DOCKETEE

1			
2			'87 JUN 30 P3:33
3			
4	UNITED STATE	ES OF AMERICA	DOCKETHA & COMMING
5	NUCLEAR REGULA	ATORY COMMISSION	
6			
7	In the Matter of)	
9	SOUTHERN CALIFORNIA EDISON COMPANY, et al.) DOCKET NOS.	50-361 OL 50-362 OL
10	(San Onofre Nuclear Generating Station, Units 2 and 3))	
11)	
13	TICENSEEC' SUDMIS	ITAL RE EMERGENCY	
14		(10 C.F.R. 50.17(b)(12).)
15 16 17 18 19 20 21 22 23 24	CONTROL OF THE PROPERTY OF THE	AVID R. PIGOTT ATHERINE K. O'CONNE RRICK, HERRINGTON & OO Montgomery Stree an Francisco, Califi elephone: (415) 39 HARLES R. KOCHER AMES A. BEOLETTO OUTHERN CALIFORNIA COMPANY O. Box 800 244 Walnut Grove Avosemead, California elephone: (818) 30 ttorneys for Licens outhern California Company, an Diego Gas & Flee	SUTCLIFFE t ornia 94111 2-1122 EDISON enue 91770 2-1212 ees Edison
25 26	C	an Diego Gas & Elec ity of Anaheim, Cal ity of Riverside, C	ifornia and
20	Dated: June 29, 1987		

14500

B707070061 B70629 ADDCK 05000361 G

1	LICENSEES' SUBMITTAL RE EMERGENCY
2	MEDICAL SERVICES (10 C.F.R. 50.47(b)(12))
3	I. INTRODUCTION
4	By Order dated January 13, 1987 the Atomic Safety &
5	Licensing Board ("Board"), in the above captioned action,
6	required Licensees (Southern California Edison Company, San
7	Diego Gas & Electric Company, City of Anaheim and City of
8	Riverside, California) to submit by July 1, 1987,
9	documentation of having implemented emergency medical
10	arrangements in conformity with 10 C.F.R. 50.47(b)(12). The
11	requirement of 10 C.F.R. 50.47(b)(12) was initially defined in
12	"Criteria for Preparation and Evaluation of Radiological
13	Emergency Response Plans and Preparedness in Support of
14	Nuclear Power Plants," NUREG-0654 FEMA-REP-1 Rev. 1 ("NUREG
15	0654") issued in 1980. More recently, it was further defined
16	in "Guidance Memorandum MS-1, Medical Services" issued by FEMA
17	in coordination with the NRC Staff ("MS-1"). Licensees have
18	now completed their arrangements for offsite emergency medical
19	services. Licensees believe such arrangements fully satisfy
20	the requirements of 10 C.F.R. 50.47(b)(12) as interpreted in
21	NUREG 0654 and MS-1. By this filing Licensees submit a
22	description of said arrangements along with supporting
23	documentation.
24	II. PROCEDURAL BACKGROUND
25	On May 14, 1982 the Board authorized full-power

26 operating licenses for San Onofre Nuclear Generating Station

- 1 ("SONGS"), Units 2 and 3. The authorization was conditioned,
- 2 however, on Licensees developing within six months, in
- 3 conformity with the Board's interpretation of 10 C.F.R.
- 4 50.47(b)(12),1/ offsite medical arrangements for persons who
- 5 may become contaminated and/or injured in the event of an
- 6 accident. Groups United Against Radiation Danger ("GUARD"),
- 7 an Intervenor, then sought to stay the Board's decision
- 8 granting the operating licenses. That request was denied. On
- 9 appeal of that decision the Atomic Safety and Licensing Appeal
- 10 Board again denied the requested stay but stated in dictum
- 11 that it interpreted 50.47(b)(12) to refer only to persons who
- 12 are both contaminated and physically injured.
- 13 The NRC declined to review the Appeal Board's denial
- 14 of the stay but, because of the differing opinions of the two
- 15 Boards, directed certification of two questions:
- 16 (1) Does the phrase "contaminated injured individuals" as used in 10 C.F.R.
- 17 50.47(b)(12) require applicants for nuclear
- power plants to provide arrangements for medical services only for members of the
- public who have suffered traumatic [physical]
- injury and are also contaminated with
- radiation?
- (2) If the answer to Question 1 is no, to what extent does 10 C.F.R. 50.47(b)(12) require advance, specific arrangements and
- 22 commitments for medical services for the
- general public as opposed to the general
- knowledge that facilities and resources exist and could be used on an ad hoc basis?

24

^{1/ 10} C.F.R. 50.47(b)(12) provides in part that emergency
response plans must include "[a]rrangements . . . for medical
services for contaminated injured individuals."

In answering the certified questions the NRC held that Section 50.47(b)(12) requires that arrangements for medical services be made for those individuals who suffer only radiation exposure. The Commission also held that the requirement for medical services would be satisfied by providing a list identifying socal and regional medical facilities which have the capabilities to provide necessary treatment and that pre-accident arrangements with the particular facilities were not necessary. The Commission then remanded the proceedings to the Licensing Board.

Following remand, the Licensees moved for and were granted permission to augment the record before the Licensing Board. The Licensees then provided the Board with documents outlining the actions taken to comply with the Commission's order. These actions included: (a) forwarding to the responsible emergency personnel for the Counties of Orange and San Diego and the cities of San Clemente and San Juan Capistrano a listing of three hospitals which had agreed in writing to provide medical services to individuals who may be traumatically injured and contaminated as a result of an accident at SONGS; and (b) providing the County of Orange and County of San Diego with a list of additional hospitals that may, on a regional basis, be appropriate for medical services planning, as needed.

Based on that submission, the Board concluded that Licensees had met their burden of proof and had demonstrated

- 1 reasonable assurance regarding the arrangements for medical
- 2 services required by 50.47(b)(12). When the Board refused
- 3 Intervenor GUARD's request to inquire of Licensees concerning
- 4 the specific capabilities of the listed facilities GUARD
- 5 sought review of the NRC's interpretation of 10 C.F.R.
- 6 50.47(b)(12), as applied to SONGS, in the U.S. Court of
- 7 Appeals for the District of Columbia Circuit.
- 8 In Guard v. NRC, 753 F.2d 1144 (D.C. Cir. 1985) the
- 9 D.C. Circuit vacated and remanded for further consideration
- 10 that part of the NRC's SONGS decision which had held that
- 11 under 50.47(b)(12) the only planning required was the
- 12 preparation of a list of local treatment facilities. On
- 13 remand, the Commission directed the NRC staff, with FEMA, to
- 14 develop and issue appropriate guidance on the arrangements
- 15 necessary for medical services for offsite exposed individuals.
- 16 III. REQUIREMENTS FOR MEDICAL ARRANGEMENTS
- 17 On November 13, 1986 FEMA issued the
- 18 above-referenced MS-1, "Guidance Memorandum (GM) MS-1, Medical
- 19 Services". A copy of MS-1 is attached hereto as Exhibit 1 and
- 20 is incorporated by reference.
- 21 MS-1 further interprets and clarifies the
- 22 requirements contained in 50.47(b)(12) and the earlier
- 23 guidance in NUREG 0654. It provides standards, evaluation
- 24 criteria, areas of review and acceptance criteria for four
- 25 specific areas: agreements with hospitals; transportation
- 26 arrangements; radiological emergency response training; and

- exercises and drills. Each area is discussed further below. 1 2 A. Agreements with Hospitals. 3 MS-1 requires either state or local government or the licensee to have written agreements with a local and a 4 5 backup hospital which have the capability to treat 6 contaminated injured individuals. The agreements should 7 contain "simple assurances" of such capability, for example, through accreditation by the Joint Commission on Accreditation 8 9 of Hospitals (JCAH). Each local and backup hospital shall 10 have on call within about two hours at least one physician and 11 one nurse who can supervise the treatment of radiologically 12 "contaminated injured" members of the general public. 13 B. Transportation. 14 Arrangements are required for transporting victims 15 of radiological accidents to medical support facilities. 16 Agreements with the transportation providers should be in 17 writing. 18 C. Training. 19
 - Radiological emergency response training is to be provided to those who may be called upon in an emergency.

 Training extends to doctors, nurses, other emergency room personnel, paramedics and emergency medical technicians.
- D. Exercises and Drills.
- MS-1 requires periodic exercises and drills designed
 to evaluate major portions of response capabilities and to
 develop the skills necessary to respond in the event of an

20

21

- 1 accident. Such drills and exercises, in addition to providing
- 2 training and assurance of competence, may identify
- 3 deficiencies which will then be the subject of corrective
- 4 action.

5

IV. MEDICAL ARRANGEMENTS AT SAN ONOFRE

- 6 As previously discussed, 10 C.F.R. 50.47(b)(12)
- 7 requires that "Arrangements are made for contaminated injured
- 8 individuals." Planning Standard "L" of NUREG-0654 provided
- 9 initial guidance for compliance with the regulation. As
- 10 outlined above, FEMA Guidance Memorandum MS-1 provides further
- interpretation and clarification of 10 C.F.R. 50.47(b)(12)
- 12 pursuant to the D.C. Circuit's decision in GUARD v. NRC, 753
- 13 F.2d 1144 (D.C. Cir. 1985). In compliance with all of the
- 14 above, Licensees have implemented the following arrangements
- '15 which they believe fully satisfy both the letter and spirit of
- 16 the NRC regulations.

17 A. Agreements With Hospitals.

- 18 Licensee Southern California Edison Company ("SCE"),
- 19 as operator of SONGS, has obtained written agreements from
- 20 four hospitals located in the vicinity of the plant (the
- 21 "agreement hospitals"). Copies of those agreements are
- 22 attached hereto and incorporated herein as Exhibits 2 thru 5:
- Exhibit 2. Letter agreement of January 22, 1987
- 24 between South Coast Medical Center, 31872
- 25 Coast Highway, South Laguna, California
- 26 92677 and SCE.

1	Exhibit 3.	Letter agreement of January 22, 1987
2		between Mission Community Hospital, 27700
3		Medical Center Road, Mission Viejo,
4		California 92691 and SCE.
5	Exhibit 4.	Letter agreement of January 22, 1987
6		between San Clemente General Hospital, 654
7		Camino De Los Mares, San Clemente,
8		California 92672 and SCE.
9	Exhibit 5.	Letter agreement of January 22, 1987
10		between Tri-City Hospital, 4002 Vista Way,
11		Oceanside, California 92056 and SCE.
12	Each hospital is ac	credited by the Joint Commission on
13	Accreditation of Ho	spitals.
14	The agree	ments each provide for temporary house
15	privileges for desi	gnated SCE physicians to assist in the care
16	and treatment of co	ntaminated injured individuals if
17	necessary. The agr	eements specifically contemplate treatment
18	of members of the g	eneral public as well as SCE personnel or
19	other individuals w	ho may have been injured at the station.
20	Each of t	he agreement hospitals maintains its
21	emergency room on a	continuous basis. Each hospital has on
22	its staff doctors c	apable of treating patients who have
23	suffered excess rad	iation exposure or are contaminated with
24	radiation and are t	raumatically injured. Additionally, each
25	hospital has on its	staff, nurses who are trained and capable
26	of treating the abo	ve described patients. Both doctors and

- 1 nurses could respond in a very short time in the event of an
- 2 accident.
- 3 SCE has in its employ, in the vicinity of SONGS,
- 4 three medical doctors capable of treating injured,
- 5 contaminated individuals.
- 6 Licensees also have arrangements with three
- 7 independent physicians who are equally qualified. Copies of
- 8 their agreements are attached hereto as:
- 9 Exhibit 6. Letter agreement of February 4, 1987 from
- 10 F.C. Jackley of SCE to John P. Chard, M.D.
- 11 Exhibit 7. Letter agreement of February 4, 1987 from
- 12 F.C. Jackley of SCE to Joseph F. Ross, M.D.
- 13 Exhibit 8. Letter agreement of February 4, 1987 from
- 14 F.C. Jackley of SCE to Bernard L. Bundy,
- '15 M.D.
- 16 Physicians from each of the above three groups would
- 17 be available on short notice in the event of an emergency
- 18 situation at SONGS.
- In addition to Licensee's agreements, the County of
- 20 Orange and the County of San Diego have, as a part of their
- 21 response plans, understandings with other hospitals located
- 22 within the respective counties. Said hospitals are accredited
- 23 by the JCAH. The listing of available regional hospitals is
- 24 found in the respective county plans as set forth in
- 25 Exhibits 9 and 10.
- 26 ///

1	Exhibit 9.	County of Orange, Incident Response Plan
2		for San Onofre Nuclear Generating Station,
3		Interjurisdictional Procedures No. 12,
4		Attachments 7.6 and 7.7.
5	Exhibit 10.	San Diego County Nuclear Plant Emergency
6		Response Plan, Standard Operating
7		Procedure No. 12, Attachment 6.
8	The hospit	tals listed in Exhibits 9 and 10 have an
9	approximate total nu	umber of beds of: San Diego 1,431, and
10	Orange 5,553.	
11	B. Trans	sportation Arrangements.
12	Licensee :	SCE has entered into agreements with two
13	private companies as	s well as the City of San Clemente Fire
14	Protection Departmen	nt for ambulance services. Said agreements
15	are attached hereto	and incorporated herein as Exhibit 11, 12
16	and 13.	
17	Exhibit 11.	Letter agreement of January 22, 1987
18		between Scudders Ambulance Company, 25260
19		East La Paz Road, Suite 4, Laguna Hills,
20		California 92654 and SCE.
21	Exhibit 12.	Letter agreement of March 23, 1987 between
22		Med Air, Flight Operations, P.O.
23		Box C-11912, Santa Ana, California 92711
24		and SCE.
25	Exhibit 13.	Agreement of May 6, 1987 between the City
26		of San Clemente and SCE.

1	In each instance the agreement provides for
2	transportation of injured contaminated individuals, who may be
3	members of the general public as well as SCE employees and
4	other station personnel, to the appropriate hospital.
5	In the event it is necessary to resort to the use of
6	the regional hospitals listed in the Orange and/or San Diego
7	County plans, transportation would be provided either by the
8	contract ambulance service or through mass transportation
9	pursuant to county direction. As reflected in both San Diego
10	and Orange County plans, in the event necessary, the municipal
11	bus facilities would be available to transport contaminated or
12	exposed patients. These preparations are reflected in
13	Exhibits 14 and 15 which are portions of the Orange and San
14	Diego County plans and which, by this reference are
15	incorporated herein.
16	Exhibit 14. County of Orange Incident Response Plan
17	for San Onofre Nuclear Generating Station
18	Interjurisdiction Procedure No. 9
19	(Transportation)
20	Exhibit 15. San Diego County Nuclear Plant Emergency
21	Response Plan, Standard Operating
22	Procedure No. 9 (Transportation)
23	C. Training.
24	SCE has had in place for several years, programs to
25	train hospital workers and ambulance drivers in the
26	appropriate treatment and handling of contaminated injured

1 individuals. Examples of these training programs are attached

2 hereto as Exhibits 16 and 17 and are incorporated by reference

3 herein.

5

7

8

11

12

13

14

17

20

23

24

4 Exhibit 16. The Handling and Treatment of

Radioactively Contaminated and Injured

6 Patient(s) by Emergency Department

Physicians and Nurses, Prepared for

Tri-City Hospital, Oceanside, CA.

9 Exhibit 17. The Handling and Treatment of

10 Radioactively Contaminated and Injured

Patient(s), By Emergency Department

Physicians and Nurses, Prepared for

Scudders Ambulance Service and San

Clemente Paramedic Units.

15 These exhibits reflect materials utilized as part of

16 Licensees' most recent training programs.

D. Exercises and Drills.

18 Medical Emergency Drills have been conducted at

19 least annually since 1981. The drills have involved the

participation of some, if not all, of the local medical

21 support personnel and organizations (e.g., physicians,

22 ambulance services and hospitals) and have involved simulated

contaminated/injured individuals. Drills have been a part of

the annual exercise and have also been conducted separately.

25 ///

26 ///

1	1	7. CONCLUSION	
2	Licensees submit that the foregoing arrangements		
3	fully satisfy the requirement	ents of 10 C.F.R. 50.47(b)(12).	
4	Dated: June 29, 1987	Respectfully submitted,	
5		DAVID R.PIGOTT CATHERINE K. O'CONNELL	
6		ORRICK HERRINGTON & SUTCLIFFE	
7		CHARLES R. KOCHER JAMES A. BEOLETTO	
8		SOUTHERN CALIFORNIA EDISON COMPANY	
10		DAVID R. PIGOTT	
11		Attorneys for Licensees	
12		Southern California Edison Company, San Diego Gas &	
13		Electric Company City of Anaheim, California and City of	
14		Riverside, California	
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
30			

1	DECLARATION OF SERVI	CE OF MAIL	DOCKETER
2			
3	I am over the age of eighte	en years and not	87 JUN 30 P3
4	to the above-entitled cause. My busi	ness address is 6	SOOF
5	Montgomery Street, 14th Floor, San Fr	ancisco, Californ	nia 94111.
6	I served the foregoing LICE	NSEES' SUBMITTAL	RE
7	EMERGENCY MEDICAL SERVICES (10 C.F.R.	50.47(b)(12)) da	ated
8	June 29, 1987, by depositing a true c	opy thereof in th	ne United
9	States mail in San Francisco, Califor	nia, on June 29,	1987,
10	enclosed in a sealed envelope with po	stage thereon ful	lly
11	prepaid, addressed as follows:		
12 13 14	* Stephen F. Eilperin, Esq. Chairman, Atomic Safety and Licensing Appeal Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555		
15 16 17	* Dr. Reginald L. Gotchy Atomic Safety and Licensing Appeal Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555	Dr. Cadet H. Has Administrative c/o Bodega Maris University of C. P.O. Box 247 Bodega Bay, CA	Judge ne Laboratory alifornia
18 19 20	* Dr. W. Reed Johnson Atomic Safety and Licensing Appeal Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555	Mrs. Elizabeth : Administrative Oak Ridge Natio Oak Ridge, TN	Judge nal Laboratory
21 22 23 24	* Sheldon J. Wolfe, Chairman Administrative Judge Atomic Safety and Licensing Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555	Robert Dietch, Southern Califo Edison Co. 2244 Walnut Gro	Vice President rnia ve Avenue
25			

:34

1	*	Lawrence J. Chandler, Esq. Donald F. Hassell, Esq.		Charles James A.
2		Nuclear Regulatory Commission Office of the Executive Legal		
3		Director Washington, D.C. 20555		2244 Wal Rosemead
4		Mrs. Lyn Harris Hicks		Mr. Lloy
5		G U A R D 3908 Calle Ariana		2089 Foo Vista, C
6		San Clemente, CA 92801		James F.
7	*	Richard J. Wharton, Esq. University of San Diego		State Ge Division
8		School of Law Alcala Park		1416 Nin Sacramen
9		San Diego, CA 92110		Phyllis
10	*	Janice E. Kerr, Esq. J. Calvin Simpson, Esq.		1695 W. Suite 22
11		Lawrence Q. Garcia, Esq. California Public Utilities		Anaheim,
12		Commission 5066 State Building		Atomic S Appeal
13		San Francisco, CA 94102		U.S. Nuc
14	*	Charles E. McClung, Jr., Esq. 24012 Calle de la Plata		Washingt
15		Suite 330 Laguna Hills, CA 92653		Atomic S Board
16		Alan R. Watts, Esq.		U.S. Nuc
17		Rourke & Woodruff 701 & Parker St., #7000		Washingt
18		Orange, CA 92668-4702	*	Samuel Secretar
19	*	James C. Holcombe Louis Bernath		U.S. Nuc
20		San Diego Gas & Electric Co. 101 Ash Street		Washingt
21		San Diego, CA 92101		
22				
23				
24	*	VIA Federal Express		
25				

Charles R. Kocher, Esq. James A. Beoletto, Esq. Southern California Edison Co. 2244 Walnut Grove Avenue Rosemead, CA 91770

Mr. Lloyd von Haden 2089 Foothill Drive Vista, CA 92083

James F. Davis
State Geologist
Division of Mines and Geology
1416 Ninth Street, Room 1341
Sacramento, CA 95814

Phyllis M. Gallagher, Esq. 1695 W. Crescent Avenue Suite 222 Anaheim, CA 92801

Atomic Safety and Licensing Appeal Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555

Atomic Safety and Licensing Board U.S. Nuclear Regulatory Commission Washington, D.C. 20555

* Samuel J. Chilk
Secretary of the Commission
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

1	Executed on June 29, 1987, in the City and County of
2	San Francisco, State of California.
3	I declare under penalty of perjury that the
4	foregoing is true and correct.
5	
6	Christine P. Swor
7	Christine r. Swoi
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	

86 ISE 0 215

SSINS No.: 6835 IN 86-98

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

DEC 8 1986

December 2, 1986

"HICIFAR LICENSIN

IE INFORMATION NOTICE NO. 86-98: OFFSITE MEDICAL SERVICES

Addressees:

All nuclear power reactor facilities holding an operating license or a construction permit.

Purpose:

This information notice is provided to bring to the attention of licensees a new Commission policy on offsite medical services around nuclear power plants and a Federal Emergency Management Agency (FEMA) guidance memorandum addressing that policy. It is suggested that recipients review the information for applicability to their facilities. No written response is required.

Description of Circumstances:

Attached is FEMA Guidance Memorandum MS-1, "Medical Services," that addresses implementation of the Commission policy on offsite medical services published on September 17, 1986 in the Federal Register (51 FR 32904). This Guidance Memorandum was prepared in coordination with the NRC staff. As noted in the referenced policy statement, the Commission has determined that these modifications fall under the backfit rule's exception as necessary to bring facilities into compliance with a rule of the Commission.

No written response is required by this information notice. If you have any questions about this matter, please contact the Regional Administrator of the appropriate regional office or this office.

dward L. Jordan, Director

Division of Emergency Preparedness

and Engineering Response

Office of Inspection and Enforcement

Attachments:

1. FEMA Guidance Memorandum MS-1

2. List of Recently Issued IE Information Notices

Technical Contact: Edward M. Podolak, IE

(301) 492-7290

Attachment 1 IN 86-18 December 2, 1986 Page 1 of 12



Federal Emergency Management Agency

Washington, D.C. 20472

MEMORANDUM FOR: Regional Directors

Acting Regional Directors

NOV 1 3 1986

FROM:

cLoughlin

Deputy Associate Director

State and Local Programs and Support

SUBJECT:

Guidance Memorandum (GM) MS-1, Medical Services

The attached GM MS-1, Medical Services, is forwarded for your use in providing guidance to State and local officials in developing their radiological emergency response plans and in evaluating the medical services capabilities of State and local governments.

The origins of this GM and its development and approval have been some that different from other GM's. This GM was developed as a result of a series of legal decisions involving NRC which determined that the existing interpretation of the required pre-accident medical arrangements for contaminated injured individuals was not sufficient. Those decisions led NRC to issue a policy statement (Attachment B) on September 17, 1986, indicating that the NRC staff (in consultation with FEMA) would develop detailed guidance on the necessary pre-accident arrangements for medical services by November 17, 1986.

We have worked closely with NRC in recent weeks in the preparation of this guidance. Unfortunately, the short deadline did not permit our usual procedure of obtaining Regional and other comments before issuing this final guidance.

If you have any questions about MS-1, you may contact James Thomas at 646-2808. A list of all current operative QM's (Attachment C) is also provided for your information.

ATTACHMENTS:

A. GM MS-1, Medical Services

B. Emergency Planning - Medical Services, September 17, 1986, 51 FR 32904

C. List of Operative GM's



Federal Emergency Management Agency Washington, D.C. 20472

NOV 1 3 1986

GUIDANCE MEMORANDUM MS-1
MEDICAL SERVICES

Purpose

This Guidance Memorandum (GM) provides interpretation and clarification of requirements contained in the Nuclear Regulatory Commission rule, 10 CFR 50.47 (b)(12) and the associated guidance in NUREG-0654/FEMA-REP-1, Revision 1, related to the provision of medical services for members of the general public.

Background

The background is contained in a policy statement from the Nuclear Regulatory Commission (NRC) titled "Emergency Planning - Medical Services" (51 FR 32904). In this policy statement, NRC states its belief that 10 CFR 50.47(b)(12) ("arrangements are made for medical services for contaminated injured individuals") requires pre-accident arrangements for medical services (beyond the maintenance of a list of treatment facilities) for individuals who might be severely exposed to dangerous levels of offsite radiation following an accident at a nuclear power plant. As used in 10 CFR 50.47(b)(12) and planning Standard "L" of NUREG-0654/FEMA-REP-1, Revision 1, the term "contaminated injured" means 1) contaminated and otherwise physically injured; 2) contaminated and exposed to dangerous levels of radiation; or 3) exposed to dangerous levels of radiation.

Guidance

10 CFR 50.47 (b)(12) requires that "Arrangements are made for contaminated injured individuals." In its policy statement the NRC determined that this standard requires pre-accident arrangements for medical services for offsite individuals who might be exposed to dangerous levels of radiation following an accident at a nuclear power plant. The following guidance applies to the evaluation of the medical services aspects of State and local emergency plans under the criteria in NUREG-0654/FEMA-REP-1.

Standards, Evaluations Criteria, Areas of Reviews and Acceptance Criteria

A. Assignment of Responsibility (Organization Control)

Planning Standard

Primary responsibilities for emergency response by the nuclear facility licensee, and by State and local organizations within the Emergency Flanning Zones have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

A.3. Evaluation Criterion

Each plan shall include written agreements referring to the concept of operations developed between Federal. State, and local agencies and other support organizations having an emergency response role within the Emergency Planning Zones. The agreements shall identify the emergency measures to be provided and the mutually acceptable criteria for their implementation, and specify the arrangements for exchange of information. These agreements may be provided in an appendix to the plan or the plan itself may contain descriptions of these matters and a signature page in the plan may serve to verify the agreements. The signature page format is appropriate for organizations where response functions are covered by laws, regulations or executive orders where separate written agreements are not necessary.

Areas for Review and Acceptance Criteria

State or local governments should obtain written agreements with the listed medical facilities (Planning Standard L. Evaluation Criteria 1 and 3) and transportation providers (Planning Standard L. Evaluation Criterion 4). The written agreements should contain simple assurances that the providers have adequate technical information (e.g. treatment protocols) and treatment capabilities for handling "contaminated injured" individuals. An indication of Joint Commission on Accreditation of Hospitals (JCAH) accreditation will suffice for such assurance. (Note: Veterans Administration (VA), military and other government hospitals are not usually accredited by JCAH but usually have the desired capabilities.) If state or local governments do not obtain written agreements, the licensee should obtain written agreements with the listed medical facilities and transportation providers. If good faith efforts are not successful in a particular case, the licensee shall provide or arrange for adequate compensatory measures, e.g., obtain written agreements with other providers or provide temporary field medical care.

L. Medical and Public Health Support

Planning Standard

Arrangements are made for medical services for contaminated injured individuals.

L.1. Evaluation Criterion

Each organization shall arrange for local and backup hospital and medical services having the capability for evaluation of radiation exposure and uptake, including assurance that persons providing these services are adequately prepared to handle contaminated individuals.

Areas for Review and Acceptance Criteria

There should be one primary local hospital and one backup hospital for each site for the evaluation and emergency treatment of "contamination injured" members of the general public. Hospitals are generally distributed proportional to the population. Thus, at sites with low population and few hospitals, the primary local and backup hospitals for members of the general public could be the same as those for the utility employees and emergency workers.

L.3. Evaluation Criterion

. ! .

Each State shall develop lists indicating the location of public, private and military hospitals and other emergency medical services facilities within the State or contiguous States considered capable of providing medical support for any contaminated injured individual. The listing shall include the name, location, type of facility and capacity and any special radiological capabilities. These emergency medical services should be able to radiologically monitor contaminated personnel, and have facilities and trained personnel able to care for contaminated injured persons.

Areas for Review and Acceptance Criteria

The lists should be annotated to indicate the ambulatory/non-ambulatory capacities for providing medical support for "contaminated injured" members of the general public and any special radiological capabilities. This will enable state and local officials to direct members of the general public to those institutions capable of handling "contaminated injured" patients. In the event that local and regional medical resources need to be supplemented, additional medical resources would be available through the Federal Radiological Emergency Response Plan. These resources would include the Radiation Emergency Assistance Center/Training Site at Oak Ridge, Tennessee and the National Disaster Medical System with headquarters in Rockville, Maryland.

L.4. Evaluation Criterion

Each organization shall arrange for transporting victims of radiological accidents to medical support facilities.

Areas for Review and Acceptance Criteria

Because the early symptoms of persons exposed to dangerous levels of radiation are usually limited to nausea and vomiting, ambulances may not be required to transport such persons to medical facilities. Rather, non-specialized public and private vehicles can be used, supported, if necessary, with agreements in accordance with A.3. above. For other types of contaminated injured individuals, specialized transportation resources (e.g., ambulances) would be necessary and should be assured by agreements, if necessary, in accordance with A.3. above. Provisions should be made for the use of contamination control in transporting contaminated persons to medical facilities.

Planning Standard

O. Radiological Emergency Response Training

Radiological emergency response training is provided to those who may be called on to assist in an emergency.

O.4. Evaluation Criterion

Each organization shall establish a training program for instructing and qualifying personnel who will implement radiological emergency response plans. The specialized initial training and periodic retraining programs (including the scope, nature and frequency) shall be provided in the following categories:

h. Medical support personnel

Areas for Review and Acceptance Criteria

Each hospital listed under Evaluation Criteria L.1 and L.3. shall have at least one physician and one nurse on call within about 2 hours who can supervise the evaluation and treatment of radiologically "contaminated injured" members of the general public. There are several sources for this training including NRC licensee sponsored training. Transportation providers should have basic training in contamination control. Examples include but are not limited to:

- FEMA handbook, videotape, slides and instruction manual titled "Hospital Emergency Department Management of Radiation Accidents," SM 80/1984.
- Courses from The Radiation Emergency Assistance Center/Training Site (REAC/TS) at Oak Ridge Associated Universities.
- Audiocassette and text course, "Radiation Accident Preparedness: Medical and Managerial Aspects" by Science-Thru-Media Inc., 303 Fifth Avenue, Suite 803, New York, NY 10016.

N. Exercises and Drills

Planning Standard

Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.

N.2. Evaluation Criterion

A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. A drill is often a component of an exercise. A drill shall be supervised and evaluated by a qualified drill instructor. Each organization shall conduct drills, in addition to the biennial annual* exercise at the frequencies indicated below:

c. Medical emergency drills

A medical emergency drill involving a simulated contaminated individual which contains provisions for participation by the local support services agencies (i.e., ambulance and offsite medical treatment facility) shall be conducted annually. The offsite portions of the medical drill may be performed as part of the required biennial annual* exercise.

Areas for Review and Acceptance Criteria

State or local governments should provide for the conduct of appropriate drills and exercises which include "contaminated injured" individuals. These medical emergency drills involving the primary local (L.1.) hospital for state and local governments should be conducted annually. These drills should also test the capability of relocation centers to direct "contaminated injured" members of the general public to the appropriate hospital. If State or local governments cannot provide for the cordect of the drills, the licensee shall provide for the conduct of such drill. If good faith efforts are not successful in a particular case, the licensee shall provide or arrange for adequate compensatory measures.

Implementation

State and local emergency response plans should reflect the provisions of this GM at the next annual update following 9 months from the effective date of this GM.

Plans for plants that do not have a full power operating license should reflect the provisions of this GM within 9 months of the effective date of this GM. The first medical drill reflecting the provisions of this GM should be conducted by the end of the next biennial exercise following 1 year from the effective date of this GM.

^{*}Changes reflect language incorporated into GM PR-1.

Attachment 1 IN 86-98 December 2, 1986 Page 7 of 12

-6-

NRC Coordination

This Guidance Memorandum has been prepared in coordination with the NRC staff. As noted in the referenced NRC Policy Statement, the Commission has determined that these modifications fall under the backfit rule's exception as necessary to bring facilities into compliance with a rule of the Commission.

Attachment B

32904 Federal Register / Vol. 31. No. 180 / Wednesday, September 17, 1986 / Roles and Regulations

such additional arrangements, the Commission leaves to the informed judgment of the NRC staff, subject to general guidance from the Commission, the exact parameters of the minimally necessary arrangements for medical services. To fulfill this mandate the staff (and FEMA) will issue appropriate guidance to licensees, applicants, and state and local governments.

The United States Court of Appeals for the District of Columbia ("Court") vacated and remanded a previous Commission interpretation of planning standard (b)(12) which required only the development and maintenance of a list of treatment facilities on which postevent, od hoc arrangements for medical treatment could be based. GUARD v. NRC. 753 F.2d 1144 (D.C. Cir. 1985). Pending fine! Commission action in response to the CUARD remand, the Commission issued a statement of interim guidance which permitted. pursuant to 10 CFR 50.47(c)(1), the issuance of full power licenses where the applicant satisfied the requirements of planning standard (b)(12) as interpreted by the Commission prior to GUARD, and where the applicant committed to full compliance with the Commission's final response to the GUARD remand. The Commission's prior interim guidance will continue to govern the fasuance of full power licenses until issuance and implementation of the NRC staff's specific guidance on this matter, at which point the new policy will apply. EFFECTIVE DATE: September 17, 1988. FOR FURTHER INFORMATION CONTACT: C. Sebastian Aloot, Office of the General Counsel, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Telephone (202) 634-3224.

NUCLEAR REGULATORY

10 CFR Part 50

Emergency Planning—Medical Services

Anemory: Nuclear Regulatory
Commission.
Action: Statement of Policy on
Emergency Planning Standard 10 CFR
50 47(b)[12].

BUMMARY: The Nuclear Regulatory
Commission ("NRC" or "Commission")
believes that 10 CFR 50.47(b)(12)
["planning standard (b)(12)"] requires
pre-accident arrangements for medical
services (beyond the maintenance of a
list of treatment facilities) for
individuals who might be severely
exposed to dangerous levels of offsite
radiation following an accident at a
nuclear power plant. While concluding
that planning standard (b)(12) requires

1. Introduction

In the wake of the Three Mile Island accident in 1979, the Nuclear Regulatory Commission ("NRC" or "Commission") promulgated regulations requiring its licensees and applicants for licensees to operate commercial nuclear power reactors to develop plans for emergency responses to accidents at their facilities. Among those requirements was 10 CFR 50 47(b)(12) ("planning standard (b)(12)"), which provides:

BUPPLEMENTARY SIFORMATIONE

(b) The onsite and offsite emergency response plan for nuclear power reactors must meet the following standards:

(12) Arrangements are made for medical services for contaminated injured individuals.

In Southern California Edison Company, et al. (Sen Onofre Nuclear Cenerating Station, Units 2 and 3), CLI-83-10, 17 NRC 528 (1983) ("SONGS)

decision"), the Commission Itself faced for the first time the question whether plenning standard (b)(12) applied to members of the public who were exposed to offsite redistion following an accident at a nuclear power facility but were not otherwise injured, and if so to what extent In considering this question, the Commission sought the views of the parties in the SONGS proceeding, reviewed the principal purposes of the pleaning standard. analyzed the likelihood of serious exposures to the public requiring emergency medical treatment, and evaluated the type of emergency treatment likely to be required. Based on this review, the Commission concluded as a generic matter that: (1) Planning standard (b)(12) applied to individuals both onsite and offsite: (2) "contaminated injured individuals" was intended to include seriously irrediated members of the public as well as members of the public who are not seriously trradiated but also are treamatically injured from other causes and radiologically contaminated; and (3) Adequate, post-accident arrangements for pecessary medical treatment of exposed members of the public could be made on an od hoc basis if emergency plane contained a list of local treatment facilities.

On appeal the United States Court of Appeals for the D.C. Circuit concluded that the Commission had not ressonably interpreted planning standard (b)(12) when it generically found that a preaccident list of treatment facilities constituted "emangements" for postaccident medical treatment GUARD v. NRC, 753 F.2d 1144 (D.C. Cir 1985). For this reason, the Court vacated and remanded that part of the Commission's SONGS decision that bad interpreted planning standard (b)(12) to require only the preparation of a list of local treatment facilities. However, in doing so, the Court made clear that the Commission had on remand, in its sound discretion, flexibility in fashioning a reasonable interpretation of planning etenderd (b)(12).

II. Arrangements Beyond A List Of Treatment Facilities Required

When originally faced with the question whether the phrase "contaminated injured individuals" was intended to encompass, inter alia. members of the public who, as a result of an accident, were exposed to dangerous levels of radiation, the Commission found no explicit and conclusive definition of the phrase in the regulation itself or its underlying documents. Nonetheless, the

Commission concluded that the prudent risk reduction purpose of the Commission's regulations required interpreting planning standard (b)(12) to apply to such offsite exposed individuals, given the underlying essumption of the NRC's emergency planning regulations that a serious accident could occur and the Commission presumption that such an accident could result to offsite Individuals being exposed to dangerous levels of radiation (a presumption concurred in by the Federal Emergency Management Agency). After reconsideration of this matter following the CUARD decision, the Commission has decided to re-affirm this prior interpretation of planning standard (b)(12).

However, the Commission has come to a different result with respect to the minimum arrangements necessary for Individuals who might be seriously exposed, but not otherwise injured to a rediologic emergency. In onginelly resolving the scope of arrangements Issue, the Commission focused on the particular needs of offsite exposed individuals for emergency medical treatment of their radiation injury in this fashion, the Commission made a distinction between the need for Immediate or near-term medical care. which was in its view the goal of planning standard (b)(12), and the need for long term medical care. As to exposed individuals, the Commission found that:

the special bazard is posed by the radiation exposure to the patient. The nature of radiation injury is that, while medical treatment may be eventually required in cases of extreme exposure the patients are unlikely to need emergency medical care (footnote omitted). The non-immediacy of the treatment required for radiation exposed individuals provides onesic and offsite authorities with an additional particle of time to arrange for the required medical service.

From this, the Commission reasoned that the long-term treatment needs of exposed individuals could be adequately met on ad had basis.

After reconsideration is light of the GUARD decision, the Commission has concluded that some additional planned arrangements beyond the development of a list of treatment facilities are necessary to provide additional assurance of effective management of emergency medical sendoes in the hours or days following a severe socident However, the Commission continues to believe that the long term treatment needs of exposed individuals can be adequately met on of hoc basis.

The minimally necessary arrangements for the person that may be exposed need not be elaborate. As previously stated by the Commission. [i]! was never the intent of the regulations to require directly or indirectly that state and local governments adopt extraordinary measures, such as construction of additional hospitals or recruitment of substantial additional medical personnel, just to deal with padeur plant accidents." 17 NRC at 533. Rather, the Commission believes that satisfactory errangements should include (1) a list of local or regional medical treatment facilities and transportation providers appropriately annotated to show their capacities, special capabilities or other unique characteristics. (2) a good faith reasonable effort by licensees or local or state governments to facilitate or obtain written agreements with the listed medical facilities and transportation providers. (3) provision for making available necessary training for emergency response personnel to identify, transport and provide emergency first aid to severely exposed Individuals, and (4) a good faith reasonable effort by licensees or state or local governments to see that appropriate drills and exercises are conducted which include simulated severely-exposed individuals. If good faith efforts are not successful to a particular case, the licensee shall provide or arrange for adequate compensatory measures consistent with the Commission's totent to turn't the need for extraordinary measures noted above. The compensatory measures must be approved by NRC. This level of planning would help (1) provide additional assurance of the cooperation of medical facilities (2) ensure proper training (3) ensure the availability of transportation, and (4) demonstrate a capability to provide necessary services through drills and exercises

The Commission has directed the staff to develop, consistent with this interpretation of the planning standard. detailed and specific guidance on the nature of the medical services to be available to exposed individuels and on the application of planning standard (b)(12) to NRC licensees and applicants for licenses to operate commercial nuclear power reactors. The Commission has also directed the staff to consider whether and under what critena it is necessary or appropriate for the staff to wently the appropriateness of training and dolls or exercises sesociated with the handling of severely exposed persons.

The Commission has determined that the arrangements contemplated under this Statement of Policy are the minimum required by a ressonable reading of planning standard (b)(12). Accordingly, although implementation of this reading of the standard will entail some additions to, and some modifications of the emergency procedures and organizations for which licensees are ultimately responsible, the requirements of the backfit rule. 10 CFR 50 109 (1986), for a cost-benefit analysis and a finding that the costs of the modifications are justified by a substantial increase in safety are not applicable, since these modifications fall under the backfit rule's exception for modifications necessary to bring facilities into compliance with a rule of the Commission. See 10 CFR 50:109 (a)(2) and (a)(4) (1986). The analysis which the backfit rule requires be done to justify the application of any of its exception provisions constitutes the core of this Statement of Policy. See Id.

III. Interim Guidance

In its prior statement of policy, the Commission identified three lactors which justified an interim policy of granting applicants for full-power license an equitable exception to the requirements of planning standard (b)(12) under 10 CFR 50.47(c)(1) where the applicant satisfied the requirements of planning standard (b)(12) as interpreted by the Commission prior to the CUARD decision and committed itself to full compliance with am additional requirements imposed by the Commission in response to the GUARD remand Statement of Policy on Emergency Planning Standard 10 CFR 50 4"(b)(12), 50 FR 20851 (May 21, 1885). The three factors were: (1) the poss bility that the scope of planning standard (b)(12) would be braited (2) the possibility that delay in compliance with the post-CUARD requirements could be found to be insignificant due to the low probability of accidents during the interim period, and (3) the possibility of "other compelling ressans" justifying a bile! exception where applicants had relied to good faith upon prior Commission interpretation of planning standard (b)(12).

In this Statement of Policy Interpreting planning standard (b)(12) the Commission directs the NRC staff to develop (in consultation with FEMA) and issue by 11/17/86 appropriate detailed guidance on the exact contours of the necessary amangements consistent with the Commission's determination that planning standard (b)(12) require arrangements for medical

32906 Federal Register / Vol. 51, No. 100 / Wednesday, September 17, 1988 / Rules and Regulations

services (beyond the maintenance of a list of pre-existing treatment facilities) for offsite exposed individuals. The Commission believes that the last two fectors, discussed in detail in its May 21. 1963 Statement of Policy, continue to fustify relience on the Interim guidence for the period necessary for the NRC staff to leave and licensees, applicants. and state and local governments to implement the detailed guidance. Therefore, until appropriate detailed guidance consistent with this policy statement is issued and implemented. the Licensing Boards may continue to reasonably find that any hearing regarding compliance with 10 CFR 50.47(b)(12) shall be limited to issues which could have been heard before the Court's decision in GUARD v. NRC.

Dated at Washington, DC. this 12th day of September, 1986.

For the Nuclear Regulatory Commission.
Samuel J. Chilk.
Secretary of the Commission.
[FR Drac 86-21058 Filed 9-18-86. 6:45 am]
SALLING CODE 7500-91-81

Attachment 1 IN 86-98 December 2, 1986 Page 11 of 12



Federal Emergency Management Agency

Washington, D.C. 20472

Attachment C

November 13, 1986

OPERATIVE GUIDANCE MEMORANDA

Number	Date	<u>Title</u>
4	4/1/80	Radio Transmission Frequencies and Coverage
5	4/1/80 (Revised- 10/19/83)	Agreements Among Governmental Agencies and Private Parties
8	4/2/80 (Revised- 10/19/83)	Regional Advisory Committee Coordination with Utilities
16	8/7/80	Standard Regional Reviewing and Reporting Procedures for State and Local Radiological Emergency Response Plans
17	1/8/81	Joint Exercise Procedures
18	5/21/81 (Revised- 10/19/83)	FEMA Action to Qualify Alert and Notification Systems Against NUREG-0654/FEMA-REP-1, Rev. 1
20	10/19/83	Foreign Language Translation of Public Education Brochures and Safety Messages
21	2/27/84	Acceptance Criteria for Evacuation Plans
22	10/19/83	Recordkeeping Requirements for Public Meetings
24	4/5/84	Radiological Emergency Preparedness for Handicapped Persons
EX-1	7/15/85	Remedial Exercises
EX-2	7/15/85	Staff Support in Evaluating REP Exercises
PR-1	10/1/85	Policy on NUREG-0654/FEMA-REP-1 and 44 CFR 350 Periodic Requirements

77-1	10/1/85	A Guide to Documents Related to the REP Program
PI-1	10/2/85	FEMA Action to Pilot Test Guidance on Public Information Materials and Provide Technical Assistance on Its Use
FR-1	12/3/85	Federal Response Center
MS-:	11/13/86	Medical Services
EV-2*	11/13/86	Protective Actions for School Children

^{*}GM-21 will be retitled as GM EV-1 when it is revised.

Jan Cor man

FEB 05 1987 RECEIVED

Southern California Edison Company

P 0. BOX 4198

SAN CLEMENTE. CALIFORNIA 92672

F C BUD JACKLEY
MANAGER NUCLEAR AFFAIRS
AND EMERGENCY PLANNING

RECEIVED

TELEPHONE (714) 368-8316

January 22, 1987

JAN 30 15 87

ADMINISTRATION SCMC

South Coast Medical Center 31872 Coast Highway South Laguna, California 92677

Attn: Mr. Paul McQuade, Administrator

SUBJECT: Agreement for Medical Treatment Facilities

Dear Mr. McQuade:

This letter confirms the Agreement between South Coast Medical Center (the "Hospital") and Southern California Edison Company ("SCE") concerning provision of medical treatment facilities for the general medical treatment of SCE personnel from San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for other individuals suffering from injuries, injuries complicated by radiation contamination, or excessive radiation exposure as a consequence of activity at the Station. Staff training and certain equipment to support the handling of radiation contaminated patients will be provided by SCE.

Confirmation of this Agreement is based on our current understanding that:

- 1. The Hospital has the physical capacity, personnel, medical equipment and resources to handle a radiation contaminated patient as a result of an accident at the Station and is accredited by the Joint Commission on Accreditation of Hospitals (JCAH).
- The Hospital has or will grant temporary house privileges through the appropriate procedures as defined by the Medical Staff bylaws to those designated physicians who have their up-to-date credentials and license on file with the Hospital and have contracted with SCE to provide treatment or consultation to SCE personnel and other individuals who have been injured at the Station or individuals from communities in vicinity of the Station who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.

By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical treatment services to SCE in support of the operation of the Station:

- Hospital care and treatment for SCE personnel or other individuals in support of Station operations who have been injured at the Station; or who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.
- 2. Hospital care and treatment for individuals from communities in the vicinity of the Station injured as a result of activities at the Station, whose injuries may be complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

200 DAY OF Till

, 1987

BY:

Administrator

South Coast Medical Center

am-> melay MICEIVED & MAN 3 0 19 Southern Cellfornia Edison Company P O BOX 4198 SAN CLEMENTE, CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS (714) 368 6316 AND EMERGENCY PLANNING January 22, 1987 Mission Community Hospital 27700 Medical Center Road Mission Viejo, California 92691 Attn: Mr. George McLay, Executive Director SUBJECT: Agreement for Medical Treatment Facilities Dear Mr. McLay: This letter confirms the Agreement between Mission Community Hospital (the "Hospital") and Southern California Edison Company ("SCE") concerning provision of medical treatment facilities for the general medical treatment of SCE personnel from San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for other individuals suffering from injuries, injuries complicated by radiation contamination, or excessive radiation exposure as a consequence of activity at the Station. Staff training and certain equipment to support the handling of radiation contaminated patients will be provided by SCE. Confirmation of this Agreement is based on our current understanding that: The Hospital has the physical capacity, personnel, medical equipment and resources to handle a radiation contaminated patient as a result of an accident at the Station and is accredited by the Joint Commission on Accreditation of Hospitals (JCAH). 2. The Hospital has or will grant temporary house privileges through the appropriate procedures as defined by the Medical Staff bylaws to those designated physicians who have their up-to-uate credentials and license on file with the Hospital and have contracted with SCE to provide treatment or consultation to SCE personnel and other individuals who have been injured at the Station or individuals from communities in vicinity of the Station who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station. EX. 3

By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical treatment services to SCE in support of the operation of the Station:

- 1. Hospital care and treatment for SCE personnel or other individuals in support of Station operations who have been injured at the Station; or who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.
- 2. Hospital care and treatment for individuals from communities in the vicinity of the Station injured as a result of activities at the Station, whose injuries may be complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

/

Xm

Executive Director

Mission Community Hospital

Southern California Edison Company P O BOX 4198 SAN CLEMENTE. CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS AND EMERGENCY PLANNING (714) 368 8316 January 22, 1987 San Clemente General Hospital 654 Camino De Los Mares San Clemente, California 92672 Attn: Mr. Thomas W. McClintock, Administrator SUBJECT: Agreement for Medical Treatment Facilities Dear Mr. McClintock: This letter confirms the Agreement between San Clemente General Hospital (the "Hospital") and Southern California Edison Company ("SCE") concerning provision of medical treatment facilities for the general medical treatment of SCE personnel from San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for other individuals suffering from injuries, injuries complicated by radiation contamination, or excessive radiation exposure as a consequence of activity at the Station. Staff training and certain equipment to support the handling of radiation contaminated patients will be provided by SCE. Confirmation of this Agreement is based on our current understanding that: 1. The Hospital has the physical capacity, personnel, medical equipment and resources to handle a radiation contaminated patient as a result of an accident at the Station and is accredited by the Joint Commission on Accreditation of Hospitals (JCAH). The Hospital has or will grant temporary house privileges through the appropriate procedures as defined by the Medical Staff bylaws to those designated physicians who have their up-to-date credentials and license on file with the Hospital and have contracted with SCE to provide treatment or consultation to SCE personnel and other individuals who have been injured at the Station or individuals from communities in vicinity of the Station who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station. EX. 4

By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical treatment services to SCE in support of the operation of the Station:

- Hospital care and treatment for SCE personnel or other individuals in support of Station operations who have been injured at the Station; or who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.
- Hospital care and treatment for individuals from communities in 2. the vicinity of the Station injured as a result of activities at the Station, whose injuries may be complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

Administrator

San Clemente General Hospital

Tri-City Medical Center
4002 Vista Way, Oceanside, California 92056, (619) 724-8411

Richard A. Hachten II Chief Executive Officer

March 11, 1987

F. C. Jackley
Manager, Nuclear Affairs
and Emergency Planning
Southern California Edison Company
P.O. Box 4198
San Clemente, California 92672

MAR 16 1987 RECEIVED

Dear Mr. Jackley:

Please find attached the signed agreement for medical treatment facilities.

One issue for comment is in respect to page (1), paragraph (2), "the Hospital has or will grant temporary house privileges" etc., "as defined by the medical staff bylaws" etc. Our records indicate that no SCE related physician has been granted temporary house privileges. For your convenience and assistance please find attached Tri-City Medical Center's Medical Staff Bylaws authorizing and facilitating privileges. Tri-City Medical Center encourages SCE to designate and maintain up-to-date credentials and other related processes which would expedite patient care.

Tri-City Medical Center maintains an office and staff to assist physicians in this process. Ms. Karen Rennie, Medical Staff Coordinator, telephone number (619) 940-3001, will be happy to assist in this process.

If I can be of any further assistance, please call (619) 940-3357. Sincerely,

Joseph A. Alborn
Assistant Administrator
For General Services

JAA/dd

c: R. Hachten, C.E.O.

L. Maas, C.O.O.

K. Rennie, Medical Staff Coordinator

4:47

DUPLICATE Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY MANAGER NUCLEAR AFFAIRS AND EMERGENCY PLANNING TELEPHO (714) 368 8 January 22, 1987 Tri-City Hospital 4002 Vista Way Oceanside, California 92056 Attn: Mr. Richard A. Hachten II, Chief Executive Officer SUBJECT: Agreement for Medical Treatment Facilities Dear Mr. Hachten: This letter confirms the Agreement between Tri-City Hospital (the "Hospital") and Southern California Edison Company ("SCE") concerning provision of medical treatment facilities for the general medical treatment of SCE personnel from San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for other individuals suffering from injuries, injuries complicated by radiation contamination, or excessive radiation exposure as a consequence of activity at the Station. Staff training and certain equipment to support the handling of radiation contaminated patients will be Confirmation of this Agreement is based on our current understanding The Hospital has the physical capacity, personnel, medical 1. equipment and resources to handle a radiation contaminated patient as a result of an accident at the Station and is accredited by the Joint Commission on Accreditation of Hospitals The Hospital has or will grant temporary house privileges through the appropriate procedures as defined by the Medical Staff bylaws to those designated physicians who have their up-to-date credentials and license on file with the Hospital and have contracted with SCE to provide treatment or consultation to SCE personnel and other individuals who have been injured at the Station or individuals from communities in vicinity of the Station who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station. EX. 5

By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical treatment services to SCE in support of the operation of the Station:

- Hospital care and treatment for SCE personnel or other individuals in support of Station operations who have been injured at the Station; or who have been exposed to excessive radiation; or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.
- 2. Hospital care and treatment for individuals from communities in the vicinity of the Station injured as a result of activities at the Station, whose injuries may be complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to letter agreement is also enclosed for your records.

Very truly yours,

C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

// DAY OF

. 1987

BY:

hier Executive Officer

Tri-City Hospital

can be were Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS (714) 368 8316 AND EMERGENCY PLANNING February 4, 1987 John P. Chard, M.D. 657 Camino De Los Mares San Clemente, California 92672 SUBJECT: Agreement for Physician Services Dear Dr. Chard: This letter reconfirms the Agreement between yourself and Southern California Edison Company ("SCE") concerning the general medical treatment of personnel from the San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for any individuals suffering from injuries or injuries complicated by radiation contamination as a consequence of activity at the Station. Confirmation of this Agreement is based on our current understanding that: You are a licensed physician qualified to handle medical emergencies, including injuries complicated by radiation contamination. 2. You have access to and may expect the assistance of other medical personnel qualified to handle medical emergencies, including injuries complicated by radiation contamination. By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical services to SCE in support of the operation of the Station: Medical treatment to SCE employees in the South Coast area as a company contract physician during normal office hours. Medical treatment of Station personnel at the Station when notified of an emergency when it is inadvisable to transfer the patient to more appropriate medical facilities. EX. 6

John P. Chard, M.D. February 4, 1987

- Medical treatment of Station personnel at either the San 3. Clemente General Hospital in San Clemente, South Coast Community Hospital in Laguna, Mission Community Hospital in Mission Viejo, or the Tri-Cities Community Hospital in Oceanside upon transfer of patients to these facilities.
- Assistance to SCE in the treatment of SCE personnel or other individuals identified by SCE who have been exposed to excessive radiation or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter Agreement is also enclosed for your records.

Manager, Nuclear Affairs and Emergency Planning

BY: John P. Chard, M.D.

Som. Lann. Born. Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS (714) 368 8316 AND EMERGENCY PLANNING February 4, 1937 Joseph F. Ross, M.D. Professor of Medicine 12246 Cashmere Street Los Angeles, California 90049 SUBJECT: Agreement for Physician Services Dear Dr. Ross: This letter reconfirms the Agreement between yourself and Southern California Edison Company ("SCE") concerning the medical consultation services you will provide in support of the operation of the San Onofre Nuclear Generating Station (the "Station"). Confirmation of this Agreement is based on our current understanding that: You are a licensed physician qualified to handle medical emergencies, including radiation explosure cases as well as injury cases complicated by radiation contamination. You are qualified by education and experience to instruct 2. and train persons on preparing for and responding to the medical consequences of radiation contamination or excessive radiation exposure. You have access to and may expect the assistance of other medical personnel qualified to handle radiation exposure cases or injury cases complicated by radiation contamination. By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical services to SCE in support of the operation of the Station: Consultation relative to medical requirements and practices for SCE radiation monitoring personnel. 2. Consultation and assistance to SCE regarding arrangement with medical support facilities and medical personnel to EX. 7

Joseph F. Ross, M.D. February 4, 1987

handle patients who have been exposed to excessive radiation or who have injuries complicated by radiation contamination.

- Consultation relative to radiological medical training for SCE and other medical support personnel.
- 4. Consultation relative to the amount and availability of medical resources necessary to effectively deal with the potential offsite consequences of a major release of radiation at the Station.
- 5. Biannual review of adequacy of SCE and other medical support procedures for care of patients who have been exposed to excessive radiation, or who have injuries complicated by radiation contamination as a consequence of a radiological accident at the Station.
- Assistance to SCE in the care and treatment of SCE personnel or other individuals identified by SCE who have been exposed to excessive radiation or who have injuries complicated by radioactive contamination.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter Agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO
THIS DAY OF 1987

BV.

Por from ma Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS 714 368 8116 AND EMERGENCY PLANNING February 4, 1987 Bernard L. Bundy, M.D. 210 Avenida Del Mar San Clemente, California 92672 SUBJECT: Agreement for Physician Services Dear Dr. Bundy: This letter reconfirms the Agreement between yourself and Southern California Edison Company ("SCE") concerning the general medical treatment of personnel from the San Onofre Nuclear Generating Station (the "Station") and emergency medical treatment for any individuals suffering from injuries or injuries complicated by radiation contamination as a consequence of activity at the Station. Confirmation of this Agreement is based on our current understanding that: 1. You are a licensed physician qualified to handle medical emergencies, including injuries complicated by radiation contamination. You have access to and may expect the assistance of other medical personnel qualified to handle medical emergencies, including injuries complicated by radiation contamination. By executing acceptance of this letter, you confirm these understandings and agree to provide the following medical services to SCE in support of the operation of the Station: 1. Medical treatment to SCE employees in the South Coast area as a company contract physician during normal office hours. 2. Medical treatment of Station personnel at the Station when notified of an emergency when it is inadvisable to transfer the patient to more appropriate medical facilities. EX. 8

- Medical treatment of Station personnel at either the San 3. Clemente General Hospital in San Clemente, South Coast Community Hospital in Laguna, Mission Community Hospital in Mission Viejo, or the Tri-Cities Community Hospital in Oceanside upon transfer of patients to these facilities.
- Assistance to SCE in the treatment of SCE personnel or other individuals identified by SCE who have been exposed to excessive radiation or who have injuries complicated by radioactive contamination as a consequence of a radiological accident at the Station.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter Agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS 7th DAY OF February

Bernard L. Bundy, M.D.

COUNTY OF ORANGE INCIDENT RESPONSE PLAN FOR SAN ONOFRE NUCLEAR GENERATING STATION INTERJURISDICTIONAL PROCEDURE NO. 12, ATTACHMENTS 7.6 AND 7.7

ATTACHMENT 7.6

DECONTAMINATION SUPPORT HOSPITALS

Brea Community Hospital 380 W. Central Avenue Brea, CA 92621 529-0211

Fountain Valley Community Hospital 17100 Euclid Avenue Fountain Valley 92708 979-1211

Fullerton Community Hospital 100 E. Valley View Dr. Fullerton, CA 92635 871-1120

Hoag Memorial Hospital 301 Newport Boulevard Newport Beach 92660 645-8600

Huntington Intercommunity Hospital 17772 Beach Blvd. Huntington Beach, CA 92647 842-1473

Kaiser Foundation Hospital 441 Lakeview Avenue Araheim 92807 998-4400

La Habra Community Hospital 1251 W. Lambert Road La Habra 90631 870-5090

La Palma Intercommunity Hospital 7901 Walker St. La Palma, CA 90623 522-0150

Martin Luther Hospital Medical Center 1830 W. Romneya Drive Anaheim, CA 92803 772-1200

Mercy General Hospital 2701 S. Bristol Street Santa Ana 92704 754-5454

/nm EM10-7-13 2-1-83 Mission Community Hospital 27802 Puerta Real Mission Viejo 92675 831-2300

UC Irvine Medical Center 101 City Drive South Orange 92668 634-6011

Saddleback Community Hospital 24451 Via Estrada Laguna Hills, CA 92653 837-4500

South Coast Medical Center 31872 Coast Highway South Laguna 92677 1-499-1311

St. Joseph Hospital 1100 W. Stewart Drive Orange 92668 633-9111

St. Jude Hospital 101 E. Valencia Mesa Drive Fullerton 92632 871-3280

Tustin Community Hospital 14662 Newport Avenue Tustin 92680 838-9600

West Anaheim Community Hospital 3033 W. Orange Anaheim, CA 92804 827-3000

Western Medical Center-Anaheim 1025 S. Anaheim Blvd. Anaheim, CA 92805 533-6220

Western Medical Center-Santa Ana 1001 N. Tustin Avenue Santa Ana 92705 834-3555

Westminster Community Hospital 200 Hospital Circle Westminster, CA 92683 893-4541

ATTACHMENT 7.7

IRRADIATED PERSONNEL PROCEDURES

1.0 Purpose

The purpose of this Attachment is to provide procedures designed to support and amplify responses already provided in:

INTERJURISDICTIONAL PROCEDURE #10 (Reception and Care Centers)
INTERJURISDICTIONAL PROCEDURE #11 (Radiological Monitoring and Assessment)
INTERJURISDICTIONAL PROCEDURE #12 (Decontamination)
INTERJURISDICTIONAL PROCEDURE #18 (Medical/Public Health)

2.0 Patient Categories

2.1 Three categories of patients are anticipated:

TYPE

- Seriously injured and irradiated and contaminated.
- II. Not injured (or minor) but irradiated and/or contaminated.
- III. Not injured or irradiated/ contaminated but perceived irradiated.

DISPOSITION

Treat medically. Transport to the nearest Decontamination Support Hospital.

To the UCI Decontamination Station.

To the UCI Decontamination Station.

3.0 Procedures

- 3.1 The designated Decontamination Support Hospitals listed in Attachment 7.6 to this INTERJURISDICTIONAL PROCEDURE will be alerted and activated through the Hospital Emergency Administration Radio System (HEARS) for Category I patients.
- 3.2 The designated primary Reception and Care Centers will each be staffed with radiological monitoring teams. Those persons determined to be Category II patients will be evacuated as soon as possible to the UCI Decontamination Station.
 - 3.2.1 Evacuees directed to the UCI Decontamination Station will be interviewed, monitored, and treated in accordance with the provisions specified in this INTERJURISDICTIONAL PROCEDURE. Persons suspected of having radiation sickness will have blood samples taken and receive other treatment as determined by medical personnel. These patients may be evacuated to an available Decontamination Support Hospital for further evaluation and treatment.

/nm EM10-7-14 2-1-83

- 3.3 Category III patients must be classified and evaluated to prevent any undue concern or anxiety among the general public. Those persons should be evacuated to the UCI Decontamination Station if they are creating any difficulties or disruption to the activities of the center.
- 3.4 Additional requirements for assistance with radiological monitoring teams or physician support can be obtained by a request to the EOC. Southern California Edison is prepared to assist in the screening and classification effort by providing Mobile Whole Body Counters (3600#) as requested by the EOC to the SONGS EOF. (A 24-hour lead time is required)

4.0 Personnel, Equipment and Supplies

The UCI Decontamination Station will be equipped with sufficient quantities of those items listed on Attachment 7.1 to this INTERJURISDICTIONAL PROCEDURE to process 250 irradiated/contaminated persons per hour.

5.0 Responsibilities

5.1 Orange County Agencies

- 5.1.1 Emergency Management Division Coordinate personnel, equipment and supplies procurement and readiness. Coordinate operation of decontamination and treatment facilities. Train radiological monitors and hospital personnel.
- 5.1.2 Orange County Fire Department Provide locally or through Mutual Aid agreements sufficient radiological monitors.

 Develop personnel and equipment requirements.
- 5.1.3 HCA/Environmental Health Provide services to other parties concerned with nuclear radiation exposure and measurement. Assist in training radiological monitors. Develop personnel, equipment, and supply requirements.
- 5.1.4 CAO, Public Information Promote and coordinate timely radiation and casualty information releases to the EBS and news media.
- 5.1.5 HCA/Emergency Medical Services Coordinate the support required to implement the procedures contained in this INTERJURISDICTIONAL PROCEDURE. See also INTERJURISDICTIONAL PROCEDURE #18 (Medical/Public Health).
- 5.1.6 HCA/Mental Health Provide qualified personnel to support the Decontamination Station at UCI.

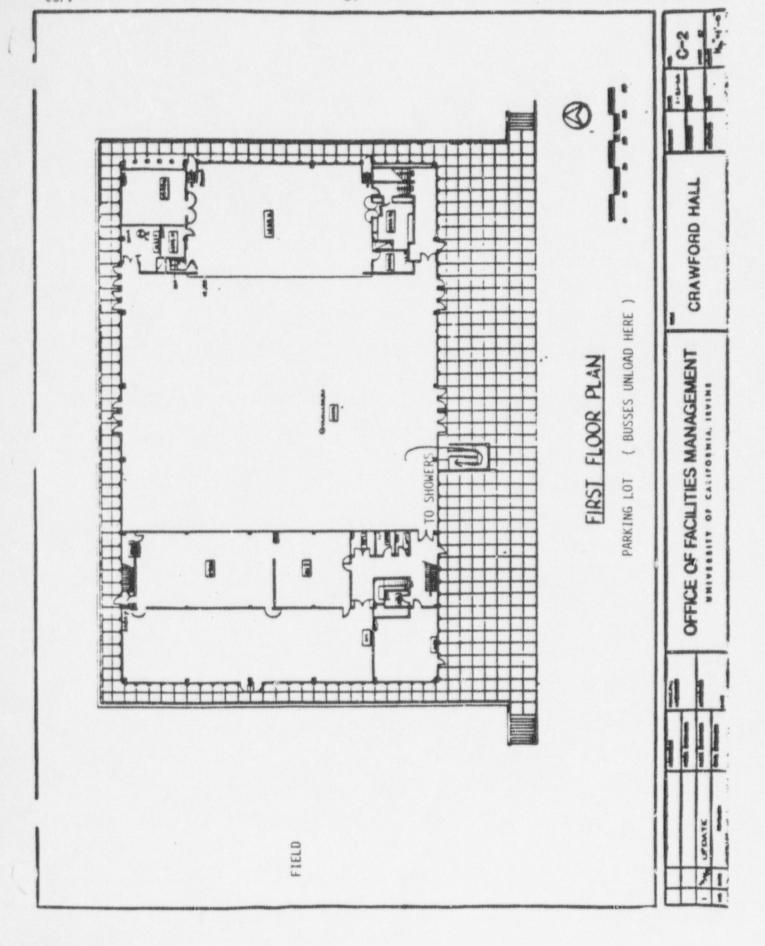
5.2 State Agencies

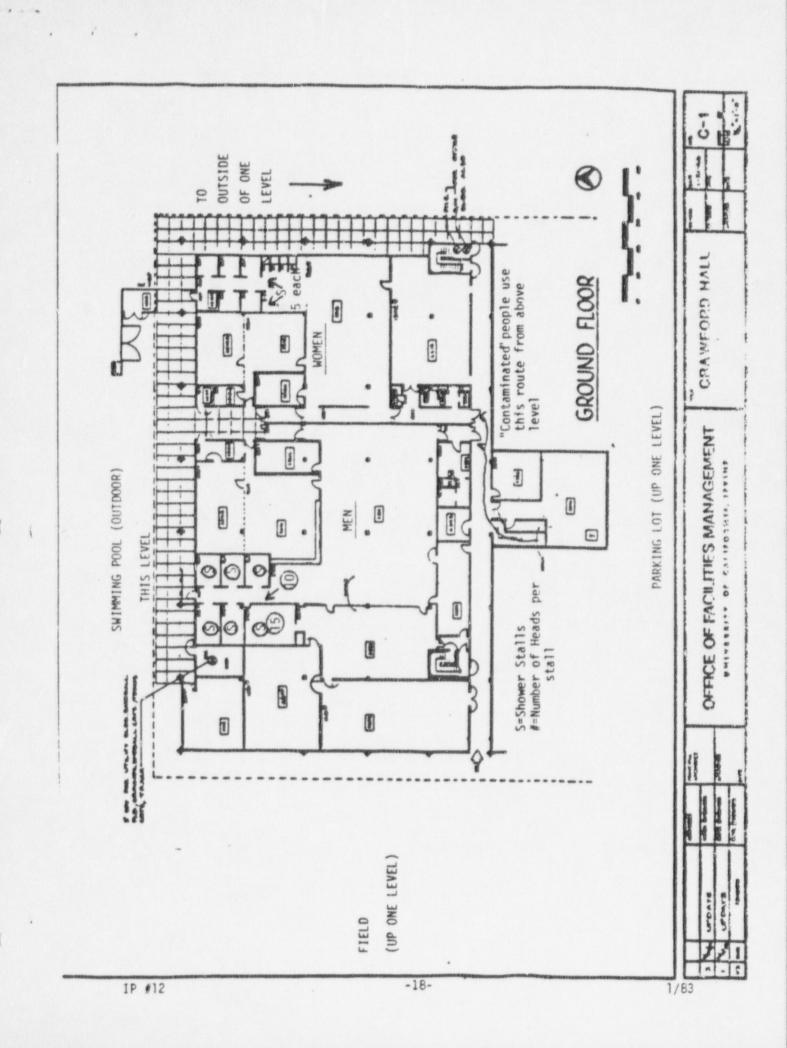
5.2.1 OES - Coordinate the provision of decontamination equipment from state and federal agencies.

/nm EM10-7-15 2-1-83

- 5.3 Ol Provide space and utility services for the Decontamination Station. Develop personnel, equipment, and supply requirements.
- Red Cross Conduct initial interviewing of evacuees arriving at R&C Centers. Assist in recording of the status and location of persons exposed to significant levels of radiation, the collection of baseline blood samples if required. Coordinate the arrangements of the R&C Centers, and the movement of people in and out of those Centers.
- 5.5 Southern California Edison Be prepared to furnish the services of nuclear-trained medical professionals and equipment.

/nm EM10-7-16 12-29-82





SAN DIEGO COUNTY NUCLEAR PLANT EMERGENCY RESPONSE PLAN, STANDARD OPERATING PROCEDURE NO. 12, ATTACHMENT 6

SAN DIEGO COUNTY

DECONTAMINATION

SOP #12

1.0 PURPOSE

- 1.1 This procedure provides guidance and information concerning the decontamination of:
 - 1.1.1 Emergency workers
 - 1.1.2 General population
 - 1.1.3 Vehicles
 - 1.1.4 Areas
 - 1.1.5 Foodstuffs

2.0 REFERENCES

- 2.1 San Diego County Nuclear Power Plant Emergency Response Plan.
- 2.2 AEC Manual TID-24919, Radiological Emergency Operations.
- Decontamination of Nuclear Reactors and Equipment,
 J.A. Ayres.
- 2.4 EPA-520/1-75-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.
- 2.5 Department of Defense Manual SM-11.22.2, Radiological Defense Textbook, March 1963.

3.0 RESPONSIBILITIES

- 3.1 Radiological Protection Officer (RPO), ODP
 - 3.1.1 Coordinate the planning and implementation of decontamination.
- 3.2 Oceanside Fire Department
 - 3.2.1 Provide four two-member personnel monitoring teams.

4.0 PRECAUTIONS

SOP #12-1

4.1 General

- 4.1.1 When monitoring a surface for contamination, locate the detector face about 1/2-inch from the surface and move the detector over the surface slowly enough to give the instrument time to respond.
- 4.1.2 Perform decontamination of localized areas carefully, to prevent the spread of contamination to lesser contaminated or uncontaminated areas. Highly contaminated areas should be decontaminated first.
- 4.1.3 Wear protective clothing and respiratory protective equipment, as needed when performing decontamination.
- 4.1.4 Survey frequently to determine the effectiveness of decontamination. Consider ceasing decontamination or changing methods when successive surveys show a minimal decrease in contamination levels.
- 4.1.5 Collect solid waste which is potentially contaminated for later disposal.

4.2 Personnel

- 4.2.1 Prior to decontamination, inspect skin areas for minor wounds such as cuts and abrasions. If any are found, they should be protected from becoming either contaminated or more contaminated during the process.
- 4.2.2 Discontinue immediately any decontamination agent or method which appears to cause skin reddening or irritation.
- 4.2.3 Exercise caution during the decontamination process to prevent potentially contaminated liquids from entering body openings.
- 4.2.4 The temperature of any water used should be slightly warm.

5.0 EQUIPMENT AND SUPPLIES

- 5.1 Decontamination equipment and supplies are listed in Attachment 1.
- 5.2 Equipment and supplies are stored at Oceanside Fire Department and ODP.

6.0 PROCEDURE

- 6.1 Personnel decontamination
 - 6.1.1 Emergency workers will be monitored, using the techniques outlined in Attachment 2.
 - 6.1.2 The general population will be monitored for contamination, initially on a random basis, at the Rest Stop south of SONGS on I-5, using the techniques outlined in Attachment 2. Additional monitoring and decontamination will take place at designated reception and mass care centers, if required.
 - 6.1.3 If contamination which exceeds the limits shown in Attachment 3 is detected on any individual's clothing, the clothing will be collected and bagged for later disposal. The clothing and contamination levels will be recorded in the applicable portion of a Personnel Decontamination Record form (see Attachment 4). Substitute clothing will be provided.
 - 6.1.4 If contamination which exceeds the limits shown in Attachment 3 is detected on any individual's skin, decontamination is recommended. Attachment 5 provides guidance for decontamination techniques. Contamination levels and the decontamination effort will be recorded in the applicable section of a Personnel Decontamination Record form (see Attachment 4).
 - 6.1.5 Decontamination support will be available at the hospitals listed in Attachment 6.
- 6.2 Vehicle Decontamination
 - 6.2.1 Vehicles suspected of being contaminated

will be monitored internally and externally for contamination at such location as the RPO may designate using the techniques outlined in Attachment 8. These surveys will be performed on an occasional, random basis, as determined by the RPO, consistent with Department of Health Services, Public Health Services pronouncements and with the existing contamination conditions which have been determined by survey.

- 6.2.2 If contamination which exceeds the limits shown in Attachment 3 is detected on any external vehicle surface, an attempt should be made to decontaminate using soap and water in an area approved by the RPO. All decontamination efforts will be recorded on a Vehicle Decontamination Record form (see Attachment 9).
- 6.2.3 If contamination which exceeds the limits shown in Attachment 3 is detected on any internal vehicle surface and the contamination is low-level and spotty, an attempt should be made to decontaminate using methods such as tape presses and damp rags. All decontamination efforts will be recorded on a Vehicle Decontamination Record form (see Attachment 9).
- 6.2.4 If a vehicle with internal contamination cannot be successfully decontaminated or there are no resources readily available for decontamination and the vehicle is required for emergency use, consideration should be given to covering the contaminated areas with a clean covering such as plastic sheeting and requiring the occupants to wear protective claiming.
- 6.2.5 Contaminated vehicles which cannot be decontaminated, and are not essential for emergency service, should be impounded for further evaluation.
- 6.3 Building and Area Decontamination
 - 6.3.1 The decontamination of large land areas and building surfaces, if required, will occur as part of the general recovery phase. The degree of decontamination

needed will depend on the extent and severity of contamination and on the type of surface(s) which is contaminated. 6.3.2 General decontamination methods and some approximate efficiencies are shown in Attachment 10. If large land areas are contaminated, 6.3.3 more severe methods, such as earth removal or plowing-under contaminated soil may have to be considered. 6.4 Foodstuffs 6.4.1 Public advisories on decontamination of foodstuffs will be provided by the County Health Officer. The primary methods for decontamination 6.4.2 of foodstuffs are washing, brushing, peeling or boiling. 6.4.3 Although not a direct contamination removal process, time delays (to permit the decay of short-lived radioactivity on foodstuffs) may be considered. Such delays are accomplished by such processes as refrigeration, canning, freezing and dehydration. Foodstuffs may be diverted into another 6.4.4 food product which can be consumed at a later date or used as animal feed. If attempts to decontaminate foodstuffs 6.4.5 either by direct removal, time delays, or diversion are unsuccessful, foodstuff isolation and condemnation by County and State agencies may be required. ATTACHMENTS Attachment 1 - Personnel Decontamination Station Equipment and Supplies Attachment 2 - Personnel Contamination Survey Techniques Attachment 3 - Beta-Gamma Contamination Limits Attachment 4 - Personnel Decontamination Record SOP #12-5

Attachment 5 - Personnel Decontamination Techniques

Attachment 6 - Decontamination Support Hospitals

Attachment 7 - Reception and Mass Care Centers

Attachment 3 - Surface Contamination Survey Techniques

Attachment 9 - Vehicle Decontamination Record

Attachment 10 - Decontamination Method Efficiency

Attachment 6

COUNTY ODP

DEPARTMENT OF HEALTH SERVICES, PUBLIC HEALTH SERVICES

NOTE:

.... . . .

If needed, the following San Diego County Hospitals are equipped to handle contaminated patients:

Primary:

Tri-City Hospital Scripps La Jolla Palomar Hospital

Secondary:

Mission Bay Memorial

Fallbrook

Clairemont General

El Cajon Valley

Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS 71413688316 AND EMERGENCY PLANNING January 22, 1987 Dr. Bruce Tovar Scudders Ambulance Company 25260 East La Paz Road, Suite 4 Laguna Hills, California 92654 SUBJECT: Agreement for Transportation of Injured or Contaminated Individuals Gentlemen: This letter reconfirms the Agreement between Scudders Ambulance Company ("Company") and Southern California Edison Company ("SCE") concerning the transportation of injured individuals to treatment facilities outside the site boundary of San Onofre Nuclear Generating Station (the "Station"). Confirmation of this Agreement is based on our current understanding that: The Company is duly licensed and operated under the laws and regulations of the State of California. 2. The Company has the capability of handling the normal range of medical emergencies, including an injury complicated by radiation contamination. 3. The Company has the capability of promptly providing to injured persons emergency medical technician care and transportation from the Station or surrounding communities to appropriate medical treatment facilities, including San Clemente General Hospital, South Coast Community Hospital, Tri-City Community hospital, or Mission Community Hospital. EX. 11

Scudders Ambulance Company January 22, 1987

By executing acceptance of this letter, the Company confirms these understandings and agrees to provide the following services to SCE in support of the operation of the Station:

- 1. Transportation of SCE personnel or other individuals suffering from injuries including injuries complicated by radiation contamination as a result of activities at the Station from the Station or its vicinity to appropriate treatment facilities as directed by SCE.
- Emergency care for such individuals enroute to the treatment facility.

SCE will be responsible for the payment of your reasonable fees and charges for any such services rendered at SCE's request. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

6 DAY OF JEG

. 1987

General Manager

Scudders Ambulance Company

Southern California Edison Company P O BOX 4198 SAN CLEMENTE CALIFORNIA 92672 F C BUD JACKLEY TELEPHONE MANAGER NUCLEAR AFFAIRS (714) 368 63 6 March 23, 1987 AND EMERGENCY PLANNING Med Air Flight Operations P.O. Box C-11912 Santa Ana, California 92711 SUBJECT: Agreement for Transportation of Injured or Contaminated Individuals Gentlemen: This letter reconfirms the Agreement between Med Air, a California Corporation, ("Company") and Southern California Edison Company ("SCE") concerning the transportation of injured individuals to treatment facilities outside the site boundary of San Onofre Nuclear Generating Station (the "Station"). Confirmation of this Agreement is based on our current understanding that: The Company owns a helicopter air ambulance service which is operated by HOSPITAL AIR TRANSPORT, Inc. ("HAT") an Oregon Corporation. HAT is duly licensed to operate such service in California. 2. The medical flight team has the capability of handling the normal range of medical emergencies, including an injury complicated by radiation contamination. The Company has the capability of promptly providing to injured 3. persons emergency paramedical care and transportation from the Station or surrounding communities to appropriate medical treatment facilities, including San Clemente General Hospital, South Coast Community Hospital, Tri-City Community Hospital, or Mission Community Hospital. Such capability is subject to the availability of an aircraft which availability will be determined solely by Med Air. EX. 12

4

Med Air March 23, 1987

By executing acceptance of this letter, the Company confirms these understandings and agrees to provide the following services to SCE in support of the operation of the Station:

- Transportation of SCE personnel or other individuals suffering from injuries (including injuries complicated by radiation contamination) as a result of activities at the Station from the Station or its vicinity to appropriate treatment facilities as directed by SCE, subject to availability of an aircraft.
- 2. Emergency care for such individuals enroute to the treatment facility.
- It is understood that HAT, as operator of the MED AIR program, shall have the sole right and obligation to determine whether or not a given flight requested by SCE should be made and how such flight should be conducted from the standpoint of weather conditions, or perceived danger to flight crew. (or aircraft safety)

SCE will be responsible for the payment of your transportation and medical services fees and charges for any such services rendered at SCE's request to Med Air or its sub-contractors. SCE will make such payments within 30 days of date of invoice. This Agreement will remain in effect unless terminated by either party giving thirty (30) days advance written notice of termination to the other party.

Please signify your continued agreement to the provisions of this letter by executing the acceptance below and returning this letter to me in the enclosed self-addressed stamped envelope. A copy of this letter agreement is also enclosed for your records.

Very truly yours,

F. C. JACKLEY

Manager, Nuclear Affairs and Emergency Planning

ACCEPTED AND AGREED TO THIS

26thDAY OF March , 1987

Med Air, a California Corporation

Betty Belden,

President

ACTION OF THE CITY COUNCIL OF THE CITY OF SAN CLEMENTE, CALIFORNIA

Addressed to: DIRECTOR OF FIRE PROTECTION

Copy to:

CITY MANAGER

BUD JACKLEY, NUCLEAR AFFAIRS AND EMERGENCY

PLANNING

Council Meeting Date: MAY 6, 1987

Present: COUNCIL MEMBERS - LIMBERG, LORCH, MECHAM, MAYOR

VEALE

Absent: COUNCIL MEMBERS - RICE

Agenda Item No.: 4-C

Subject: Agreement with Southern California Edison Company -Transportation of Injured Contaminated Citizens

Following clarification, MOTION BY COUNCILMEMBER LORCH, SECOND BY COUNCILMEMBER LIMBERG, CARRIED 4-0 (COUNCILMEMBER RICE ABSENT), to approve and authorize the Mayor to execute the agreement with Southern California Edison Company to provide training and supplies to the San Clemente Fire Department, as well as reimburse the City for the transportation costs for citizens who are provided emergency medical assistance during a nuclear accident at SONGS.

STATE OF CALIFORNIA COUNTY OF ORANGE CITY OF SAN CLEMENTE)

I, MYRNA ERWAY, City Clerk and ex-officio Clerk of the City Council of the City of San Clemente, California, do hereby certify the foregoing to be the official action taken by the City Council at the above meeting.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 12th day of May, 1987.

(SEAL)

Megena City Clerk and ex-officio Clerk

of the City Council

AGREEMENT

THIS AGREEMENT ("Agreement") is entered into this 6th day of May, 1987 (the "Effective Date"), by and between the City of San Clemente ("City"), a municipal corporation, and the Southern California Edison Company ("SCE"), a California corporation, and is based upon the following:

RECITALS

WHEREAS, the Nuclear Regulatory Commission ("NRC") has promulgated regulations requiring emergency planning in the vicinity of nuclear power plants (10CFR50.47); and

WHEREAS, NRC regulations at 10CFR50.47(c)(2) require emergency planning be implemented in the area about ten miles in radius from a nuclear facility; and

WHEREAS, the City of San Clemente is located within a ten mile radius of the San Onofre Nuclear Generating Station ("SONGS"), which facility is subject to the NRC regulations contained in 10CFR50.47; and

WHEREAS, specialized training and materials would aid the San Clemente Fire Department in responding to injuries resulting from the unlikely event of an accident at SONGS; and,

whereas, it is in the interest of the health, safety and general welfare of the citizens of the City of San Clemente that the City participate with SCE, the manager of SONGS, in developing plans to provide emergency medical assistance in the unlikely event of an accident at SONGS;

NOW, THEREFORE, in consideration of the mutual covenants, conditions, promises and terms contained herein, the parties hereby agree as follows:

1. PROVISION OF SERVICES.

1.1 Transportation of Injured

Subject to the limitations of manpower and equipment, the Fire Department of the City of San Clemente shall endeavor to provide emergency medical assistance to any individual suffering from injuries, injuries complicated by radiation contamination, or excessive radiation exposure within the City limits of the City of San Clemente as a consequence of a General Emergency at SONGS. Such assistance shall include emergency aid to individuals suffering from injuries complicated by radiation contamination or exposure, and the transportation of those individuals to the closest available hospital.

2. TERM.

2.1 Initial Term

The Initial Term of this Agreement shall commence on the 6th day of May 1987, and shall continue until June 30, 1990, unless terminated in the manner provided in paragraph 5.

2.2 Renewal Term

Subject to paragraph 5 below, either party shall have the right to extend this Agreement for an additional three (3) year term. In order for such extension to be effective, the party electing to extend shall provide the other party with written notice indicating its exercise of this option to extend not less than one (1) month nor more than six (6) months prior to the end of the Initial Term.

3. COMPENSATION.

3.1 Per-Call Charge

SCE shall pay the City for services provided pursuant to Section 1.1 of this Agreement, based upon a per-call charge, calculated under the "Fee Schedule" approved by Resolution of the City Council of the City pursuant to Chapter 20, Article 2, Sections 20-12 through 20-14 of the Code of the City of San Clemente, as such fee schedule currently exists or as it may hereafter be adjusted. SCE shall cause such payments to be made to the City within fifteen (15) days after receipt of City's invoice.

4. TRAINING, MATERIALS AND EQUIPMENT.

4.1 Training

SCE shall institute a periodic training program for all First Responders employed by the San Clemente Fire Department. Such training shall cover the transportation and care of contaminated individuals. Such training shall commence within six (6) months of the Effective Date of this Agreement.

4.2 Materials

SCE shall provide the City with the materials and supplies necessary to care for the injured contaminated individuals during transport to a hospital facility.

4.3 Equipment Maintenance

SCE shall decontaminate all City equipment contaminated as a result of the provision of services under this Agreement.

SCE shall replace any of such equipment or any part thereof that cannot be decontaminated.

5. TERMINATION.

5.1 Cancellation

Either party may terminate this Agreement by giving the other party thirty (30) days advance written notice.

5.2 Payment Upon Cancellation

SCE shall pay the City all amounts due and payable under this Agreement no later than seven (7) calendar days after cancellation of this Agreement.

6. LIABILITY.

6.1 Liability for Breach

SCE's sole remedies for any breach of this Agreement by the City shall be the termination of the Agreement. Under no circumstances shall the City be liable to SCE, its agents or employees, for any damages arising out of the City's breach of this Agreement.

6.2 No Third Party Beneficiaries

This Agreement does not create any additional obligation upon the City to persons not a party hereto, nor does it create any third party beneficiaries.

7. MISCELLANEOUS PROVISIONS.

7.1 Prohibition Against Assignment

Neither party shall assign any interest in this Agreement, nor shall any party transfer any inverest in the same without the prior written consent of the other. Any attempt to assign any rights under this Agreement in any other manner shall be null and void.

7.2 Integration

This Agreement represents the entire understanding of the parties as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered by this Agreement. This Agreement shall be governed by the laws of the State of California and construed as if drafted by both parties. This Agreement may not be modified, altered or amended except in writing by the parties.

IN WITNESS WHEREOF, the parties have executed this Agreement in one or more counterparts which, taken together, shall constitute one Agreement as of the date first written above.

SOUTHERN CALIFORNIA EDISON COMPANY

Date: Opril x4 1487

F. C. Jackley, Manager

Nuclear Affairs and

Emergency Planning

CITY OF SAN CLEMENTE

Date: 4004 6,1987

Approved as to form:

/s/ Jeff Oderman

City Attorney

By Starty a. Veale

Attest:

City of San Clemente

COUNTY OF ORANGE INCIDENT RESPONSE PLAN FOR SAN ONOFRE NUCLEAR GENERATING STATION INTERJURISDICTIONAL PROCEDURE NO. 9 (TRANSPORTATION)

. . .

ORANGE COUNTY

INTERJURISDICTIONAL PROCEDURE #9 (TRANSPORTATION)

1.0 PURPOSE

- 1.1 This procedure provides for evacuation of residents from a general area as a result of an emergency incident at the San Onofre Nuclear Generating Station requiring the movement of:
 - 1.1.1 Patients at medical facilities,
 - 1.1.2 Students in schools,
 - 1.1.3 Residents of extended care facilities,
 - 1.1.4 Residents and transients without available transportation, and
 - 1.1.5 Incapacitated or handicapped persons at their place of residence.

1.2 This Procedure:

- 1.2.1 Defines Transportation Officer and transportation agency responsibilities.
- 1.2.2 Identifies available transportation equipment.

2.0 REFERENCES

- 2.1 State of California, Nuclear Power Plant Emergency Response Plan (Revised March 1981)
- 2.2 Incident Response Plan for San Onofre Nuclear Generating Station (January 1983)
- 2.3 INTERJURISDICTIONAL PROCEDURE #4 (Notification)
- 2.4 INTERJURISDICTIONAL PROCEDURE #7 (Emergency Communications)
- 2.5 INTERJURISDICTIONAL PROCEDURE #8 (Evacuation/Sheltering)
- 2.6 California Highway Patrol Disaster Plan, Chapter VI, Border Division Nuclear Response Plan
- 2.7 Emergency Response Information for San Onofre Nuclear Generating Station (Second Edition) September 1982

/nm EM10-5-1 2-1-83

IP #9

3.0 RESPONSIBILITIES

- 3.1 Operational Area Coordinator in conjunction with jurisdictional officials and SCE will determine:
 - 3.1.1 That an evacuation is required, and
 - 3.1.2 The evacuation area involved.
- 3.2 The Transportation Officer, County of Orange, will:
 - 3.2.1 Maintain lists of transportation equipment available for evacuation within the jurisdiction's area of responsibility,
 - 3.2.2 Maintain current estimate of persons who require evacuation transportation,
 - 3.2.3 Designate routes to be used to bring equipment into the risk area in coordination with CHP, CALTRANS, and Orange County Sheriff,
 - 3.2.4 Obtain commitment from transportation agencies for use of equipment in emergency situations,
 - 3.2.5 Designate number and type vehicles to proceed to each Assembly Point and to each Special Institution,
 - 3.2.6 Designate transportation equipment to pick up incapacitated persons at places of residence, based on current listing of such persons, and
 - 3.2.7 Notify agencies responsible for providing transport equipment of specific requirements for the evacuation.
- 3.3 Orange County Transit District has 300 buses available for use and will:
 - 3.3.1 Ensure vehicles are fueled and operators available,
 - 3.3.2 Provide operators with maps showing evacuation routes and pickup locations, and
 - 3.3.3 Direct operators to proceed to assembly points by identified routes involving minimum interference with outgoing traffic flow.
- 3.4 The Capistrano Unified School District has buses available for use in evacuating school children. See Attachments 6 through 14 to INTERJURISDICTIONAL PROCEDURE #8 (Evacuation/Sheltering) for listings of schools by evacuation districts.

/nm EM10-5-2 2-1-83

4.0 PRECAUTIONS

- 4.1 This INTERJURISDICTIONAL PROCEDURE supports INTERJURISDICTIONAL PROCEDURE #8 (Evacuation/Sheltering) which contains special coordinating and transportation service requirements.
- 4.2 See Reference 2.6 for CHP traffic control measures that are automatically escablished at GENERAL EMERGENCY. Traffic congestion at these points may impede buses and ambulances attempting to enter the EPZ after a GENERAL EMERGENCY has been declared.

5.0 EQUIPMENT AND SUPPLIES

- 5.1 OCTD buses and support equipment
- 5.2 CUSD buses
- 5.3 Available on request:
 - 5.3.1 Paramedic ambulances
 - 5.3.2 Hospital ambulances
 - 5.3.3 Commercial ambulances
 - 5.3.4 Commercial buses
 - 5.3.5 Commercial taxis and limousines 5.3.6 AMTRAK passenger trains

 - 5.3.7 California National Guard vehicles and helicopters
 - 5.3.8 U. S. Marine Corps vehicles and helicopters
 - 5.3.9 U. S. Coast Guard and Coast Guard Auxiliary vessels

6.0 PROCEDURE

- 6.1 When a decision to evacuate a specific area has been made, the Operational Area Coordinator will direct that transportation assets be deployed to assist in the movement.
- 6.2 The Transportation Officer will determine specific transportation and special equipment requirements based on analysis of current information.
- 6.3 Special Institutions will be queried by telephone to determine the exact number of persons to be transported and special equipment required for evacuation. In addition, similar calls may be made to the residences of incapacitated persons to confirm transportation requirements. If time does not permit (elephone calls, previously determined average personnel densities will be the basis for ordering transportation assets at specific locations. See INTERJURISDICTIONAL PROCEDURE #8 (Evacuation/Sheltering).
- 6.4 The Emergency Public Information Officer (EPIO) will ensure that public announcements have been broadcast concerning evacuation procedures and timing. Special Institutions will be notified by telephone.
- 6.5 The Transportation Officer will contact Orange County Transit District with specific requests for vehicles and special equipment.

/nm EM10-5-3 2-1-83

- 6.6 Status reports on the evolving evacuation process will be provided to the EOC by law enforcement and traffic control personnel. Developing transportation problems at Special Institutions and Assembly Points will be given priority attention by the Transportation Officer. Requests for additional transportation assets and/or redistribution of dispatched vehicles are to be anticipated.
- 6.7 Following abatement of the hazard, transportation support for reentry will be provided as required. The Transportation Officer will use similar planning techniques and transportation assets to return evacuees to homes and Special Institutions, when so directed.

7.0 ATTACHMENTS

None

/nm EM10-5-4 2-1-83

IP #9

SAN DIEGO COUNTY NUCLEAR PLANT EMERGENCY RESPONSE PLAN, STANDARD OPERATING PROCEDURE NO. 9 (TRANSPORTATION)

TRANSPORTATION

SOP #9

1.0 PURPOSE

- 1.1 Any evacuation of residents and transients as a result of an emergency incident at SONGS would require special arrangements for transportation.
- 1.2 San Diego County has no personnel under its jurisdiction who would be subject to evacuation from the 10-mile Emergency Planning Zone (EPZ). Therefore, no special transportation arrangements are required.

2.0 REFERENCES

- 2.1 San Diego County Nuclear Power Plant Emergency Response Plan.
- 2.2 California Master Mutual Aid Agreement.

3.8 RESPONSIBILITIES

- 3.1 The Director, ODP will ensure that an adequate and current inventory of available transportation assets, particularly bus and ambulance, is maintained.
- 3.2 The EOF Liaison Representative will coordinate with other offsite representatives in determining transportation assistance requirements, and will provide requests for transportation assistance to the EOC.

THE HANDLING AND TREATMENT OF RADIOACTIVELY CONTAMINATED AND INJURED PATIENT(S)

. 1 .

by EMERGENCY DEPARTMENT PHYSICIAMS AND NURSES

Prepared for

TRI-CITY HOSPITAL Oceanside, California

Prepared by

Nuclear Affairs and Emergency Planning and Mesa Medical Department San Onofre Nuclear Generating Station

SOUTHERN CALIFORNIA EDISON COMPANY P.O. BOX 4198 San Clemente, California 92672

June 5, 1987

8:00 a.m. - 12:30 p.m.

HANDLING OF RADIOACTIVELY CONTAMINATED AND INJURED PERSON(S) AT A NUCLEAR POWER PLANT

by Emergency Medical Personnel

AGENDA

TOPIC	TIME	PURPOSE
INTRODUCTION	10 minutes (Lecture)	Introduce SCE staff and their roles; provide an overview of the course and explain the need for special procedures when dealing with an injured and contaminated patient.
REVIEW OF RADIATION BIOLOGY	30 minutes (Lecture/ Slides)	Review the medical aspects of radiation injuries, exposure/effect relationships.
DETECTING AND MEASURING RADIATION	20 minutes (Lecture)	Review radiation protection principles, describe and demonstrate use of radiation survey instruments.
BREAK	10 minutes	
HOSPITAL EMERGENCY DEPT. RESPONSE TO RADIATION ACCIDENTS	25 minutes (Video)	Review a hospital procedure for managing a radiation accident victim.
HOSPITAL RESPONSE PROCEDURES	60 minutes (Lecture)	Introduce Hospital ER staff and their roles; provide participants with opportunity to demonstrate knowledge to review their hospital's procedure for managing the radiation accident victim.
BREAK	10 minutes	
SPECIFIC ELEMENTS OF RESPONSE	60 minutes (Demonstra- tion/Parti- cipation)	Demonstrate partial REA set up, use of protective clothing, dosimetry and steps in management of the contaminated patient; mini-drill.

LECTURE OUTLINE

Introduction/Overview

1

- O Introduction of SCE staff
- O Review need for special procedures for response to the injured and contaminated
- O Hospital response objectives
- O Purpose of training/overview of lecture

Classification of Radiation Accidents

- O External exposure
- O External contamination, internal contamination
- O Combined: injury and contamination, external exposure
- O Hospital response to accidents
 - o Triage
 - o Assessment and treatment
 - o Decontamination

Case Studies

- O Actual incidents involving a contaminated and injured patient
- O Define medical response
 - o At nuclear plant
 - At support hospital

Procedures for response to the injured and contaminated patient

- O Response procedures for treating the injured and contaminated patient
- O Hospital Administrative Procedures
- O Internal Notification Procedures
- O Department Responsibilities
- O Notification and Verification of Contaminated-Injured to be Received by the Hospital
- O Role of the Plant Health Physicist
- O Function and Use of Dosimetry
- O Gowning Procedure
- O Decontamination and Sample Taking Kit
 - o Contents and Use
 - o Sample Taking Procedure
- O Resuscitation and Stabilization of the Patient
- O Contamination Control Techniques
- O Documentation and Record-Keeping
- O Patient Care
- O Patient Exit Procedures
- O Attendant Exit Procedures
- O Clean-Up of the REA

THE HANDLING OF THE RADIOACTIVELY CONTAMINATED AND INJURED PERSON AT A NUCLEAR POWER FACILITY BY EMERGENCY DEPARTMENT PHYSICIANS AND NURSES OBJECTIVES At the completion of this training, emergency department personnel will be able to: Explain the difference between exposure and contamination and state when an individual from San Onofre Nuclear Generating Station should be treated in the specially prepared radiation emergency area. Explain the difference between dose and dose rate and briefly summarize the relationships between dose and biological effect. and to (b) a chest x-ray.

1

1.

2.

- 3. Compare a given radiation injury exposure to (a) background
- List 3 protective actions that can reduce exposure from 4. ionizing radiation.
- 5. Describe the set up of the Radiation Emergency Area (REA).
- 6. Briefly discuss the role of the various members of the response team: physicians, nurses, administrative personnel, security, housekeeping and maintenance, health physics personnel, data clerk, and hospital public relation and information system.
- Demonstrate the correct use of protective clothing and 7. dosimetry.
- List the samples that are needed from the radiation accident 8. victim for radiological analysis and explain why they are needed.
- Briefly describe procedures for the decontamination of 9. wounds.
- 10. Demonstrate appropriate techniques for decontaminating the intact skin.
- Explain why serious medical problems should have priority 11. over concerns about exposure and contamination during the treatment of a radiation accident victim.
- State the reason for carefully documenting information 12. during the emergency care of a radiation accident victim and list categories of information that should be documented.
- 13. Discuss the notification and verification of contaminated-injured persons; communications and hospital public relation and information capability.

THE HANDLING AND TREATMENT OF RADIOACTIVELY CONTAMINATED AND INJURED PATIENTS BY EMERGENCY SERVICES PERSONNEL

Review and Test

(PLEASE CIRCLE APPROPRIATE ANSWERS)

1. The party responsible for preventing the spread of contamination at the accident site is:

a) Security

b) Health Physicist

c) ER Physician

- Three principles which apply to protection from radiation are: TIME, DISTANCE, AND SHIELDING.
 - a) True

. 1

- b) False
- 3. If possible, the Emergency Room should be prepared prior to admitting a radioactively contaminated patient.
 - a) True
 - b) False
- 4. Decontamination should take priority over life-threatening conditions created by traumatic injury.
 - a) True
 - b) False
- 5. In the event of a radiation accident involving a plant worker, the individual who should issue a public statement is:
 - a) Attending Physician
 - b) Hospital Public Relations Officer assisted, if necessary, by a trained local physician
 - c) The head nurse of the emergency department
- 6. Did you find the lecture and/or demonstration of material informative?
 - a) ves
 - b) No
- 7. Were slide presentations and handouts helpful in understanding the material?
 - a) Yes
 - b) No

8.	San	Onofre personnel may be consulted for any information handling of a radioactively contaminated patient.	ition in
	a) b)	True False	
9.	What	t type of recommendation would you make for future sentations?	
10.	Ther	re is no difference between radiation exposure and loactive contamination of an individual.	Miller Antonino Anta e maneurine mese
	a) b)	True False	
Name:	-	Date:	

HANDLING AND TREATMENT
OF RADIOACTIVELY CONTAMINATED

AND INJURED PATIENTS

Review Information

TABLE OF CONTENTS

Topic	Page
Role of Physicians, Nurses and Support Personnel in Initial Management of Radiation Accidents	1
Initial Emergency Room Management of Radiation Accident Patients	7
Whole Body Irradiation - Biological Effects	12
A Collection of Helpful Items for Medical Evaluation of Ionizing Radiation Exposure Cases	19

ROLE OF PHYSICIANS, NURSES AND SUPPORT PERSONNEL IN INITIAL MANAGEMENT OF RADIATION ACCIDENTS

As with casualties from any accident, trained emergency room personnel are essential to the management of radiation accident victims. During an initial planning period, the Emergency Department head physician, nurse, supervisor or disaster planning committee personnel may be asked to draft a procedure manual and assist with the training of other staff. Although specific emergency medical procedures may be routine, other aspects of radiation casualty care are unique. The presence of radioactive contamination in the emergency room area requires measures to control its spread. Health physicists from the nuclear utility are available to assist the hospital personnel in radiation protection principles and practices. Further, the patient and family need explanations and reassurance as to potential effects of the radiation encountered.

Emergency room personnel can be most helpful if they have a basic understanding of radiation in terms of protective measures, detectability, and relative potential for causing injury. Familiarity with procedural guidelines will enhance their effectiveness in patient management, ultimately contributing to the patient's well being.

478.txt

I. EMERGENCY DEPARTMENT PREPAREDNESS

. 1

- A. Responsibility of the ER staff physician, nurses, health physicists.
 - 1. Emergency room leader and support personnel.
 - Response procedures for treating the injured contaminated patient.
 - Notification and verification of contaminated injured to be received by the hospital.
- B. Education/Training of Emergency Room Medical Staff.
 - Emphasize basic information about radioactivity are they "comfortable" in the presence of radiation?
 - Periodic review of procedural guidelines; drills, in-service training, self-taught audiovisual programs.
- C. Interdepartmental Cooperation.
 - Identify persons specifically responsible for participation in casualty management.
 - 2. Hospital administrative procedures.
 - Department responsibilities.
 - 4. Include all appropriate departments in periodic drills and review procedures.
- D. In-House Procedure Manual for Radiation Accident Management.
 - 1. References are available to help with establishing guidelines and detailed procedures.
 - Identify chain of command to be followed in accident situations; include responsibility for telephone contacts.
 - Describe job responsibilities in sufficient detail to allow participation by new personnel.
 - Review and revise procedures after every drill (update telephone list frequently).
 - Keep manuals readily available to Emergency Room personnel.

- E. Appropriate Facility for Decontamination Procedures.
 - Ensure that area meets essential criteria: proximity to emergency equipment, separate from other patient traffic, sufficient space for emergency treatment and decontaminations, etc.
 - 2. Monitoring Equipment:
 - Identify location of survey meters, dosimeters.
 - Ensure periodic calibration of meters and replacement of dosimeters.
 - Plan to use Emergency Room equipment and supplies as much as possible. Special storage area should include only those items not readily available in Emergency Department (e.g., monitoring equipment, special signs and barrier tape, floor covering, protective clothing, sampling kits, etc.).

478.txt

II. STEPS IN THE MANAGEMENT OF RADIATION CASUALTIES

- A. Initial call essential information.
 - Type of accident is contamination (internal or external) a possibility?
 - Number of casualties is there a need to expand the treatment area?
 - 3. Severity of injuries is there a need to call in other personnel?
 - 4. Radiation exposure levels around patient might exposure of hospital staff be a concern? Have the radioisotopes been identified? SSKI may be dispensed if radioiodine is present.
 - 5. Expected time of arrival preparations take time, does ambulance know correct discharge area?
 - 6. Name and telephone number of caller it may be necessary to make a return call to accident site; communication possible with ambulance?
 - 7. Accompanying personnel health physics personnel from the accident site would be very helpful.
- B. Preparation of Area, Supplies and Personnel.
 - Follow procedure manual guidelines.
 - Ensure that sufficient personnel are available and knowledgeable as to their responsibilities; more than one patient may require second physician/ nurse team; a recorder is essential.
 - 3. Make provision for sufficient coverage of other Emergency Room patients.
 - 4. Alert other hospital services who might become involved (e.g., clinical laboratory, x-ray department, operating room).
 - Procure supplies and equipment from Emergency Room as potentially needed.
 - 6. Are dosimeters properly dispensed? Is survey meter working correctly?
 - Brief personnel on what to expect.

- C. Patient Arrival and Management of Care.
 - Follow standard emergency medical/nursing procedures as much as possible; contamination is a nuisance, not a medical emergency; concern for staff exposure high unlikely.
 - Ascertain information concerning accident itself; consider precipitating medical causes and general medical history of patient.
 - Sampling is essential; pre-marked sampling supplies should ensure their use.
 - 4. Focus on patient's emotional needs:
 - Patient will be apprehensive, concerned about both medical and radiological injuries.
 - b. Negligence may be a factor; consider patient's feelings of guilt, concern for job security.
 - c. Explain need for special protective measures; patient may or may not be familiar with properties of radioactivity.
 - 5. Consider family members present and their need for reassurance; radiation not "contagious" despite elaborate protective measures; serious overexposure may require long-term follow-up.
 - Anticipate patient's transfer to other hospital area or home; ensure that follow-up hospital personnel or family understand that patient should no longer be source of radiation exposure (in an extreme emergency, patient could be taken directly to operating room similar protective measures would be initiated there).
- D. Immediate Follow-Up Concerns.
 - 1. Are all samples correctly labeled and directed to appropriate labs or industrial site?
 - 2. Is paper work complete?
 - 3. Has area been restored to original use? Confirmed as free of contamination?
 - 4. Have accident site personnel been apprised of patient's progress and disposition?
 - 5. Arrange a meeting of all participants to discuss management process, suggestions for greater efficiency, concerns of the staff vis-a-vis their own exposure.

III. RELATED TOPICS FOR IN-SERVICE PROGRAMS

- A. Basic radiation; common sources of radiation, protective measures, relationship of dose to biological effects.
- B. Radiation doses; environmental, medical, occupational (especially hospital employees), expected doses while caring for radiation casualty.
- C. Measurement of radiation; use of dosimeters, survey meters, whole body counters, etc. (suggest they visit Nuclear Medicine Department for actual measurement of radioactivity); bioassays for internal contamination.
- D. Mixed injuries; the contaminated burn, inhalation of contaminated smoke particles, determination of internal contamination, etc.

478.txt

OF RADIATION ACCIDENT PATIENTS

Management of the radiation accident casualty is in many ways no different from that of any accident victim coming to the Emergency Room. The person who has been simply exposed to a radiation field, like a patient completing radiation therapy, presents no hazard to the attending medical care team. The presence of radioactive contamination, as liquid or particulate material, does require appropriate care to avoid spread of the radioactivity to other areas of the hospital. In addition, all contaminated materials must be removed rapidly and efficiently to avoid internal contamination of the patient and to minimize radiation exposure to both victim and staff. Because radiation cannot be appreciated by any of the human senses, reliable instrumentation is needed to locate and identify radioactivity in the environment or on the patient.

- Specific Management Concerns According to Types of Radiation Casualties
 Whole body or extremity exposure no special protective measures for staff or environment; no need for monitoring instrumentation
 - B. Internal contamination only glove protection when handling excreta; body fluids saved and labeled as directed
 - C. External contamination of clothing and/or body surface special measures to limit spread of contamination; protective clothing for immediate staff; personnel and environmental monitoring
- II. Procedural Guidelines

1

- A. Required by the Joint Commission on Accreditation of Hospitals
- Detailed as necessary will be infrequently utilized; some unfamiliar routines
- C. Include agreements with industry, updated communications network, physical specifications, specific procedures, equipment requirements and location, job responsibilities
- D. Keep guidelines readily available for all participants
- E. Prepare in advance for special needs: x-rays, scans, counting of samples
- III. Victim of Overexposure Only
 - A. No special precautions; can be observed and treated in general Emergency Room
 - B. Review of accident scenario with victim or accompanying personnel may determine extent of overexposure and need for immediate treatment
 - C. Identify consultative resources; local physician(s); State Department of Health or Occupational Safety; 24 hour consultative service offered by the Radiation Emergency Assistance Center/Training Site, Oak Ridge, TN (REAC/TS)

- D. Extremity exposure; emphasis on determining actual exposure; greatest need for treatment may be in future weeks months
- IV. Management Goals for the Contaminated Casualty

A. Protection of patient from further injury

B. Containment of all contamination

C. Documentation of type and location of radioactivity

D. Minimal exposure of personnel

V. Radiation Emergency Area - Suggested Treatment Facility for Externally Contaminated Victim

A. Separate room or area for decontamination of victim

1. can be cordoned off and other patients moved to suitable area

2. direct access to outside if possible

3. adjacent to emergency equipment

4. washing capabilities present - hot and cold water

5. air circulation filtered or shutoff

- B. Buffer zone proximal to decontamination room for additional supplies and personnel; dedicated unlisted outside telephone line if possible
- VI. Departmental Responsibilities and Personnel Requirements

A. Nursing service

 oversees area preparations; responsible for logistical and staffing requirements

2. communicates with accident site

3. provides nursing staff to assist with patient care

B. Medical service

 identifies the physician-in-charge; may be contract Emergency Room physician, physician under agreement with specific industry, rotating staff physician, or otherwise designated physician; specialty physicians on call

2. radiologist or nuclear medicine physician may supervise radiological aspects of patient management [Industrial health physicist may come to the Emergency Room with victim; will monitor patient and interpret exposure levels vis-a-vis patient and personnel; will be familiar with radioisotopes involved - utilize his expertise.]

 technologists from radiology and nuclear medicine departments can assist with monitoring of patient and supplies if familiar with survey meters

C. Housekeeping department - for area preparation and to help, under supervision, with general clean-up

D. Security department - to guard ambulance and entrance to Radiation Emergency Area

E. Administration - public relations liaison with media, other hospital personnel, and community

VII. Steps in the Management of a Contaminated Radiation Casualty
A. Notification of accident

1. number of victims and extent of exposure and injuries

- 2. is contamination really present?
- 3. what isotopes are involved?
- preliminary first-aid and decontamination performed at accident site
- 5. other personnel accompanying victim to hospital
- 6. repetition of all information to confirm accuracy
- B. Radiation emergency area preparation
 - cover floor of treatment area and pathway from outside entrance with Herculite® or impermeable paper (precut to fit
 - 2. cordon off area and buffer zone with barrier tape
 - check monitoring equipment and cover probes with thin plastic wrap; pass out dosimeters to participating staff
 - . assemble all supplies most to be kept in buffer zone
 - 5. protective clothing and double gloves for primary staff
- C. Arrival of Victim
 - life-saving measures always take precedence
 - assess victim in ambulance if REA is not prepared and if medical condition allows
 - 3. transfer patient to decontamination tub or facsimile
 - .4. detain ambulance personnel and equipment in restricted area until surveyed and cleared for return to duty
 - remove all outer clothing from victim (contains most of radioisotope); save his personal dosimeters
 - monitor victim to determine location and intensity of radioactivity (survey periodically throughout the procedure)
 - 7. perform superficial treatment of serious injury
- C. Sampling to document presence and nature of contamination; to ensure removal of radioisotopes
 - take samples before and after decontamination, especially open exposed areas
 - a. prelabel sample holders to facilitate process
 - b. wound, skin, mouth and other orifices as appropriate: dampened cotton-tip applicators
 - c. necrotic tissue
 - d. urine and feces if internal contamination is suspected
 - 2. label specimens as radioactive and identify by body location
 - 3. blood samples as directed
- E. Decontamination of victim
 - 1. contaminated wounds, highest priority
 - a. irrigate with copious normal saline for 3 minutes; repeat irrigation if necessary
 - b. surgical debridement may be needed
 - c. save all tissue removed for analysis
 - d. cover decontaminated wound prior to washing other areas
 - contaminated skin
 - a. wash with soap and tepid water scrubbing gently with soft brush or gauze pads for 1-2 minutes
 - b. if still contaminated repeat washing
 - c. do not irritate or abrade skin
 - d. if residual contamination is noted after 2 or 3 washings, cover with thin plastic for further treatment with more specific agents, to be determined by consultation

e. decontamination to a level 2-5 X background is appropriate

(Note: background may be increased because of contaminated articles in room)

contaminated eyes

. 1 .

- a. rinse with water in the direction of nose to temple
- sample and repeat (a) until sampling indicates no contamination
- contaminated ear canals
 - irrigate gently with small amount of water, suctioning frequently
 - repeat until sampling indicates no contamination

contaminated nares or mouth

a. turn head to side if possible

b. rinse with small amounts of water suctioning frequently

c. avoid water going into stomach

- perform gastric lavage if necessary, monitoring and sampling contents
- contaminated hair
 - shampoo for 2-3 minutes and rinse thoroughly
 - b. survey and repeat washing if necessary
 - may cut hair but do not shave
- F. Transfer of patient
 - 1. cover pathway for clean stretcher
 - personnel remove outer apron and gown and 1 set of gloves (or change staff)
 - transfer patient to clean stretcher
 - survey stretcher wheels just prior to exit from area
- Personnel and area clean-up
 - personnel remove protective clothing in c rrect order
 - survey personnel for possible contamination; wash hands or 2. shower if necessary
 - collect personnel dosimeters for definitive readout
 - place contaminated materials in plastic bags and mark radioactive, monitor, and remove to storage area or back to accident site
 - survey all room surfaces; wash down contaminated areas under careful supervision of knowledgeable personnel
- VIII. Integration of Two Disciplines; Health Physics and Medicine
 - Prior meetings of industry based health physics personnel and medical personnel will clarify focus of patient management for each group
 - HPs comfortable with radiation; know exposure of staff can be B . minimal with protective measures; "don't hesitate to treat patient because of contamination"; may need directions vis-a-vis medical procedures
 - Nursing and medical personnel apprehensive about radiation may inhibit aggressive treatment of acute needs; "we need to know it is safe for us to work near patient"; may need interpretation of instrument readings

- IX. Importance of Periodic Drills
 - A. Educational benefits
 - 1. hands-on experience
 - familiarity with handling radioisotopes (if shortlived isotope is used)
 - experience available to new staff
 - B. Assurance of quality patient care rarity of accident precludes staff familiarity with routine
 - C. Follow-up critique
 - allows suggestions for improved procedures
 - 2. fosters discussion of staff concerns regarding radiation exposure

Whole Body Irradiation

- - A. Asymptomatic (<100 REMs)
 - 1. 10 REMS
 - a. Lowest amount of radiation which has a biological effect that can be measured in the individual.
 - b. Most sensitive technique for measuring radiation damage is cytogenetics.
 - Cytogenetics involves culturing the patient's lymphocytes and examining them for chromosomal abnormalities.
 - ii. Certain kinds of chromosomal abnormalities (e.g., dicentrics) are very characteristic of radiation induced abnormalities.
 - iii. The predisposition of circulating lymphocytes to develop chromosomal abnormalities should not be misconstrued as evidence for radiation inducing genetic abnormalities in man. Although it is likely that they do occur, radiation induced genetic abnormalities have not been detected in man even when large populations (Hiroshima and Nagasaki survivors) have been carefully studied.
 - Approximately the same dose one receives when undergoing a diagnostic test such as a cardiac catheterization or other angiographic procedure. Note that these procedures involve only partial body irradiation.
 - d. Temporary decrease in sperm count may occur.
 - 50 REMs
 A fall in the circulating lymphocyte count may be seen especially if serial counts are obtained.

1

- B. Symptomatic Acute Radiation Syndromes (>100 REMs)
 - 100 REMs
 50% of patients have anorexia, or nausea.
 - 150 REMs
 Redness of the conjunctive may appear.
 - 3. 200 REMs Hematopoietic Syndrome begins.
 - a. Vomiting occurs in 50% of persons.
 - Onset of vomiting between 20 minutes and three hours after the exposure. Earlier onset suggests higher dose.
 - Psychogenic vomiting in frightened, unexposed people is uncommon but must be considered.
 - iii. Lack of vomiting excludes life threatening exposure.
 - b. Decreased production of blood cells.
 - i. Rarely fatal at this dose.
 - ii. Lowest blood counts occur 3 4 weeks after the exposure.
 - c. Loss of hair.
 - i. Late effect after 17-20 days.
 - 3. 350 REMs

 Dose expected to kill 50% of untreated individuals.

 If measures are taken to avoid infections and hemorrhage, the LD50 may be considerably higher.
 - 4. 600 REMS
 - a. Bone marrow transplantation should be considered.
 - i. Probable 50-80% fatality rate without transplant.
 - Probability of finding a compatible donor is only about 40%.
 - iii. Probability of a successful transplant given a compatible donor is 50-60%; total probability of success is .4 x . 5 or 20%.
 - b. Permanent sterility (men and women) likely.
 - c. Death occurs 4-5 weeks after the accident.

- 5. 700 REMs Gastrointestinal Syndrome
 - a. At this dose, the lining of the gastrointestinal tract is damaged. This creates several additional life threatening problems.
 - The normal secretory and absorptive functions of the GI tract are impaired resulting in an unstable fluid balance and poor nutrition.
 - ii. The barrier between the bacteria normally found in the G. I. tract and the rest of the body is destroyed; further increasing the chances of infection.
 - b. Mortality is thought to approach 100% but very little experience in humans was available prior to the Chernobyl accident.
 - c. Death occurs 2-4 weeks following the accident.

6. 1000 REMS

- a. Probably invariably fatal; however, optimistic supportive treatment is appropriate since dosimetry estimates are likely to be significantly in error plus uniform exposure is unlikely.
- b. 1200 REMs of "whole body radiation" are routinely used to prepare cancer patients and aplastic anemia patients for bone marrow transplantation. This high radiation dose differs from an accident in that
 - i. it is carefully planned so that the bone marrow receives the bulk of the dose and the G. I. tract is spared.
 - ii. it is given in multiple small doses.
- 7. >2000 REMs Cerebrovascular Syndrome
 - a. Hopeless.
 - b. The blood vessels of the body are damaged and become leaky. Loss of intra-vascular volume causes uncontrollable hypotension.
 - c. Edema of all organs. Cerebral edema causes profound neurological symptoms and may by the cause of death.
 - d. Death occurs in days.

. 1 .

- II. Frequency of Whole Body Accidents (1945-1986)
 - A. Most Common Medically Significant Radiation Accident. 85 accidents worldwide. 20 accidents in US.
 - B. Accounts for Most Fatalities. 45 worldwide (including 30 at Chernobyl). 5 in the US.
- III. Types of Whole Body Accidents
 - A. Criticality Accidents
 - 1. Early Los Alamos Accidents 1945-46
 - 2. Oak Ridge 1958
 - 3. Yugoslavia 1958
 - 4. Mol, Belgium 1965
 - 5. Argentina 1984
 - 6. Chernobyl 1986
 - B. External Sources
 - Marshall Islands 1954
 Fallout
 - 2. Los Angeles 1958
 - 3. Pittsburg 1967
 - 4. Oakridge 1971
 - 5. Parsippany, NJ 1974
 - 6. Rockaway, NJ 1976
 - 7. California 1979

NUTE: See Appendix A on page 7.

- IV. Management of Acute Whole Body Exposures A. General Considerations.
 - 1. Acute whole body radiation exposure is not a medical emergency. Don't allow the radiation exposure to distract you from caring for any true medical emergency. Possible internal contamination should be treated expediously when indicated. External contamination should be removed when the patient is
 - 2. Reassure patient from the start.
 - a. Clearly identify one physician to be in charge. This physician need not be a radiation expert but should be very sympathetic to the needs of the patient. This physician should be present at all major discussions with the patient and should be willing to explain in detail what has happened and what is planned for the future. He must be empowered to protect the patient from unnecessary investigations and to protect the patient's privacy.
 - 3. Because of the rarity of radiation accidents you will have more "help" than you could want after an hour or two. Concentrate on the few things which you should do for this short time.
 - B. Specific Considerations
 - 1. Estimate probable dose.
 - a. Serial blood counts with a differential should be obtained immediately and every 6 hours for the first 48 hours. These blood counts will be the most reliable prognostic indicator.
 - b. Cytogenetic studies should be ordered but the results may take weeks.
 - from radiation monitors should be obtained.
 - d. If the radiation source include neutrons, the amount of exposure can be estimated by measuring residual radioactivity induced by the neutrons. This amount of activity is small and does not represent a risk to medical personal. Useful samples are the blood, hair and fingernails, metalic objects such as the rims of eyeglasses, jewelry, coins, wristwatches, buttons, etc. the exact location of these metal objects should be recorded.
 - f. Obtain a description of the accident from the patient and all eyewitnesses. Eventually a mock-up of the accident should be done to estimate the dosimetry. These estimates can be

. 1 .

grossly in error since they depend partly on the witnesses estimate of the time of exposure.

- 2. Low Dose (< 25 REMs).
 - Reassurance.
 Common questions involve risk of cancer, risk to future child and sterility.
 Follow-up.
- Very High Dose (> 2000 REMs).
 Invariably fatal provide supportive care and emotional support.
- 4. Potentially Fatal Dose (100 REMs 2000 REMs).
 a. Initial dose estimate is quite approximate therefore patient should be given the benefit of the doubt.
 - Avoid ordinary hospital environment to prevent colonization with resistant bacteria.
 - c. Ideally identify one matched donor for white cells and platelets.
 - d. Consider transfer to a facility expert in bone marrow transplants.
 - e. If granulocyte counts fall below 1500, use laminar flow facility, prophylatic oral antibiotics, routine cultures.
 - f. Treat fever with systemic antibiotics.
 - g. Weakness and fatigue may last several months.

Figure 2. Major Radiation Accidents: Criticality Accidents The Medical Basis for Radiation Accident Preparedness. New York, 1980. Elsevier/North-Holland, From Hubner KF, Fry SA:

Overview of Serious Radiation Accidents abed

TOTAL BODY IRRADIATION (BI)

- FATAL TREE SEVERE INJURY
 - FATAL TBI

FATAL BLAST INJURY

- INTERMAL EXPOSURE SURVIVING TBI 000
- LOCAL EXPOSURE
 - LOCAL ONLY 0 3
- SURGERY REQUIRED LOCAL + TBI

GENERAL NOTES

- NATURAL DEATH
 - FEMALE
- PATIENT
- FETUS
- RESCUER
- TOTAL PERSONS INVOLVED IN ACCIDENT REACTIS CONF. - 1979 unitation

major radiation accidents world-wide. In Figures 2-5, each square D represents one individual who received a radiation dose equal to or in excess of the DOE/ Figure 1. Chart key. This chart is applicable to Figures 2-5 that summarize the NRC dose criteria" as recorded in the U.S. and Foreign Radiation Accident Registries (REAC/13 December 1979). Body MUOIE

000000 · 0 0 0 0 A. A. A. A 6 4 6 Sel se O O 00 000 0 0 4 Q BB 0 V 0 **େଉଉଉଉଉଉଉଉଉଉଉ**ଉ MONE IN LAST 14 YEARS RHODE ISLAND MOL BELGIUM LOS ALAMOS LOS ALAMOS DAHO FALLS YUGOSLAVIA DAK RIDGE RICHLAND ARGONNE RUSSIA 45 45 98. 4 2 58 95. 4 533 58 83 82 20 \$ 85

् व डा विव विव विव विव विव विव विव 00000 6,0,0,0 0.00 A Sam 7 44 D 3 A ze us ৰা তাৰা 4 3 [9] 00000000000 0 0 MARSHALL ISLANDS FED. REP. GERMANY BRESCIA, ITALY LOS ANGELES MEXICO CITY PITTSBURGH PARSIPPANY WISCONSIN ARGENTINA CALIFORNIA MAYAGUEZ HOCKAWAY LOCKPORT P.R. CHINA AUSTRALIA OAK RIDGE GLASGOW ALGERIA RUSSIA JAPAN 4 54 £3. 4 18. 4 88 88 68 8 69. 4.71 12. 4 \$1.5 0 75 21. 4 87. 4

Figure 3. Major Radiation Accidents: Total Body Irradiation from External Sources.

A COLLECTION OF HELPFUL ITEMS FOR MEDICAL EVALUATION OF IONIZING RADIATION EXPOSURE CASES

This collection of miscellary provides information designed to help physicians to evaluate and treat radiation cases. It is divided into your sections:

Subjects		Pages
1.	DIRECT WHOLE BODY RADIATION CASES	19 23
III.	LOCAL RADIATION BURNS RADIGACTIVE INTERNAL CONTAMINATION	25
IV.	LATE EFFECTS	30

I. DIRECT WHOLE BODY RADIATION CASES

History:

- Circumstances of exposure.
 Source: Type of radiation, source strength, preliminary radiation measurements.
- 3. Position of patient relative to source.
 4. Length of exposure.
 5. Immediate symptoms (if any).

Initial Clinical Response (First 48 hours):

1. Early gastrointestinal symptomatology:

	Po	essible Do	se	Range
Anorexia	Most sensitive symptom	20+rad	or	30+R
Nausea		754 rad	or	110+R
Vomiting		100+rad	or	150+R
Diarrhea	Ominous	150+rad	or	225+R
doses	assume acute, one-time expe in rads are at body midline body exposure)			

2. Lymphocyte absolute count (Fair Prognostic Value)

1500-3000 lymphs/mm3 - Normal

1000-1500 " - Moderate injury; Good prognosis

500-1000 " - Severe injury; Fair prognosis >

100- 500 " - Very severe injury; Poor prognosis

Under 100 " - Lethal

- 3. Chromosome analysis: study of chromosomes in peripheral lymphocytes is probably the most sensitive laboratory test for detecting changes due to ionizing radiation. The number of chromosome aberrations, including inversions, translocations, deletions, dicentrics, and rings, can be used to estimate the exposure. The technique appears to be useful for evaluating exposures as low as about 10 rem to the whole body.
- 4. Skin erythema: can appear within minutes to hours following a single large exposure. Positive response correlating with known exposure suggests an exposure in excess of several hundred rads, but is only a confirmatory sign—not diagnostic. Skin response varies with dose fractionation, dose rate, radiation energy, depth—dose distribution, area size, anatomical region, and presence of other irritants, nonionizing radiations (UV), or trauma.

Radiation Dose Terms:

permissible dose - "The permissible dose for an individual is that dose, accumulated over a long period of time or resulting from a single exposure, which, in the light of present knowledge, carries a negligible probability of severe somatic or genetic injuries; furthermore, it is such a dose that any effects that ensue more frequently are limited to those of a minor nature that would not be considered unacceptable by the exposed individual and by competent medical authorities." (ICRP Publication 6, 1964). The permissible dose values are derived by independent professional bodies--National Council on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP).

(For Nuclear Regulatory Commission licensees: 10 Code of Federal Regs. 20.101)

Rems/calendar Quarter

 Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads

1 1/4*

2. Hands and forearms; feet and ankles

18 3/4 *

3. Skin of whole body

7 1/2

*If previous occupational doses are known, the whole body exposure limit may be revised to 3 rems/quarter provided accumulated occupational dose does not exceed 5(N-18) where N equals the individual's age in years at his last birthday.

Emergency Dose Limits - Life Saving Purposes (NCRP Report No. 39)

Individual (older than 45 years if possible)

100 rems

2. Hands and forearms

200 rems, additional (300 rems total).

Quality factor (QF) - arbitrary modifier used to translate rad to rem in radiation protection work to equate the probable biological effects resulting from different radiations; common values used are 1 for x- or gamma rays, 1 for electrons, 5 for protons, 10 or 20 for alpha particles, and 10 or less for neutrons (varies markedly with neutron energies).

rad - most common dosimetry term; defined as 100 ergs per gram of absorbed energy in any material.

relative biological effectiveness (RBE) - correction factor that equates various biological effects (mortality, cataracts, etc.) from exposure to various ionizing radiations to that of standard 250 keV x-rays or 60Co gamma rays.

rem - a dose equivalent unit that describes the same biological effectiveness as an absorbed dose of 1 rad x-radiation. (rem = rad x QF x other modifiers.)

ments) most commonly used for x-ray and gamma measurements. One roentgen produces 2.58x10 coulombs per kilogram of air. One roentgen exposure delivers about 93 ergs per gram of soft tissue.

DOSE-EFFECT RELATIONSHIPS FOLLOWING ACUTE

WHOLE BODY IRRADIATION (X- OR GAMMA)

Whole Body* Dose (rad)	Clinical and Laboratory Findings
5 - 25	Asymptomatic. Conventional blood studies are normal. Chromosome aberrations detectable.
50 - 75	Asymptomatic. Minor depressions of white cells and placelets detectable in a few persons, especially if baseline values established.
75 - 125	Minimal acute doses that produce prodromal symptoms (anorexia, nausea, vomiting, fatigue) in about 10-20% of persons within 2 days. Mild depressions of white cells and platelets in some persons.
125 - 200	Symptomatic course with transient disability and clear hematological changes in a majority of exposed persons. Lymphocyte depression of about 50% within 48 hours.
240 - 340	Serious, disabling illness in most persons with about 50% mortality, if untreated. Lymphocyte depression of about 75+% within 48 hours.
500 +	Accelerated version of acute radiation syndrome with gastrointestinal complications within two weeks, bleeding, and death in most exposed persons.
5000 +	Fulminating course with cardiovascular, gastro- intestinal and CNS complications resulting in death within 24-72 hours.

^{*} Conversion of rad (midline) dose to radiation measurements in R can be made roughly by multiplying rad times 1.5. For example, 200 rad (midline) is equal to about 300 R (200 x 1.5).

II. LOCAL RADIATION BURNS

History:

 Exposure to radiation may not be recognized; suspicion must be high if painful burn-like symptoms present without known etiology.

 Local burns usually result from handling a radioactive source or samples in or around x-ray apparatus or

accelerator beams.

3. Development of burn symptoms is much slower than with thermal burns. Blister formation within less than one week does not occur unless a severe radiation burn has been sustained. The shorter the latent period before symptoms, the more severe is the radiation burn.

 The energy of radiations (penetration power) is an important factor, expecially in beta-ray burns.

Representative Doses to Produce Skin Effects:

Theshold erythema (100 keV x-ray)	300R
Threshold erythema (1000 keV x-ray)	600-1000R
Raw, moist area	1500R
Ulceration, slow healing	2000+R
Gangrene	3000+R

Clinical Classification of Acute Radiation Burns:

Erythema: similar to first degree thermal burn.

The erythema appears 2-3 weeks after exposure depending on the dose. At the time of exposure there may be no symptoms of a burn.

Transepidermal Injury: similar to second degree thermal burn with a latent period of 1-2 weeks before blister formation depending on the dose. Initial symptoms at the burn site are erythema, pain, swelling, and itching or tingling. Usually will heal without skin grafting if protected to prevent infections.

thermal burn and is a more serious version of transepidermal injury. Injury extends into the dermis and produces prompt, intense pain. If involved area is more than a couple of centimeters in extent, skin grafting will be likely. Larger areas may involve necrosis and gangrene of the distal portion of the fingers or extremities and require amputation. Damage to the circulation is of prime importance in ultimate healing.

Treatment Considerations:

- Evaluate the possibilities of direct whole body (acute radiation syndrome) exposure. (See Section I.)
- 2. In beta-ray burns, early excision and skin grafting will spare the patient much discomfort and permit early restoration of function. In more penetrating exposures (x- or gamma), the extent of the burn and condition of subcutaneous circulation will be more difficult to evaluate early.
- Sterile, protective dressings should be used on local burns. No particular type of local ointment appears to be advantageous in treatment.
- 4. Surgical treatment should be minimized if in the early weeks of hematopoietic changes (depression) are noted or anticipated due to radiation exposure.

III. RADIOACTIVE INTERNAL CONTAMINATION

Radioactively contaminated materials may result in external surface (skin) contamination and internal deposition in the body. The following lists may be useful in emergency planning.

On-site Emergency Check List

(Note: The sequence and priority of these actions will vary with different accident conditions.)

Provide emergency medical care immediately for serious injuries and preserve vital functions. Minor injuries can wait until after initial radiation survey has been completed.

Remove individual from contaminated radiation area. Individual doses up to 100 rems may be permitted for life saving purposes or up to 25 rems for less urgent needs (NCRP Report No. 39). Teams may be used in relays to remove injured persons from very high radiation areas.

Survey individual for surface contamination levels.

Get masal smears. Do this before showering.

Remove contaminated clothes and replace with clean coveralls or wrap in blanket. Take subject to an area where skin decontamination or showering can be done.

Decontaminate skin. Remove all transferable contamination by cleansing contaminated skin areas and showering.

Cover contaminated wounds with sterile dressings before and after decontamination efforts.

Alert hospital and call for ambulance service as soon as it is determined that it is needed. Apprise them of the situation if their help is required.

Identify what radionuclide(s) is(are) involved in the accident and, if possible, ascertain its chemical form, solubility, and presumed particle size.

Send personnel radiation dosimeters for processing.

Get complete history of accident, especially as it relates to the activities of the patient. Where was he? What was he doing? Exit path? Symptoms?

Evaluate possibility of penetrating radiation exposure.

Advise patient on collection of all excreta. Provide containers. Save other contaminated materials.

Be sure someone has assumed responsibility for management of the accident area. Is radiological assistance needed? Who will request it? From whom?

Report your initial responses and evaluation to the plant manager.

Get names of supervisory and health physics personnel who will remain on call in case additional information is needed.

Take subject to the hospital if injuries require surgical care not available at plant or if further medical or dosimetric evaluation and treatment is required.

Take precautions to prevent spread of contamination during transport and movement of the patient. Have transport vehicles, attendants, and equipment checked for residual radioactive contamination before release from hospital area.

If environmental contamination outside the plant has occurred, notify public health authorities.

Advise family and next of kin on the extent of injuries and exposure. Plant management, personnel and the medical department should agree on the proper procedure.

Find out where to send bioassay specimens and length of time required for analysis. Specify who will receive the results.

Reference: NCRP, 1980. "Management of Persons Accidentally Contaminated With Radionuclides", NCRP Report No. 65 (National Council on Radiation Protection and Measurements, Washington).

Planning Considerations for

Hospital Management of the Radioactively-Contaminated Patient

A. Planning Considerations.

Assemble hospital team of staff persons trained to manage contaminated radiation cases, including physicians, medical physicists, technicians, and nurses. A team leader shall be designated. Develop a list of consultants for advice, such as physicians and health physicists experienced in handling such problems. These persons will aid the physician in charge of the case, as requested, in performing decontamination procedures.

Use preselected area in hospital that is suitable for decontamination of patients - consider location of room in an area of the hospital having a nearby outside entry, showers, hot and cold water, floor drains, ease of room washdown, table suitable for washdown, and isolation of air movement thru air conditioning or heating system. Consider physiotherapy room, cast room, regular emergency room, or autopsy room as possible candidates unless a special decontamination room is available.

Plan to evaluate the patient's medical condition immediately so as to determine priority of need for medical or surgical treatment, important diagnostic procedures, and decontamination procedures.

Plan to move patient within the hospital as little as possible so as to minimize hospital contamination. Keep patient in selected work area for medical and minor surgical treatment until loose contamination has been removed.

Arrange to have a health physicist monitor area entrances and hallways after the patient is located in the room so as to prevent "tracking" to other hospital areas.

Be prepared to set up monitoring station(s) at exits from the work area. Personnel should not leave the room (area) unless monitored for radioactivity. Equipment or property should not be removed from the room unless monitored. Designate persons to perform these monitoring tasks at specific locations.

Prepare a list of decontamination room supplies (see list on page 13) and either store them in the room or identify where they are available for quick assembly.

B. Hospital Decontamination Procedures

Personnel should wear surgical scrub suits, surgical caps and gowns, and rubber gloves (surgical, household, or industrial depending upon duties).

The team leader should be trained to recognize the rare, instance when there may be a need for masks, respirators, or supplied airpacks due to the presence of very high levels of alpha or beta radionuclides.

Rubber or plastic shoe covers are desirable. Those performing the actual decontamination with water should wear plastic or rubber laboratory aprons. Good temporary shoe covers for dry areas can be improvised from brown paper bags held on with adhesive or masking tape.

Air conditioning and forced air heating systems should be turned off so radioactive particulates are not carried into ducts or to other rooms unless a special filtered system has been designed for use under these conditions.

The floors should be protected with a disposable covering to reduce "tracking" by keeping cleaner surfaces and to aid the clean up tasks. The covering should be changed when significant contamination is present. Brown paper rolls (36 inches wide, 60-pound weight) are ideal where water is not used. Plastic sheets are useful where spillage of liquids is a problem, although ribbed or nonskid types should be used to reduce the chance of slips and falls.

All contaminated clothing should be placed carefully into plastic or paper bags to reduce secondary contamination of area.

Splashing of solution used in decontamination should be avoided.

Patients and personnel may move to clean areas only after surveys show satisfactory decontamination.

All passage of persons and property between contaminated and clean areas must be surveyed and regulated by monitoring teams.

Supplies are passed through monitoring stations from clean areas to contaminated areas. Reverse flow must not occur unless monitored and found clean.

All individuals on the decontamination team shall be trained in radiological monitoring and decontamination techniques. Persons not working on the team should be excluded from the work area.

Fiberboard or steel drums with tight fitting tops should be obtained for contaminated materials. Labels describing the contents should be affixed so that proper disposal can be carried out without reopening them. They may be sealed with masking tape or some other type of sealing tape.

Personal dosimeters (pocket chambers, film badge or TLD dosimeters) should be supplied to all personnel working in the decontamination area. Personnel should be rotated after a dose of 5 rems (or less if possible) is received.

The entry of all nonessential personnel including family, visitors, and administrative persons should be restricted.

Reference: NCRP, 1980. "Management of Persons Accidentally Contaminated With Radionuclides", NCRF Report No. 65 (National Council on Radiation Protection and Measurements, Washington).

IV. LATE EFFECTS OF IONIZING RADIATION

The potential late or delayed effects of greatest interest after accidental radiation exposures are:

1. Chronic Radiodermatitis.

Dry, atrophic, hairless skin with numerous telangiectatic areas is more prone to develop squamous-cell or basal-cell carcinomas. Doses required to produce late skin sequelae are likely to be in excess of 1000 rads to the basal cell area. If dose is protracted over pariods greater than 30 days, it is probable that chronic sequelae can occur without producing an acute skin reaction or developing chronic radiodermatitis.

2. Cataracts.

Direct exposure of the lens to x- or gamma rays, neutrons, and even higher energy beta rays can produce cataracts. Requires single dose of the order of 600 rads (200 rad minimum) of x- or gamma rays or 70 rad of fast neutrons. Protracted doses require higher exposure totals before effects may be noted. A latent period of several months to many years is present before beginning opacities are noted in the posterior subcapsular area of the lens. No features are pathognomonic, although initial changes at the posterior pole are expected. Radiation cataracts do not progress necessarily to complete loss of sight.

3. Sterility.

Fermanent sterility has not been noted following accidental whole body exposures even after exposure to the mid-lethal dose range of 300 rad. Doses of 500-600 can produce permanent sterility, while in males doses as low as 50 rads can cause a temporary period of sterility. Radiation does not appear to have significant effects on potency or libido.

4. Pre-natal Radiation Effects.

The fetus is particularly sensitive to radiation exposure during the period of major organogenesis (second to sixth week of gestation in man). Teratogenic effects are believed possible to low doses (10 rads) in man. For this reason, the MCRP has recommended that the maximum permissible dose equivalent to the fetus from occupational exposure of the expectant mother should not exceed 0.5 rem during the entire gestation period (NCRP 1977).

5. Carcinogenesis.

Development of cancer is the major late health effect resulting from exposure to ionizing radiation. Epidemiologic studies in man estimate a lifetime risk of excess cancer mortality per million persons per rad exposure of 75 to 250 cases (most likely value is about 100 to 125). Age at exposure to ionizing radiation is a major factor in the carcinogenic response. For example, for leukemia the risk increases with age of exposure after about 15 to 20 years of age; for breast cancer in women. the greatest sensitivity occurs during teenage. The table below shows the major radiation-induced cancers shown to have higher relative sensitivity to radiation and the . estimated risk. The risk estimates, taken from several authoritative sources, are nevertheless tentative and approximate. The question as to whether a threshold dose exists below which carcinogenesis is not induced is still not answered and probably never will be because one cannot detect these low probability excess cases statistically from among the higher baseline incidence of cancer from other causes.

The models from which risk estimates are extrapolated to the low dose regions are most frequently based on a linear, nonthreshold relationship. The data on which these estimates are based are nearly always from high dose exposures delivered at high dose rates. The UNSCEAR Committee (UNSCEAR 1977) report calls attention to this problem as follows: "It is to be expected that low-LET radiation is likely to be less carcinogenic per unit absorbed dose at doses of a few rads than at levels of one or a few hundred rads. ... The value appropriate to the much lower dose levels involved in occupational exposure, and even more so in environmental exposures to radiation, may well be substantially less."

Risk Estimates for Major Radiation-Induced Cancers

Cancer Pype	Contracting aggregations and a supplemental and a s	Lifetime E in 10 Pers Fatal Cases		Hinimum Latent Period (Years)	Depen Age	dent Sex	Factors
All Cancers		75-250					
Leukemia*	Atom bomb survivors Pelvic radiotherapy Spinal Scalp irradiation	15-60	15-60	2	x		x
Thyroid	Head/Chest radiotherap Scalp irradiation Marshall Islanders Atom bomb survivors	y 5-15	20-150	10	?	x	
Breast	Multiple fluoroscopies Breast radiotherapy Atom bomb survivors	10-80	30-200	<10	x	x	x
Lunger	Atom bomb survivors Uranium miners Spinal radiotherapy	20-90	20-100	10	x		
Alimentary Canal	Atom bomb survivors Pelvic radiotherapy Spinal radiotherapy	10-15	15-35	10	x		

^{*}All forms except chronic lymphocytic leukemia, which is not radiation induced.

Reference: Selected data from UNSCEAR 1977; NAS/NRC 1980; Pochin 1978.

^{***}History of cigarette smoking is an important dependent variable in the incidence of lung cancer.

6. Life Shortening.

Shortened life span without specific disease patterns has been studied by whole body irradiation of various animal species. This effect has not been demonstrated to date in either the Japanese atom bomb survivors or the Marshallese Islanders subjected to fallout irradiation. It has been noted in early American radiologists as a higher . age-specific death rate than in other medical specialists without occupational radiation exposure. This difference has lessened in recent years apparently as a result of decreasing radiation exposures. The National Council on Radiation Protection and Measurements (NCRP, 1971) states that "life shortening of persons whose exposure is maintained within presently recommended occupational limits would be too small to detect in the presence of so many other variables. While it is probable that some small degree of life shortening from radiation in man may occur following high-dose exposure, its quantitative expression is not possible at the present time."

7. Genetic Effects.

The largest study on genetic effects of exposed humans has been done on the offspring of the Japanese atom bomb survivors. No genetic injury has been identified in these studies. These data has been interpreted to suggest that the dose required to double the mutation rate in Hiroshima

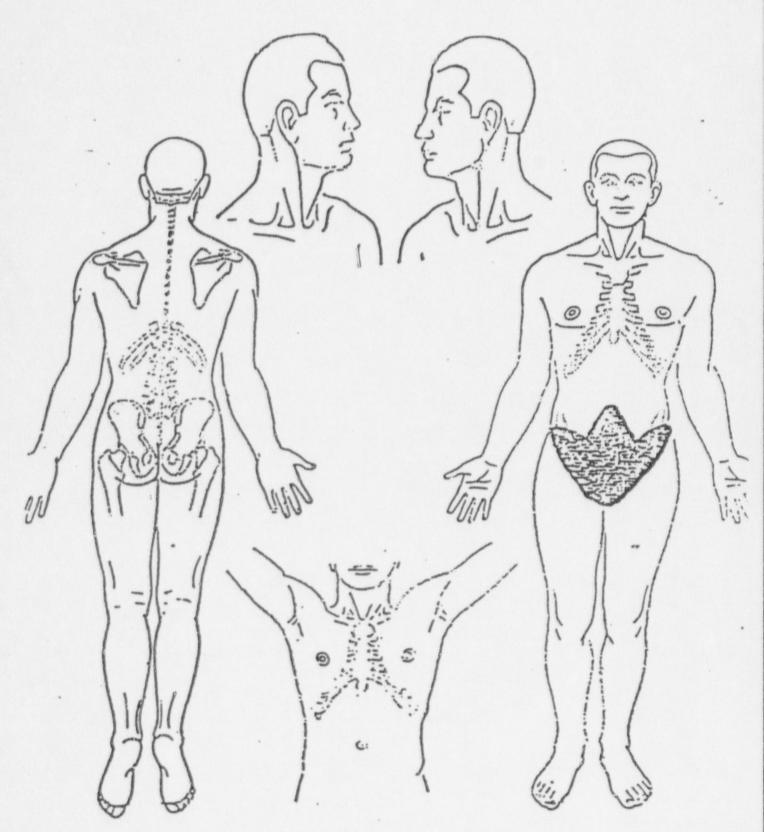
and Magasaki must be at least 150 rem.

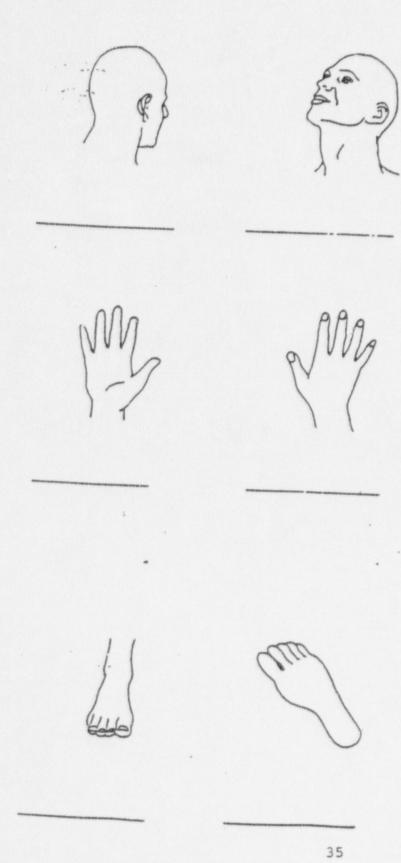
The UNSCEAR Committee report (UNSCEAR 1977), after reviewing experimental animal data and human data, uses a doubling dose value of 100 rem. The BEIR III Committee report (NAS/NRC 1980) indicates a range for the doubling dose of 50 to 250 rem. The doubling dose is the amount of radiation exposure required to produce as many more mutations as are already occurring spontaneously.

- NAM						
	remenseemb	MENNANCE INCREMENTAL PROPERTY.	SERVICE PROPERTY AND ADDRESS OF THE PARTY OF	CONTRACTOR OF THE PERSON AND	-	

DATE

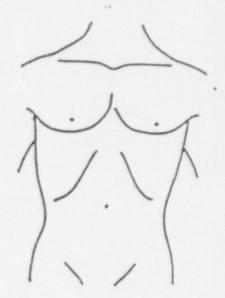
TIME AIMITTED











THE HANDLING AND TREATMENT OF RADIOACTIVELY CONTAMINATED AND INJURED PATIENT(S)

BY EMERGENCY DEPARTMENT PHYSICIANS AND NURSES

Prepared for

SCUDDERS AMBULANCE SERVICE

and

SAN CLEMENTE PARAMEDIC UNITS

Prepared by

Nuclear Affairs and Emergency Planning and Mesa Medical Department San Onofre Nuclear Generating Station

SOUTHERN CALIFORNIA EDISON COMPANY
P.O. Box 4198
San Clemente, California 92672

JUNE 4, 1987

1:30 p.m. - 3:30 p.m.

RADIATION ACCIDENTS

EMERGENCY CARE OF THE INJURED AND CONTAMINATED PATIENT

· DISCOVERY

- 1. Check vital signs.
- 2. Notify Control Room.
- 3. Observe patient.

· RESCUE

- 1. Bring First Aid bag, stretcher, blankets and high dose rate meter.
- 2. Check for high radiation field.
- 3. Perform first aid.
- 4. Traffic Control.
- 5. Check for other injuries.
- 6. Remove patient.

. TRANSPORT

- 1. Blankets under and in stretcher.
- 2. Secure patient in stretcher.
- 3. Take to ambulance pick-up point.
- 4. Continually check vital signs.

. EVACUATION

- 1. Provide ambulance with floor covering, dosimetry, and Anti-C clothing.
- 2. Direct ambulance to pick-up point.
- 3. Perform gross decontamination.
- 4. Transfer to ambulance stretcher. 5. Accompany patient to hospital.
- 6. Provide dose/hazard assessment.

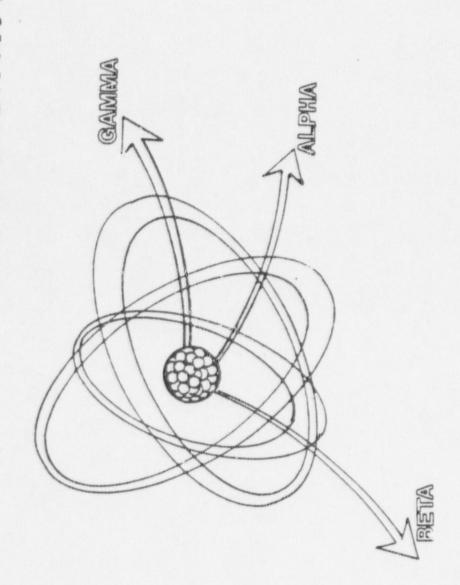
* ON - SITE TREATMENT (OPTIONAL)

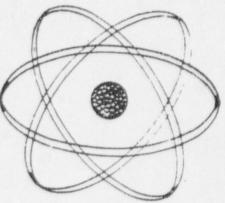
- 1. Stabilize injuries.
- 2. Leave wound dressing intact.
- 3. Decontamination.
 - Remove clothing.
 - Sample
 - Survey
 - Scrub
- 4. Dose Assessment.
- 5. Evacuate to hospital.

THE HANDLING AND TREATMENT OF RADIOACTIVELY CONTAMINATED AND INJURED PATIENT(S) BY EMERGENCY SERVICES PERSONNEL

Information Handout	
CONTENTS	PAGE
Radioactivity What, and where is it? Terminology	1 1
Radiation Accidents	5
Exposure Injury	6
External Contamination Response	7
Rescue Operation Hazards	8
Rescue Personnel Exposure Guidelines	9
Dose-Effect Relationships	10
Skin Effects	11
Effect of Time on Radiation Exposure	12
Effect of Distance on Radiation Exposure	13
Effect of Shielding on Radiation Exposure	1.4

RADIOACTIVITY





TERMINOLOGY

1 RAD = 1000 MILLIRAD ---- PHYSICAL

1 REM = 1000 MILLIREM --- BIOLOGICAL

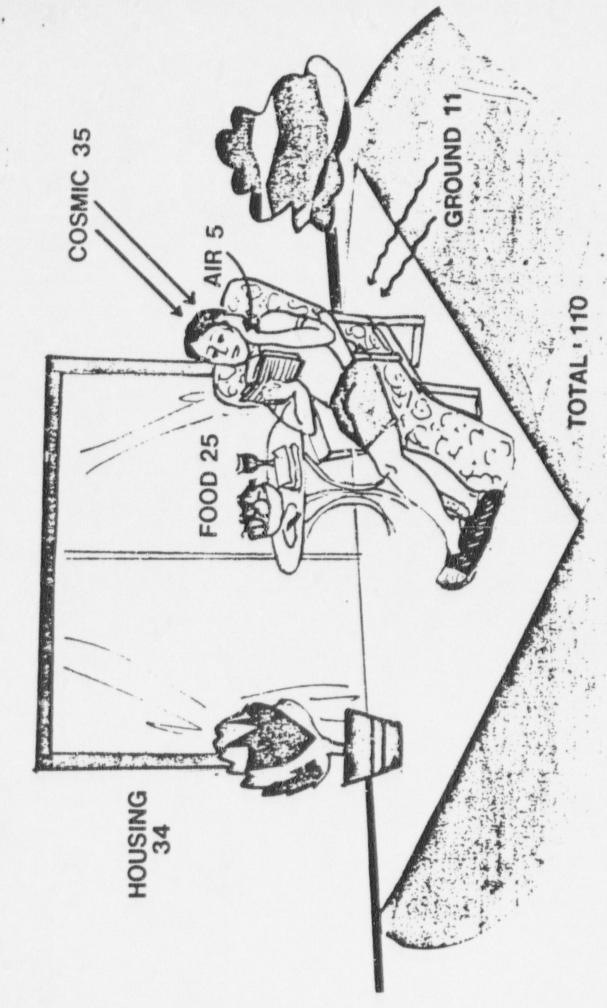
UNITS

COUNTS / MINUTE

MILLIREM / HOUR

RAD or REM / HOUR

Natural Background Radiation



A TERACIE IATURA SACKGROUI) RADIV TION (rient ar year) THE UNITE STATE 3

Radic: on Source	Gon. cs	Lung	Bone Surfaces
Cosmic Radiation	28	28	28
Cosmogenic Radionuclides	0.7	0.7	0.8
External Terrestrial	26	26	26
Inhaled Radionuclides	ı	100-450	
Radionuclides in Body	27	24	09
Totals (Rounded)	80	180-530	115

RADIATION ACCIDENTS

EXPOSURE

Partial Body Total Body

CONTAMINATION

External

Internal

EXPOSURE INJURY

Seldom Life-Threatening to Patient
Traumatic Injury takes Precedence
Clinical Course Unfolds Over Time
Few Initial Symptons
Must deal with Patient's Anxiety
No Hazard to Attendants
Normal ER Procedures

RESCUE OPERATION HAZARDS

SKIN CONTAMINATION · TOTAL BODY EXPOSURE

NCORPORATION OF RADIONUCLIDES

EXTERNAL CONTAMINATION RESPONSE

- TRAUMATIC INJURY
- ANXIETY
- DECONTAMINATION
- CONTAINMENT

RESCUE PERSONNEL EXPOSURE GUIDELINES

5000 mr 25000 mr 100000 mr

Routine Assistance
Emergency Care
Life-Saving
Situation

Dose-Effect Relationships

5,000 MREM NO OBSERVABLE EFFECTS

50,000 MREM BLOOD THRESHHOLD

100,000 MREM SYMPTOM THRESHHOLD

350,000 MREM 50% LETHALITY

600,000 MREM APPROACHING 100% LETHALITY

THESE RELATIONSHIPS FOR MIDLINE DEPTH
DOSES OF THE TOTAL BODY ARE USEFUL IN
THE INITIAL EVALUATION OF A PATIENT.
THESE EXPOSURES ARE FOR PENETRATING
GAMMA OR X-RAY RADIATION THAT OCCURS
WITHIN A DURATION OF A FEW HOURS.

SKIN EFFECTS

(mrads)

REDNESS 700 000 - 1000 000

FLAKING 1000000 - 2000000

ULCER 2000 000 - 3000 000

RADIODERMATITIS = 2500 000

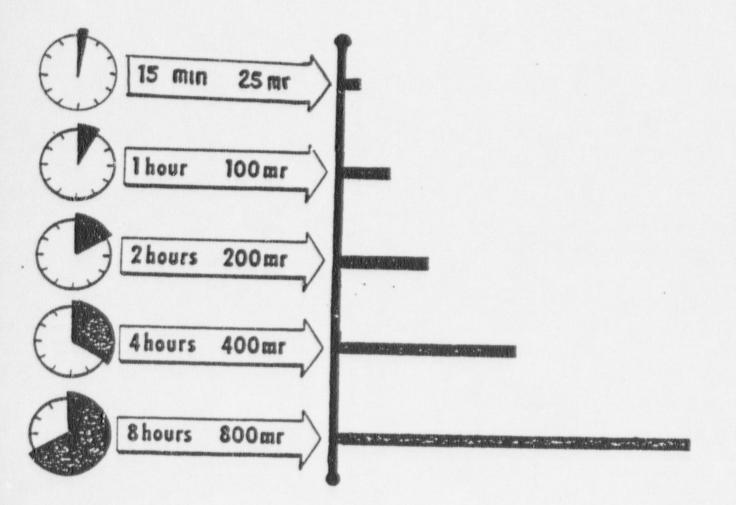
rmc

100 mr per hr.

Effect Of

Con Radiation

Exposure



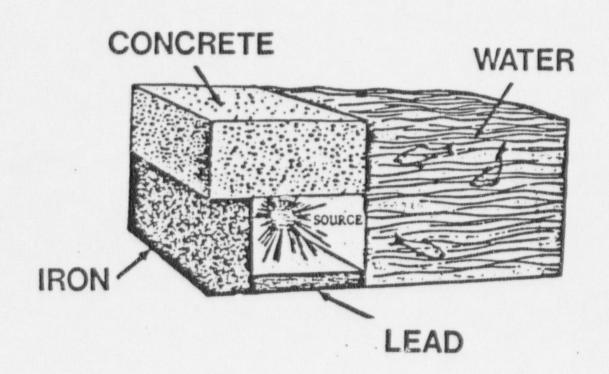
.

Effect of DISTANCE on Radiation Exposure

Exposure in mr/hr

10 9 8 7 6 5 4 3 2 1

Relative Efficiency of Various Shielding Materials



rmc