of Parks and Recreation.
(f)	Source:	(e); Assumes maximum utilization.
(g)	Source:	Base Operations and Training Office, Camp Pendleton. Marine Corps Base.
(h)	Source:	(g), Estimated maximum utilization based on average summer and weekend visitation of 300 persons.
(i)	Camp popur	alation within a ten-mile radius from SONGS excluding on beach.
(*)	Negligib	le
N.A.	Not Avait	lable

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(Ortega Highway) is the only regional east-west roadway within the study area. Ortega Highway is a winding, mountain-area roadway which connects the area to I-15 approximately 32 miles to the east.

Figures 2a and 2b illustrate the network of arterial and freeway facilities which presently provide the major travel-ways in the study area. These major roadways are restricted somewhat by geographic features and tend to either parallel the coastline or follow the inland valleys and canyons.

Emergency Response Plans

This study has been completed in consultation and cooperation with primary local response agencies responsible for evacuation planning and implementation within the area. The evacuation time estimates presented in this study were developed to reflect the plans and procedures set forth in the relevant emergency response plans which have been developed and adopted by the various local agencies. These plans set forth the agency responsibilities, assigned functions, and procedures to be utilized in the event of a radiological incident at SONGS. The principal emergency response plans include:

- California Nuclear Power Plant Emergency Response Plan, July, 1978.
- Orange County Emergency Response Plan, San Onofre Nuclear Generating Station, December, 1980.
- San Diego County Nuclear Power Plant Emergency Response Plan, December 1980.
- Camp Pendleton Marine Corps Base Emergency Response Plan, April, 1979 (with revisions).

-5-

CHAPTER 7

EVACUATION ROADWAY NETWORK

Evacuation plans are set forth as part of the emergency response plans (Chapter 1) for the local organization responsible for the planning and implementation of an evacuation of the EP2. These plans identify the area roadways to be used as evacuation routes by each community. The major roadway system and the principal evacuation routes within the Orange and San Diego Counties EP2 sectors are depicted in Figures 7a and 7b, respectively.

Major Evacuation Routes

Major roadways in the area which were examined for use as evacuation routes are described in the following paragraphs. These facilities, with the exception of Ortega Highway, were included as evacuation routes.

- o Interstate Route 5 (San Diego Freeway), the principal area roadway follows a general north-south direction along the coast and passes just east of SONGS. I-5 is primarily an eight-lane facility built to full freeway standards. However, it narrows to six lanes through the City of San Clemente, widening again to eight lanes near Capistrano Beach.
- Basilone koad, a two-lane road which intersects I-5 approximately two miles north of the site, runs in a southeasterly direction into the interior of Camp Pendleton.





- Camino Capistrano is a two-lane arterial, originating at Pacific Coast Highway in North San Clemente, and parallels the Coast Highway through residential areas of Capistrano Beach. At Camino Las Ramblas, it turns northward, paralleling I-5 through San Juan Capistrano. At it's juncture with Doheny Park Road, Camino Capistrano widens to a four-lane cross section, which is continued through most of San Juan Capistrano.
- Rancho Viejo Road is a four-lane, north-south roadway which is aligned parallel to and east of I-5 from Junipero Serra Road to the San Juan Capistrano City Limit, where it becomes Marguerite Parkway.

Planned Improvements to the Highway Network

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There is one significant improvement planned to the highway network which will affect access and egress from the ten-mile radius study area. The six-lane section of I-5, through the City of San Clemente, will be widened to eight lanes. This improvement project is currently underway and is expected to be completed in 1982.

Longer term, there are several regional arterials being considered in or near the study area. Those which could increase available evacuation route capacity are summarized below.

 Avenida San Pablo Corridor (between I-5 in San Clemente and Ortega Highway) - The Orange County Environmental Management Agency is currently studying alternatives for this corridor. The results of the study will determine the general alignment and extent of the facility.

-41-

In the EPZ evacuation plans, all persons within each subsector have been assigned the same principal evacuation route and the same reception center. Reception centers are located beyond a fifteen-mile radius from SONGS and would be available to those evacuees requiring emergency shelter and/or medical aid.

For the Orange County subsectors, assigned evacuation routes lead northward, away from the SONGS facility and generally represent the most direct routes out of the EPZ. The principal evacuation routes out of the area are I-5 and the Pacific Coast Highway, with Camino Capistrano as a secondary route.

Population from within U.S. Marine Corps Base Camp Pendleton and San Onofre State Park, Bluffs Area, have assigned evacuation routes leading to the South. The principal evacuation routes to the south are Basilone Road, primarily for the Camp Pendleton facilities, and I-5.

Evacuation Route Link/Node Network

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These designated evacuation routes were translated into a link/node network for input to the computerized Evacuation Time Assessment Program. First, area roadway network was redefined as a system of roadway links (segments) and nodes (roadway intersections). Network nodes were then numbered and coded for input to the computer program.

The designated evacuation routes were then translated into a series of link/nodes for each individual subsectors. Subsectors were further divided into several population centroids, each representing an individual population concentration within the subsector who require a separate local access route to reach the primary evacuation routes. Table 6 identifies the evacuation route link/node description for each population centroid. Presented

EVACUATION ROUTE

LINK/NODE DESCRIPTION BY CENTROID

CENTROID				1	EVAC	CUAT	TOI	R	DUTE	2		
							1.0.4					
011	0011	2002	1012	1009	0206	0210	0214	0218	0220	0224	0229	0230
	0234	0235	0240	0244	0252							
012	0012	2005	1017	1018	1019	0210	0214	0218	0220	0224	0228	0230
	0234	0236	0240	0244	0252							1750
013	0013	2007	1023	1024	2008	0218.	020	0224	0.12	0230	9234	0200
	0240	0244	0252									0770
021	0021	2003	1009	1003	0236	0210	0214	0218	0220	0224	0228	0230
	0234	0236	0240	024	0252			0000	0004	1000	0770	0774
022	0011	2004	1018	1017	0210	0214	4516	0220	Vera	100	4234	0234
	0235	0240	0249	0.02			A5-50	-	170	1750	0240	0744
023	0013	2005	0214	0218	00	0224	فنتنا	0230	0231	V230	92.10	V
	0.5.	-			0004	0000	1750	0774	4750	0240	0714	0252
021	00.1	2003	0215	0220	0227	0220	0230	0734	0240	0244	0757	
025	00.20	2017	1095	1013	1072	0230	0228	0230	0234	0236	0240	0244
020	0250	2012	1000	1030			*****					
A71	0.0.	2010	1070	2013	1097	2022	1055	2023	2024	1063		
031	40.77	2010	1037	2000	1055	2023	2024	1043				
032	AATT	2013	1030	1079	2013	1097	2022	1055	2023	2024	1063	
025	0034	1075	1027	2009	0220	0224	0228	0230	0234	0236	6240	6244
•51	0252											
075	0075	1629	1030	2011	1032	0224	0228	0230	0234	0236	0240	0244
	0252											
041	0041	2016	1040	6230	0234	0235	0240	02:4	0252	,		
012	0012	2015	1036	2015	1040	0230	0234	0234	0240	024	025:	!
043	0043	2017	1039	1040	0:28	0230	0234	0236	0240	0 02A	025	2
015	0044	2014	1033	2018	2021	104:	0234	0240	0244	025	2	
045	0045	2019	:020	104	: 1645	0234	0234	0240	024	025	2	
051	0051	2022	1055	202	2024	106	3					
052	0052	2023	2024	105	3							
031	6061	2015	3 2021	100	2 0234	024	024	025	2			
032	005	2021	1062	023	6 0240	0244	1 025	2				
671	0071	2020	1014	104	5 0234	023	6 024	0 024	4 025	2		
072	007	2 2028	8 106	106	6 1067	106	203	2 107.	3 107	5 107	6 203	3 1077
073	067.	5 2024	9 100	5 024	0 024	025	2					
074	007	4 2030	0 1072	2 107	1 024	4 025	2				_	
031	663	1 262	7 1067	105	8 203	2 107	3 107	5 107	6 203	3 107	7	
002	008:	2 202	5 2027	7 100	7 105	203	2 107	3 105	0 107	8 025	2	
023	003	3 203	1 107.	2 107	1 024	025	2					
621	005	4 203	2 1073	5 108	0 107	8 022	2					
095	000	5 203	3 1077	7								
091	009	1 202	5 202	3 202	4 106	3						
002	200	2 202	1 198	3								
111	0:1	1 200	0 109	5 110	1 110	0 025	7 025	9				
112	611	2 100	2 100	1 200	1 100	7 020	2 020	6 021	0 021	4 02	18 02	0 0224
	022	8 023	0 023	. 023	0 024	0 024	4 025	2			-	
113	011	3 200	1 100	7 020	2 020	5 021	0 021	4 023	8 02	0 02	4 02	0 0230
	023	4 023	6 024	0 024	H 025	2						

in this table are the numbers of each node through which the evacuation route passes. Illustrated in Figures 8a and 8b are the coded line/node network and the evacuation routes for each centroid.

A description of roadway characteristics represented by each link in the evacuation route network is presented in Table 7. Evacuation network links are identified by the numbered A and B nodes which represent either end of the link. The order of the nodes (from A to B) indicates the direction of travel. Also identified is the link travel time (under normal conditions), length, traffic capacity, and roadway identification. A brief description of each is given below:

- Travel Time on a particular link is determined by dividing the normal traffic speed on each segment by the link length. Travel time is expressed in minutes.
- Distance represents the length of the roadway link and is expressed in miles.
- <u>Capacity</u> identifies the number of vehicles which can be accommodated on a particular roadway link during a fixed increment of time. In this case, capacity has been expressed in vehicles per 15 minute increment.
- O <u>Roadway Identification</u> is the name of the roadway facility of which the link is a segment.

The following assumptions were utilized in developing the link travel times and capacities.

Directional Flow - All roadways will operate as they do under present conditions. As an example, for a two-lane, twoway facility, only the two outbound lanes would be utilized for evacuation under normal conditions, with the inbound lane used for circulating traffic and/or emergency vehicles.

LINK-NODE NETWORK

IDENTIFICATION AND CHARACTERISTICS

				INC	HELD	
ATOS	300:45	TIPE	DIST	CAP	CAP	ROADWAY IDENTIFICATION
11	2002	1.2	0.3	250	85	Centroid Connector
12	2005	1.3	0.3	250	96	Centroid Connector
13	2007	1.6	C.4	500	234	Centroid Connector
21	2003	2.0	0.5	500	299	Centroid Connector
22	2004	1.8	0.5	250	134	Centroid Connector
23	2006	3.7	0.9	500	539	Centroid Connector
24	2002	3.0	0.8	250	222	Centroid Connector
25	2009	2.2	0.6	250	164	Centroid Connector
26	20:2	0.6	0.1	250	43	Centroid Connector
31	20:0	2.1	0.5	1000	457	Centroid Connector
32	2013	0.8	0.2	250	58	Centroid Connector
22	2011	2.1	0.5	250	152	Centroid Connector
34	1026	4.0	1.0	500	525	Centroid Connector
35	1029	3.2	0.8	500	469	Centroid Connector
41	2016	1.5	0.4	500	222	Centroid Connector
42	2015	2.7	0.7	250	199	Centroid Connector
43	2017	2.2	0.6	500	328	Centroid Connector
44	2014	1.2	0.3	250	87	Centroid Connector
45	2019	2.1	0.5	250	155	Centroid Connector
51	2022	0.4	0.1	200	29	Centroid Connector
52	2023	0.8	0.2	250	58	Centroid Connector
61	2018	2.1	0.5	250	155	Centroid Connector
62	2021	1.6	0.4	250	120	Centroid Connector
71	2020	2.4	0.6	250	175	Centroid Connector
72	2028	2.0	0.5	250	143	Centroid Connector
73	2029	1.4	0.3	250	99	Centroid Connector
74	2030	1.2	0.3	250	87	Centroid Connector
81	2027	6.0	1.5	450	879	Centroid Connector
82	2026	1.0	0.3	250	76	Centroid Connector
83	2031	1.4	0.3	450	199	Centroid Connector
84	2032	1.2	0.3	250	87	Centroid Connector
23	2033	2.0	0.5	250	143	Centroid Connector
91	2025	1.6	0.4	500	240	Centroid Connector
92	2025	3.4	0.9	500	504	Centroid Connector
111	2000	0.2	0.1	250	29	Centroid Connector
112	1002	0.4	0.1	200	29	Centroid Connector
113	2001	0.4	0.1	250	29	Centroid Connector

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TIME - Travel time from A Node to B Node (minutes)
DIST - Distance from A Node to B Node (miles)
INC CAP - Incremental link capacity (vehicles per 15 minutes)
HOLD CAP - Queuing capacity from A Node to B Node (vehicles)

(Continued)

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INC KELD

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STON	BUCCHE	TIKE	DIST	CA?	CAP
202	206	1.2	1.0	1200	1196
206	210	1.2	1.0	1350	1196
210	214	0.7	0.6	1350	668
214	218	0.7	0.6	1350	692
218	220	0.4	0.3	1350	397
220	224	0.8	0.7	1350	833
224	228	2.9	2.5	1350	2836
228	230	0.0	0.0	1350	T
230	234	1.2	1.0	1350	1203
234	236	0.6	0.5	1800	586
236	240	1.5	1.3	1800	1466
240	244	1.2	1.0	1600	1173
244	252	4.0	3.4	1800	3963
257	259	8.8	7.3	1800	8202
1001	2001	3.6	1.8	300	244
1002	1001	1.0	0.4	300	123
1007	202	0.4	0.2	300	
1008	206	0.4	0.2	3/5	23
1007	1002	0.1	0.0	300	14
1012	1008	0.3	0.1	303	21
1017	1018	0.1	0.0	500	11
1018	1019	9.2	0.1	200	20
1019	217	0.2	0.1	300	20
1023	1024	9.1	0.0	200	17
1024	2003	0.2	0.1	230	11
1028	1027	0.1	0.0	200	27
1651	2014	0.2	0.1	200	13
1027	2030	1.7	1.0	200	202
1027	1000		0.7	500	124
10.0	2011	0.1	0.2	500	117
1030	2011	0.3	0.1	300	29
10.04	1077	0.4	0.3	500	146
1035	2034	0.9	0.3	250	73
1070	2018	3.0	1.0	250	293
1039	1010	0.2	0.1	500	58
1040	278	0.5	0.3	300	73
1040	230	0.3	0.2	300	49
1044	1045	0.2	0.1	375	29
1045	234	0.5	0.3	375	73
1055	2023	0.5	0.3	500	146
1062	274	0.4	0.2	300	64
104	1064	0.1	0.1	300	29
1065	240	0.4	0.2	300	58
10.54	1067	1.1	(.:	500	269
1057	1068	0.7	0.2	500	134
1045	2032	1.8	0.7	500	428

I-5 Northbound
I-5 Northbound
I-5 Southbound
Old Route 101
San Onofre State Beach Service Rd.
On-Ramp to I-5 Northbound
On-Ramp to I-5 Northbound
El Camino Real
Ave. Del Presidente/I-5 Overpass
Ave. Mendocino
El Camino Real
I-5 On-Ramp Northbound
Ave. Presidio
Ave. Presidio
Ave. Palizada
Ave. Palizada
Ave. Pico
Pacific Coast Highway
Ave. Pico
Ave. Pico
I-5 On-Ramp Northbound
Ave. Pico
Ave. Vaquero
Camino Capistrano
Camino de Estrella
I-5 On-Ramp Northbound
Pacific Coast Highway
I-5 On-Ramp Northbound
Camino Capistrano
I-5 On-Ramp Northbound
Camino Capistrano
Camino Capistrano
Camino Capistrano

ROADWAY IDENTIFICATION

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(Continued)

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				INC	HOLD	
ATOTE	BHODE	TIME	DIST	CAP	CAP	ROADWAY IDENTIFCATION
1071	244	0.4	0.2	300	52	I-5 On-Ramp Northbound
1072	1071	1.1	0.6	500	334	Ortega Highway
1075	1075	5.0	2.5	300	733	Junipero Serra Road
1073	1030	4.8	2.4	300	703	Camino Capistrano
1075	1076	0.1	0.0	300	8	Junipero Serra Road
1076	2033	1.2	0.6	600	363	Rancho Viejo Road
10.78	252	0.5	0.3	300	73	I-5 On-Ramp Northbound
1030	1075	0.2	0.1	300	29	Avery Parkway
1035	1033	0.4	0.2	500	129	Ave. Pico
1057	2022	1.6	0.9	500	539	Pacific Coast Highway
1055	1101	3.6	1.5	300	439	Old U.S. Route 101
1100	257	0.4	0.2	300	58	I-5 On-Ramp Southbound
1101	1100	0.2	0.1	250	29	Old U.S. Route 101/I-5 Underpass
2000	1075	12.5	5.2	300	1525	Old U.S. Route 101
2001	1007	0.2	0.1	300	29	Basilone Rd. Interchange Overpass
2002	1012	1.2	0.3	250	87	Ave. Del Presidente
2003	1009	0.5	0.2	500	117	El Camino Real
20(4	1018	2.9	1.2	500	703	El Camino Real
2005	1017	0.5	0.2	250	58	Ave. Del Presidente
2006	214	0.4	0.2	300	61	I-5 On-Ramp Northbound
2007	1023	1.2	0.5	150	293	Ave. Del Presidente
2008	2:8	0.2	0.1	300	35	I-5 On-Ramp Northbound
2009	220	0.2	0.1	300	29	I-5 On-Ramp Northbound
2010	1029	1.4	0.7	300	410	El Camino Real
2011	1030	0.4	0.3	500	146	Ave. Pico
2011	1032	0.4	0.2	500	123	Ave. Pico
2012	1005	1.5	0.5	20	146	Ave. Presidio
2013	1177	2.8	1.6	300	483	Pacific Coast Highway
7:14	1033	3.9	1.3	20	354	Camino Capistrano
2015	1036	1.2	0.4	300	117	Ave. Vaquero
2016	1040	1.9	0.8	500	469	Camino de Los Mares
2017	1039	0.5	0.2	500	117	Camino de Estrella
20:3	2021	2.3	0.8	250	225	Camino Capistrano
2017	2020	0.4	0.1	250	35	Via California
2020	10:4	0.2	0.1	600	53	Camino las Ramblas
2:21	1052	0.5	0.2	300	67	Camino Capistrano
2022	1055	0.2	0.1	500	70	Pacific Coast Highway
2:23	2024	3.1	1.8	500	1061	Pacific Coast Highway
202.	10:3	2.4	1.4	500	807	Pacific Coast Highway
2025	2:23	1.5	0.7	300	214	Del Obispo Street
202	2027	1.2	0.5	300	146	Del Obispo Street
: 127	1067	0.4	0.1	500	37	Del Obispo Street
2023	1054	1.5	0.8	300	219	Camino Capistrano
2000	1045	0.5	0.2	300	67	Valle Road
2030	1072	1.3	0.4	250	123	La Novia Avenue
207:	1072	1.1	0.6	500	363	Ortega Highway
2033	1073	1.5	0.6	500	363	Camino Capistrano
203	1077	2.4	1.1	600	833	Marguerite Parkway

<u>Travel Speeds</u> - Speeds were assigned to each link according to the character of the roadway. Freeway speeds were assigned at 50 miles per hour with ramp speeds at 30 miles per hour. Fourlane roadways were generally assigned speeds ranging from 25 miles per hour (El Camino Real) to 35 miles per hour (Pacific Coast Highway) depending on posted speed limits and roadway quality. Speeds for two-lane roadways ranged from 20 to 30 miles per hour. Centroid connectors were considered as local or neighborhood streets and assigned a speed of 15 miles per hour.

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The assigned speeds reflect roadway conditions where traffic control signals have been switched from normal operation to a flashing mode. Under these conditions, the primary evaucation route is given the right-of-way (flashing yellow signal) and side streets are given lower priority (flashing red signal). Manual traffic control at key interesections, where primary evaucation routes merge, is also assumed in and reflected by the estimated travel speeds.

It should be noted that the above mentioned speed assignments represent average speeds only when the roadway facilities are operating below the assigned roadway capacity. Once traffic flow reaches or exceeds the roadway capacity, the computer simulation model begins to form traffic queues on the "over-capacity" links and any adjacent links affected by the over-capacity link. The computer model adjusts the travel times to reflect the congested conditions.

<u>Capacities</u> - Capacities assigned to each roadway take into consideration general roadway geometrics as well as side road interference.

For the purpose of this analysis, the following capacities were assigned:





NUCLEAR REGULATORY COMMISSION

OHÉS

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

SOUTHERN CALIFORNIA EDISON COMPANY)DOCKET NOS. 50-361, OLET AL.,)and 50-362 OL(SAN ONOFRE NUCLEAR GENERATING)STATION, UNITS 2 AND 3)

DATE: SEPTEMBER 24, 1981 PAGES: 10,096-10,313

AT: Anaheim, California

ALDERSON ____ REPORTING

400 71 ----- ATR. , S.W. Hasnington; D. C. 10024

8109300139 Telephone: (202) 584-2345

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BY MR. MC CLUNG:

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2 Q Can you tell us briefly what your duties and 3 responsibilities are in your position with the Office of 4 Emergency Services?

A As the Deputy Director I supervise the day to day activities of the Office of Emergency Services with direct involvement in the Nuclear Power Plant project and the Governor's task force on earthquakes. I also act as director in his absence.

10 Q Are you an official representative and spokes-11 person of the OES with respect to nuclear power issues?

A I suppose I am one of the spokespersons from the
 Office of Emergency Services regarding that issue, yes.

14 Q Have you testified before governmental bodies 15 such as the legislature and Federal Emergency Management 16 Agency with respect to the State Officer of Emergency Ser-17 vices' position regarding nuclear power plant planning?

18 A Regarding nuclear power plant planning, yes, I
 19 have.

20 Q In your view as Deputy Director, then, can you 21 state for -- the position of the OES on matters regarding 22 emergency planning for nuclear power plans as it exists to-23 day?

A Yes, I believe I can.

Q Could you briefly set forth your qualifications

1 and background with respect to the emergency planning, specifically? 2 MR. PIGOTT: Excuse me. The Applicants would 3 be willing to stipulate that Mr. Kearns is an expert in the 4 area of emergency planning preparedness. The only question 5 I would ask is a very simple one, whether Mr. Kearns speaks 6 for himself or his department. 7 JUDGE KELLEY: I thought -- that is what the 8 prior question was --9 MR. MC CLUNG: That is what --10 JUDGE KELLEY: -- that he spoke for the depart-11 ment. 12 MR. PIGOTT: He said he could. I am not sure if 13 he is. 14 JUDGE KELLEY: Okay. 15 WITNESS KEARNS: I indicated I was certainly 16 one of the spokespersons dealing with emergency planning 17 around nuclear power plants in California, yes. 18 MR. PIGOTT: And you are today speaking on be-19 half of your department or agency? 20 WITNESS KEARNS: Yes, sir, I am. 21 MR. PIGOTT: Okay. 22 MR. MC CLUNG: Thank you, Mr. Pigott. 23 BY MR. MC CLUNG: 24 Now turning for a second to the Intervenors' Q 25

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1	certain of the plans. And if there is a confusion there, and
2	I think it is an important confusion in that one of our
3	positions in this case is that that line for the emergency
4	planning zone should be identical, and in fact that area in
5	San Juan Capistrano and Dana Foint should be incorporated
6	within the emergency planning zone, like they did in the
7	State of California, and not in a new term which doesn't
8	appear in the regulations called the extended planning zone,
9	where there might be confusion. We have already seen that
10	there was confusion in this case with respect to the mailing
11	of the informational pamphlets to that zone. We have seen
12	that there is confusion in this case with respect to whether
13	or not people should evacuate from that zone. The testimony
14	of the people from San Juan
15	JUDGE RELLEY: All right. Excuse me. Excuse me.
16	May I ask the Witness whether you participated in the drawing
17	of the lines being used by the Applicants in this case?
18	WITNESS KEARNS: I presume when you say the
19	Applicant you are including Orange County, because our dis-
20	cussion was with local government. Based on the study we
21	came to the conclusion that approximately 10 miles was cer-
22	tainly adequate for planning around the San Onofre plant.
23	Members of our staff worked with the Orange County officials
24	in defining the zones. We don't arbitrarily impose our

25 thoughts on them. They have the understanding, as I have to

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k2	1	0654, and ultimately the federal emergency management agency					
	2	would also recognize that, so we begin to work with them to					
	3	correct the shortcoming that may be apparent in the plan					
	4	so that it meets 0654.					
	JUDGE KELLEY: Have you had any situations where						
	6	you thought 0654 required one thing and FEMA thought it					
	7	required something else in some significant point?					
	8 WITNESS KEARNS: I really can't address t						
	9	Perhaps the next witness could address it in more detail.					
	10	JUDGE KELLEY: Okay. Redirect, Mr. McClung?					
	11	MR. MC CLUNG: No, sir.					
	12	JUDGE KELLEY: Okay. Mr. Kearns, thank you					
	13	very much. Appreciate your appearance.					
	14	WITNESS KEARNS: Thank you.					
	15	(Whereupon, the witness was excused.)					
	16	JUDGE KELLEY: Next?					
	17 MR. MC CLUNG: Yes, Intervenors would						
	18	Dr. Mary Frances Reed.					
	19	Whereupon,					
	20	MARY FRANCES REED					
	21	having been first duly sworn by the Chairman, was called as					
	a witness herein and was examined and testified as fol						
	23	DIRECT EXAMINATION					
24		BY MR. MC CLUNG:					
	25	Q Would you state your name and address please					

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for the record?

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A Mary Frances Reed. 411 South Flower Place, West Sacramento, California.

Q Could you tell us the organization you work for
and your title?

A I am with the California Officer of Emergency
7 Services. I am Chief of the Nuclear Power Plant Planning
8 Section.

9 Q Could you describe for us briefly your educational background?

A I have a Bachelor of Science and a Ph.D. from the University of California in Berkeleys My Ph.D. was in nuclear chemistry. I have spent a year in a post-doctoral appointment with the University of Kentucky Medical Center, and I can go into professional now if you would like.

16 Q Well, that would be helpful if you would describe 17 your professional experience as it relates to emergency 18 planning.

MR. PIGOTT: Applicants are willing to stipulate that Dr. Reed is an expert in the area of emergency planning and that her testimony can be considered as expert testimony. MR. MC CLUNG: That is helpful.

MR. PIGOTT: At least in the area of emergency
planning. That is what we are talking about.

JUDGE KELLEY: Why don't we just go ahead to

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WITNESS RID: Not in detail. I know there are a 1 number of hospitals there. 2 JUDGE KELLEY: All right. Have you ever given 3 any thought generally to the question of whether specific 4 medical arrangements ought to be made in the extended plan-5 ning zone in the event of a radiological emergency? 6 WITNESS REED: I do not think specific plans are 7 necessary to, say, evacuate a hospital in that extended zone, 8 for instance. However I do think some consideration to 9 sheltering and KI should be given. Any more than that -- I 10 am not quite sure what you are getting at. If you are 11 talking about for the hospital population --12 JUDGE KELLEY: I am talking about the general 13 public. 14 WITNESS REED: Okay. 15 JUDGE KELLEY: Right. Any special medical arrange-16 17 ments? WITNESS REED: Probably not. I would not antici-18 pate any need for specific medical arrangements for the 19 general public in that zone. 20 JUDGE KELLEY: The extended 20 zone? 21 WITNESS REED: True. 22 JUDGE KELLEY: How about the zero to 10 zone? 23 WITNESS REED: It is unlikely there even in terms 24 of any acute care need. Now I --25

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the NUCLEAR REGULATORY COMMISSION

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in the matter of: Southern California Edison Company, et al (San Onofre Nuclear Generating Stations, Units 2 and 3)

· Date of Proceeding: September 24, 1981

Docket Number: 50-361 CL, 50-362-CL

Place of Proceeding: Anaheim, California

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Ruth Portune

Official Reporter (Typed)

Official Reporter (Signature)

Statt CI CALIFORNIA

OFFICE OF EMERGENCY SERVICES

July 20, 1982



Sally R. Bellerue Mayor, City of Laguna Beach 505 Forest Ave. Laguna Beach, CA 92651-2394

Dear Mayor Bellerue:

Your letter of June 4, 1982 to Governor Brown was forwarded to this office for reply.

In 1979, the Office of Emergency Services, in response to Senate Bill 1183, undertook a study of the effects of a sericus nuclear power plant accident in California. The study was site-specific, It resulted in the creation of a Basic Emergency Planning Zone, extending approximately 10 miles from San Onofre, and an Extended Emergency Planning Zone, going out 10 to 15 miles beyond the basic zone.

Within the basic zone, California has adopted federal planning standards which include detailed planning for both evacuation and sheltering, as well as the development of a coordinated public warning and education program. Comprehensive plans have been developed by local jurisdictions within the basic zone, and the plans have been forwarded to this office for review.

Southern California Edison has distributed brochures to residents and businesses within this zone, providing information on how the public would be notified in an emergency. There is also a specific set of instructions on protective actions which may be necessary (e.g., evacuation routes to reception conters).

In the extended zone, due to the reduced risk indicated by our study (as compared to the basic zone) such detailed planning is not required. We do, however, require distribution



OFFICE OF CITY MANASTER

Sally R. Bellerue July 20, 1982 Page 2

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of educational materials and planning for warning the public using the Emergency Broadcast System.

As they have done in the basic zone, Southern California Edison is preparing public information materials for distribution within the extended zone. We are now reviewing a draft of an "Emergency Information Handbook," which includes information on emergency levels, the planning that has been done to protect public health and well being and the steps to take to avoid or greatly reduce potential effects of a radioactive material release.

I hope this information is helpful to you. If we can be of further help, please contact this office.

Sincerely,



Southern California Edison P.O. Box 800 + Rosemead. CA 91770

This handbook has been written to help residents who live in areas outside, but adjacent to, the San Onofre Emergency Planning Zone to better understand the development of the Emergency Response Plans for the San Onofre Nuclear Generating Station.

The handbook describes the planning that has been done to protect public health and well-being; the levels of emergency which, although unlikely, could arise; and the steps the public can take to avoid or greatly reduce the potential effects of a radioactive material release. It answers many of the questions frequently asked about a potential emergency at the San Onofre Nuclear Generating Station.



EMERGENCY PLANNING ZONE

The federal government has established the area within about a 10-mile radius of any nuclear generating station as the Emergency Planning Zone for that station. At San Onofre, this emergency planning zone encompasses portions of Orange and San Diego Counties; the cities and communities of San Clemente, San Juan Capistrano, Capistrano Beach and Dana Point; portions of the Marine Corps Base Camp Pendleton and several beaches and parks operated by the State Department of Parks and Recreation (San Onofre State Beach, San Clemente State Beach, Doheny State Beach).

The federal government established this emergency planning zone to insure that advance emergency planning is provided for an area of sufficient size surrounding each nuclear plant to assure that prompt and effective actions could be taken to protect the public in the event of an emergency. Emergency protective actions which the public in this area may be asked to take include sheltering and, under very extreme emergencies, evacuation.

PUBLIC EDUCATION ZONE

The State of California has defined an area outside and adjacent to the federal Emergency Planning Zone as the Public Education Zone. At San Onofre, the Public Education Zone encompasses the communities of Laguna Beach, Laguna Hills, Laguna Niguel, South Laguna, El Toro and Mission Viejo in Orange County; portions of the Cleveland National Forest in Riverside and San Diego Counties; and portions of Marine Corps Base Camp Pendleton and the communities of Oceanside, Fallbrook, Bonsall, Carlsbad and Vista in San Diego County.

The State Office of Emergency Services established this Public Education Zone to ensure that the public would be informed in advance of how it would be notified of an emergency and what protective action, if any, should be taken in the event of an emergency.

The only protective action which the public in this area may be asked to take is sheltering. Virtually all experts, including the Nuclear Regulatory Commission, the Federal Emergency Management Agency, State Office of Emergency Services and the Counties of Orange and San Diego agree that no evacuation planning beyond the 10-mile Emergency Planning Zone will be necessary. The reason evacuation planning is not considered a real requirement is that the distance factor (the distance



unnecessary.

What Is A Nuclear Power Plant Emergency?

A nuclear power plant emergency could occur if there were a problem with the equipment associated with public protection. Public action would be necessary only if there were an anticipated or actual uncontrolled release of radioactive material into the environment.

How Likely Is An Emergency?

The chances of a serious nuclear power plant emergency occurring are remote compared to the chances of other disasters such as floods, earthquakes and hazardous chemical spills. Nevertheless, the operators of the San Onofre Nuclear Generating Station and local government agencies believe that citizens should know what to do if a serious nuclear power plant emergency should occur.

What Are The Hazards?

Industrial plants in general pose some hazard to the public. Usually these hazards affect only the people who work in the plants, but occasionally the public living near industrial plants is threatened by fires, explosions, or the escape of harmful liquids or gases.

A nuclear power plant, like conventional power plants and many industrial plants, releases water vapors (steam) every day. This water vapor is not radioactive and is no cause for concern. Nuclear power plants may also release small quantities of radioactive gases into the air and water under highly controlled and regulated conditions. Such releases occur frequently, and are continuously monitored by the plant personnel in accordance with strict government standards. The releases are controlled to make sure the radiation dose rate to the environment is considerably *less* than the natural background radiation.

Most nuclear power plant emergencies would not result in releases of large quantities of radioactive material into the air. In the unlikely event such a release should occur, the protective action to be taken would depend upon the amount and type of the material released, the wind direction, and where you are located.

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might be only several hours depending upon the nature of the damage to the plant.

The area affected could vary from the plant site itself to an area several square miles surrounding the plant. The hazard posed would be due to the radiation given off by the radioactive gases or materials carried from the plant by the wind.

Radiation levels from any radioactive gases reaching the public beyond 10 miles from the plant would be much lower due to dilution of the gases and their distribution well above ground level.

Nuclear Emergencies: Who Decides When To Take Action



While it is unlikely that the public would be endangered by most malfunctions which could occur at the San Onofre Nuclear Generating Station, some conditions require immediate notification of local, state and federal authorities while the conditions are at minor levels. Even under low level emergency conditions, the staff at San Onofre would notify the counties of Orange and San Diego, the cities of San Clemente and San Juan Capistrano, the Marine Corps Base at Camp

corrected, or escalated to a more serious level. Some agencies

might take action in special situations; for example, at San Onofre State Beach adjacent to the plant, the State Parks and Recreation Department would carry out a precautionary evacuation assisted by the operating staff at San Onofre. However, at this level of emergency, there would be no action necessary on the part of the general public.

3. Site Emergency

A Site Emergency would be characterized by events involving actual or probable major failures of plant functions needed to protect the public. Most events within this classification would have a potential for significant releases of radioactive material to the environment, but not in amounts large enough to require protective measures beyond the plant boundaries. The local agencies would establish their respective emergency operations centers for the 10-mile Emergency Planning Zone, brief the news media and prepare for a possibly more serious emergency until the condition was corrected or escalated to the next and most serious level. The San Onofre State Beach. which is located next to the plant, would be evacuated as a precaution and the Marine Corps Base at Camp Pendleton would move its Marines and dependents out of the immediate area in order to maintain its national defense capability and be prepared to assist the civilian community if necessary.

4. General Emergency

A General Emergency is characterized by events which would involve an actual or imminent release of large amounts of radioactive material to the environment outside the plant boundaries. Total activation of the onsite and offsite emergency organizations for the 10-mile Emergency Planning Zone is required. Actions involving the public within the 10-mile Emergency Planning Zone would be likely. Actions involving the public within the Public Education Zone would be very unlikely; however, information and instructions would be given over the Emergency Broadcast system radio stations.

Public Notification Of An Emergency

Public notification of a serious emergency would be by news broadcasts and, if necessary, by public address systems operated by public service personnel on a street-by-street basis. This warning is to alert the public to turn on the radio or TV for emergency instructions, and to refer back to this folder. Notify neighbors to ensure they are aware of the emergency. The initial instructions may simply recommend that the public continue listening for further news or that they should close their windows and stay indoors. Tune in to one of the following radio or television stations:

Radio Stat	ion Frequency	Location
KEZY	AM 1190/FM 95.9	Anaheim
KWIZ	AM 1480/FM 96.7	Santa Ana
KWVE	FM 107.9	San Clemente
KIKF	FM 94.3	Garden Grove
KSBR	FM 88.5	Mission Viejo
KUDE	AM 1320	Oceanside
KEZL	FM 102.1	Oceanside
KOGO	AM 600	San Diego
KLZZ	FM 106.5	San Diego
KCBQ	AM 1170/FM 105.3	Santee
Television	Station	
CBS	Channel 2	Los Angeles
NBC	Channel 4	Los Angeles
ABC	Channel 7	Los Angeles
KOCE	Channel 50 ·	Huntington Beach
KFMB	Channel 8	San Diego
KGTV	Channel 10	San Diego
KCST	Channel 39	San Diego

What To Do

In the event of an emergency, the public would be asked to take certain actions which could include waiting for further instructions or taking sheltering precautions.

Sheltering

If the public was asked to take sheltering precautions, instructions would be given which would include staying indoors, closing all ventilators, windows and doors, turning off the air conditioner, cooking ventilation and clothing dryers. These precautions should remain in force until the public was instructed otherwise.

Some Facts About Radiation Effects And Radioactivity Releases

Radiation continues to be one of the public's chief concerns regarding nuclear power plants. This section provides information about radiation, including its sources, measurement, health and safety effects, and how protective action would minimize radiation impact during an emergency.

The primary difference between nuclear power plants and other steam-driven power plants is that the fissioning of uranium is used to provide the heat required to boil the water which generates the steam for driving the turbine/generator. During the process of releasing heat from uranium, fission byproducts are formed which are the remains of the uranium. Most of these fission by-products are radioactive and emit the



extra energy they contain in the form of radiation. The radioactive by-products are contained within the plant and are not permitted into the environment, except for the small quantities of radioactive gases discussed on page 4.

Radiation can affect body cells and, in excessive amounts, can be injurious. However, as long as the radioactive materials (fission by-products) remain inside the nuclear reactor, there are no harmful effects. Therefore, extraordinary effort is taken during the design, construction and operation of a nuclear plant to reduce the possibility of radioactive material finding its way from the reactor, through the numerous protective barriers and the containment structure, into the surrounding environment.

Natural Background Radiation

Every living thing on this planet is exposed to ionizing radiation and has been since time began. This naturally occurring radioactive material is in the air we breathe, in the food we eat, and in the homes we live in. This "natural background" radiation is the largest contributor to a person's average radiation dose, followed by exposure from medical sources. The nuclear power industry, however, contributes less than 1% of the radiation to which we are regularly exposed.

Kinds Of Radiation

Radiation is a natural form of energy and there are two types: ionizing radiation and non-ionizing radiation. Visible light, radio and TV waves, and microwaves are examples of non-



THIS DIAGRAM SHOWS THAT:

- the major contribution to the average dose is from natural background radiation
- the largest man-made contribution is from the medical uses of radiation
- the nuclear power industry is a small contributor to the average radiation dose.
- Figure 1. From "Radiation—A Fact of Life" by the International Atomic Energy Agency, 1979

Adapted from National Radiological Protection Board publication NRPB-R77

ionizing radiation. X-rays, alpha, beta and gamma are examples of ionizing radiation, and can come from virtually all natural materials. Both kinds of radiation can have beneficial as well as harmful effects. The term radiation, as used in this handbook, means the ionizing type, since it is the type nuclear reactors produce.

There are many kinds of ionizing radiation. Perhaps the best known are X-rays, alpha, beta and gamma. Alpha radiation particles have the potential to penetrate the surface of the

skin, but can be stopped by a sheet of paper. Beta radiation particles can penetrate half an inch of water or human flesh, but can be stopped by wood or housing materials an inch thick. Gamma rays and X-rays can penetrate the human body, but can be very drastically reduced, or almost completely absorbed, by several feet of concrete for stronger gamma rays, or several inches of concrete for the weaker X-rays. These characteristics of radiation are important in the public protective action called sheltering, and are discussed in more detail in the section on "Shielding Against Radiation."

What Is Meant By Radiation Dose? How Is Radiation Measured?

When a person is exposed to radiation, he or she absorbs some of the radiation energy. We call this receiving a radiation dose. However, as in the case of coffee or medicine, the possible health effects can best be determined when we know the amount of radiation, the rate at which it was received and the manner in which it was received.

Radiation doses to individuals are usually expressed in units of millirem (MREM). "Millirem" is a unit used to measure an amount of ionizing radiation. The millirem unit accounts for the different kinds of biological effect produced by equal doses of different radiations; therefore, it is used by physicians and health scientists in measurements referring to radiation protection.

The rate at which a person receives radiation is expressed as millirems per hour, per year, etc. If you stand in a radiation area of 10 millirems per hour for one hour, you receive a 10-millirem radiation dose. If you remain in this 10 millirem per hour radiation area for 10 hours, you receive a 100-millirem radiation dose. (This measurement is similar in concept to the rate at which you drive a car—expressed in miles per hour. If you drive at 10 MPH for 1 hour, you travel 10 miles).

The annual dose rate to the average U.S. citizen from cosmic

Estimate Your Annual Exposure To Radiation *

Common Sou	Your Annual Dose (mrem)		
WHERE YOU	LIVE		
Location: Cosm	26		
For your elevati			
Elevation-mre	m		
1000-2	4000-15	7000-40	
2000-5	5000-21	8000-53	
3000-9	6000-29	9000-70	
Elevation of a	iome U.S. cit	ies (in feet): Atlanta 1050,	
Chicago 595,	Dallas 435,	Denver 5280, Las Vegas	
Salt Lake Cit	AAOO Sook	and 1890	
(Coastal cities	are assume	to be sero, or at sea level)	
Ground US a	verade		26
House Construe	tion_For et		-0
building, add	7	one, concrete, or masonry	
WHAT YOU	EAT, DRIN	K & BREATHE	
Food, Water, A	ir	U.S. average	24 .
Weapons test fa	llout		4.4.1.1
HOW YOU L	IVE		
X-ray and radio	pharmaceuti	cal diagnosis:	· · · · · · · · ·
Number of ches	t x-rays	x 10	
No. of lower gas	strointestinal	tract x-rays x 500	
No. of radiopha	rmaceutical	exams x 300	
(Average dose to	o total U.S. p	population - 92 mrem)	
Jet plane travel:	For each 25	00 miles add 1 mrem	
TV viewing: For	r each hour p	er day x 0.15	
HOW CLOSE	YOU LIVE	E TO A NUCLEAR PLANT	
At site boundar	y: Avg. no. o	f hours per day x 0.2	
One mile away:	Avg. no. of h	nours per day x 0.02	
Five miles away	Avg. no. of	hours per day x 0.002	
Over 5 miles an	ay	None	
NOTE: Maximum a	lowable dose det	ermined by "as low 30 reasonably	
achievable" (ALARA	i) criteria establia	thed by the U.S. Nuclear Regulatory	
than these limits.	CIRC BIRNES CLER	FILE ALLINE GOOD IN PROPERTY RES	
	Muto	tal annual dose in mrem a	

My total annual dose in mrem #

Compare your annual dose to the U.S. annual average of 180 mrems

One mrem per year is equal to: Increasing your diet by 4%; or taking a 5-day vacation in the Sierra Nevada mountains.

Revised from earlier softions based on the "BEIR Report—III"—National Academy of Sciences, Committee on Biological Effects of lonising Radiation, "The Effects on Population of Esposare to Low-level Radiation," National Academy of Sciences, Washington, D.C., 1980.

Figure 2. From American Nuclear Society "Nuclear Power and the Environment: Questions and Answers"-Radiation (Book 1) 1980 radiations and radioactive material in the earth is about 100 millirem (ranging from 60 mrem in Florida to about 100 mrem in California to 145 mrem in Colorado). In addition the average person also receives about 100 millirem from manmade sources. For example the average person receives about 75 millirem annually from medical X-ray diagnosis. Specifically, an X-ray of the chest when properly administered gives a person a dose of approximately 10 millirem per film. A barium enema X-ray examination involves doses up to about 1,500 millirem to the skin of the midsection of the body. Your annual radiation exposure can be estimated by using the information on page 13.

Radiation At San Onofre. The radioactivity in the vicinity of San Onofre Nuclear Generating Station has been monitored continually in accordance with a program approved by the Nuclear Regulatory Commission and the California Department of Public Health and Safety, beginning years before the plant began operating. This elaborate monitoring system measures radiation in the air, ground, plants, animal life and water. More than 15 years of monitoring prove that San Onofre has not added significantly to the natural background radiation levels.

If you lived next door to San Onofre Nuclear Generating Station, you would receive less than one millirem of additional radiation per year under normal operation. To put that one millirem in perspective, natural background radiation alone exposes the average 'J.S. citizen to about 100 millirems of radiation per year, 22 to 27 of them from one's own body.

Is That Radiation Within Safe Limits? The Nuclear Regulatory Commission (NRC) is responsible for implementing and enforcing the radiation protection standards established by the Environmental Protection Agency (EPA). Radiation standards have evolved from years of study and recommendation by international and national radiation-protection organizations beginning in the early 1920s. The present limits in force in the United States were established on the basis of the recommendations of the Federal Radiation Council (FRC) in 1960, as approved by the President. These limits are in agreement with the long-standing recommendations of the National Council on Radiation Protection and Measurement (NCRP) and the International Commission on Radiological Protection (ICRP) and remain consistent with occupational radiation protection standards in effect worldwide. The U.S. Environmental Protection Agency allows individuals in the general population to absorb 500 millirem per year from all sources other than natural background radiation and medical

sources. According to NRC radiation safety requirements, persons living in the vicinity of a nuclear plant may receive doses of no more than five millirem a year from the facility.

Radiation Doses In Perspective

Protective action for an affected area will be recommended by plant personnel to local officials if offsite radiation doses are estimated to exceed 500 millirem. A 500 millirem dose is much less than the smallest dose at which health effects start to become apparent. If the public were instructed to take shelter in response to an emergency at San Onofre, there would be no need to panic and risk an injury or accident in the belief that there is imminent danger. The following dose levels will give you an idea of the increasing severity of radiation impacts:

100 millirem in any one year-Average U.S. background radiation with no significant health effects.

500 millirem in any one year—No measurable effect. Annual increase above natural background radiation allowed to an individual by the EPA. Protective measures would be ordered before this dose is reached.

5,000 millirem in any one year—A dose which is permissible to a radiation worker, year in and year out.

25,000 millirem in one day—A dose below which there is usually no observable effect on the health of a person; an allowable dose to an emergency worker.

75,000 millirem in one day-Mild flu-like symptoms may appear.

500,000 millirem in one day-Fatal to about half of people exposed if no medical treatment is given.

The overwhelming majority of clinical evidence demonstrates that low-level radiation doses up to several thousand millirem do not result in long-term health effects. Any effects of low level doses of radiation are so small that they are totally masked by effects from other causes. However, to be conservative, protective actions for the public would be ordered at low levels of anticipated or actual releases.

Airborne Spread Of Radioactive Materials

Nuclear power plants have many protective systems to hold radioactive material within the fuel assemblies containment barriers and buildings. These systems include air filtration



Figure 3. Plume Spreading Out and Diluting from a Nuclear Power Plant.

Note: The radioactive material is not visible, and would be detected with monitoring instruments.

systems required to protect plant workers as well as the general public. The most probable cause of radiation exposure to the public would be an airborne release of radioactive gas from the normally air-tight containment. As this gas was carried by the wind and mixed with air, it would form a radioactive cloud called a plume. The shape and direction of the plume would depend upon the wind speed, land contours, and atmospheric conditions at the time of the release.

The concentration of radioactivity in the plume would decrease as the distance from the plant increased, because the plume would spread out and dilute. A hypothetical "typical" plume is shown in Figure 3.

Shielding Against Radiation

Thick layers of concrete, water and steel have long been used as effective shields against the **very highly concentrated sources** of radiation used in industry. Thicknesses of several feet of concrete eliminate the soft, non-penetrating radiations and reduce the more penetrating radiation to less than 0.1% of the original dose rate.

Radiation levels from any radioactive gases reaching the public would be much smaller due to dilution of the gases and their distribution well above ground level. The relatively thin materials of a house or building would be effective in three ways as protection against diluted airborne radioactive materials. They would:

- Minimize external gases from entering the building to get near the occupants;
- 2) Virtually stop the soft, non-penetrating radiation;
- 3) Substantially reduce the more penetrating radiation.

Environmental Protection Agency studies of the effectiveness of sheltering as protection against nuclear accidents show that closing a building's windows and doors and turning off ventilation systems significantly delay entry of the gases perhaps until a gas cloud would pass.

According to these studies, even for penetrating radiation, a wood frame house would reduce radiation doses by as much as 40%, a masonry house would reduce radiation by as much as 60%, and a large office building or multi-story building would reduce radiation by as much as 99%.

Under circumstances possible for a serious nuclear power plant accident, *sheltering* would reduce radiation doses by as much as 92% when *sheltering* is begun before the radioactive gas arrives. And remember, in the Public Education Zone, radiation levels would already have been substantially diluted because of distance.

Effective Public Protection Actions

The various types of protective measures you would be instructed to take after an emergency has been declared include:

- ALERT: Do nothing yet; keep tuned to local emergency radio/TV stations for information.
- SHELTER: Remain indoors until further notice. Close all outside windows, ventilators and doors and turn off air conditioners, cooking ventilation and clothes dryers.



Any radiation dose can be reduced by three means:

- 1. Reducing the time of exposure to radiation.
- Placing an absorbing material between the radiation source and the body.
- 3. Increasing distance from the source of radiation.

Sheltering

Radiation dose is reduced by placing an absorbing material, between a person and the radiation source—the heavier the better. Therefore, the dose would be less if you were inside a home or office rather than outside in the open. In an emergency situation, the public would be instructed to go indoors until the hazard was over. In addition, to prevent airborne radioactive material from entering your home, you would be instructed to close all ventilators, windows and doors, and turn off the air conditioner, cooking ventilation and clothing dryers—that is, turn off anything that exchanges inside air with outside air.



Further Information

The emergency plans, although primarily responsive to an emergency at a nuclear generating station, might also be implemented under the direction of the local government(s) affected in the event of other disasters, such as: fire, flood, chemical spill, earthquake, or toxic gas release. Should you desire additional information please contact your local authorities.

- State Office of Emergency Services P.O. Box 9577 Sacramento, CA 95823
- Asst. Chief of Staff Operations & Training Marine Corps Base Camp Pendleton Building 1160, Rm. 211 Camp Pendleton, CA 92055
- Office of Disaster Preparedness
 County of Riverside
 4080 Lemon St. Ste. 8
 Riverside, CA 92501
- Orange County Fire/ Emergency Management Division
 625 N. Ross, B-169
 Santa Ana, CA 92701

- Office of Disaster Preparedness County of San Diego 5201 Ruffin Road San Diego, CA 92123
- American Red Cross South County Service Center 27324 Camino Capistrano Ste. 205-207 Laguna Niguel, CA 9267?
- Southern California Edison Company P.O. Box 800 Rosemead, CA 91770 Attn: Nuclear Affairs
- San Diego Gas and Electric Company District Office 101 W. El Portal San Clemente, CA 92672