



**Constellation Energy**  
Nuclear Generation Group

February 22, 2008

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

**ATTENTION:** Document Control Desk

**SUBJECT:** Calvert Cliffs Nuclear Power Plant  
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318  
Independent Spent Fuel Storage Installation Docket No. 72-8  
Changes to the Emergency Response Plan and Implementing Procedures

As required by 10 CFR 50.54(q), 10 CFR Part 50 Appendix E.V, and 10 CFR 72.44(f), changes to the Emergency Response Plan and Implementing Procedures are enclosed. These changes do not decrease the effectiveness of the Emergency Response Plan.

Should you have questions regarding this matter, please contact Mr. Jay S. Gaines at (410) 495-5219 or Mr. R. R. Woods at (410) 495-3866.

Very truly yours,

Steven C. Speer  
Director - Emergency Preparedness

SCS/CAN/bjd

Enclosure: ERPIP-504, Revision 2, Change 5

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Resident Inspector, NRC  
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**(Without Enclosure)**  
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AX45

NRR

**CALVERT CLIFFS NUCLEAR POWER PLANT  
TECHNICAL PROCEDURE**

**EMERGENCY RESPONSE PLAN  
IMPLEMENTATION PROCEDURES**

**ERPIP-504**

**ENVIRONMENTAL ASSESSMENT DIRECTOR (EOF)**

**REVISION 00205**

**Safety Related**   ✓   **Non-Safety Related**       

**REFERRAL USE**

Periodically refer to  
procedure during use

**APPROVAL AUTHORITY**       Pete Katz      

**EFFECTIVE DATE**       Dec 21, 2000



## RECORD OF REVISIONS AND CHANGES

Rev.	Chg.	Summary of Revision and Changes
2	03-0020	<p>Procedure upgraded to meet the format and content requirements of the Technical Procedures Writer's Manual.</p> <p>Changed all TLD references to DLR (Dosimeter of Legal Record) throughout the procedure. Calvert Cliffs will be going to vendor processing and will no longer be using TLDs.</p> <p>Changed title of procedure and ERO positional titles to support closure of AF200200004, Nos. 002-008 to ensure ERP position titles are consistent among Emergency Preparedness program plans and procedures.</p> <p>Removed reference to TSC Computer Operators Guide. It was inadvertently included in the previous revision as part of standard upgrade template.</p> <p>Added reference to ERPIP-901 in appropriate steps for use with speed dial phones.</p> <p>Change bars have not been used to identify these minor corrections.</p>
	03-0230	<p>Corrected revision number throughout procedure. Change bars have not been used.</p>
	0203	<p>Added Dosimeter of Legal Record (DLR) to Subsection 3.3, <i>Definitions</i>.</p> <p>Changed Plant Chemistry Unit Laboratory in step 6.1.C.1 to Fort Smallwood Plant Chemistry Unit Laboratory to avoid confusion with Chemistry Unit at CCNPP.</p> <p>Corrected reference in step 6.2.A.1 CAUTION. Instead of 10CFR19, it should have been personnel who have been trained according to 10CFR20 and GET, not GOT.</p> <p>Corrected step 6.2.D by changing State Radiological Health Program to Maryland Department of the Environment, Accident Assessment Center.</p> <p>Changed incorrect radiation sampling point on Attachment 1, Environmental Radiation Monitoring Sample Points in the Vicinity of CCNPP, page 4 of 6. Instead of RT.234 &amp; Clark's Landing Road, it should be Rt. 235 &amp; Clark's Landing Road.</p> <p>Added column to Attachment 2, <i>Background Levels</i>, to indicate 1.5 times background.</p>

**RECORD OF REVISIONS AND CHANGES**

Rev.	Chg.	Summary of Revision and Changes
02	0204	Editorial correction to change the step 6.2.A Caution Note to a Warning. The Note is to protect personnel which necessitates a Warning.
002	00205	Editorial correction to update maps with more legible copies. There is no change in point locations. Incorporated additional maps to enhance point locations.  Also, updated Developmental References to align with Fleet Procedures.

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## LIST OF EFFECTIVE PAGES

Cumulative Changes to this Revision 5 (Including ECs)

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1	03-0020,03-0230	23	03-0020,03-0230		
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## 1.0 PURPOSE

This procedure provides emergency response instructions to the Environmental Assessment Director (EOF) when an emergency action level is called at Calvert Cliffs Nuclear Power Plant.

## 2.0 APPLICABILITY/SCOPE

This procedure applies to the Environmental Assessment Director (EOF).

### 2.1 Responsibilities

A. The Environmental Assessment Director (EOF) shall:

1. Report directly to the Radiological Assessment Director (EOF) during the period that the Emergency Operations Facility is activated.

## 3.0 REFERENCES AND DEFINITIONS

### 3.1 Developmental References

- A. NUREG 0654, Criteria for Preparation and Evaluation of Radiological Emergency response Plans and Preparedness in Support of Nuclear Power Plants
- B. 10 CFR 20, Standard for Protection Against Radiation
- C. 10 CFR 50.47, Emergency Plans
- D. 10 CFR 50 Appendix E to Part 50, Emergency Planning and Preparedness for Production and Utilization Facilities
- E. Calvert Cliffs Nuclear Power Plant Emergency Response Plan
- F. PR-1-101, *Preparation and Control of Calvert Cliffs Technical Procedures*
- G. CNG-PR-1.01-1005, *Control of Constellation Nuclear Generation Technical Procedure Format and Content*
- H. PR-1-103, *Use of Procedures*
- I. CNG-PR-1.01-1009, *Procedure Use and Adherence Requirements*
- J. Technical Procedures Writer's Manual



### 3.2 Performance References

- A. Calvert Cliffs Nuclear Power Plant Emergency Response Plan
- B. CNG-PR-3.01-1000, *Records Management*
- C. ERPIP-901, *Communications Equipment*

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### 3.3 Definitions

#### Dosimeter of Legal Record:

Any passive dosimeter for which NVLAP accreditation has been obtained and which may be used as a dosimeter of legal record (that is, DLR, Film, OSL, and so forth).

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### 4.0 PREREQUISITES

#### 4.1 Training and Qualification

Personnel performing this procedure shall be qualified on the tasks or activities contained in this procedure.

#### 4.2 Initial Conditions

One of the following emergency action levels is called at Calvert Cliffs Nuclear Power Plant:

- Alert
- Site Area Emergency
- General Emergency

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### 5.0 PRECAUTIONS

Declared pregnant women and minors are not authorized to perform emergency functions.





## 6.0 PERFORMANCE

### 6.1 Activation

- A. **REPORT** to Emergency Operations Facility on notification of an Alert or higher.
- B. **NOTIFY** Radiological Assessment Director (EOF) of your presence in the Emergency Operations Facility.
- C. Status
  - 1. **ESTABLISH** contact by standard telephone or radio (refer to ERPIP-901, *Communications Equipment*) with the Fort Smallwood Plant Chemistry Unit Laboratory.

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#### NOTE

Plant Parameters Status Board is located in the status room. Meteorological Status Board is located in the Dose Assessment Office.

- 2. **GET** emergency classification and plant status from the Plant Parameters Status Board.
- 3. **GET** meteorological conditions and updates from Meteorological Status Board.
- 4. **REVIEW** Dose Assessment status with the Radiological Assessment Director (EOF).



## 6.2 Operation

### A. Environmental Impact

#### WARNING

Environmental sampling and DLR exchange during atmospheric radiological releases may result in undue exposure/contamination to personnel and equipment. Only personnel who have been trained according to 10CFR20 or CCNPP GET part 2 may enter areas where sheltering or evacuation protective actions have been implemented.

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1. **IF** projected or measured radioactivity levels in air, water, soil or vegetation indicate that environmental contamination may result or be present, **THEN**:
  - a. **CONSIDER** initiating environmental sample collection and performing gamma-spectrometric analysis of the field samples. Attachment 1, *Environmental Radiation Monitoring Sample Points in the Vicinity of CCNPP*, for routine environmental sample locations.
  - b. **COORDINATE** with the Radiological Assessment Director (EOF) to have iodine and particulate samples collected by offsite monitoring teams subjected to gamma-spectrometric analysis.

#### NOTE

It is advisable to collect only one environmental DLR from each location. The second DLR could serve as an overall event radiation record.

2. **IF** projected or measured ambient radiation dose rates exceed expected background by 50% or more as listed in Attachment 2, *Background Levels*, **THEN INITIATE** collection/replacement of environmental DLRs.
  3. **ESTIMATE** the projected possible environmental impact of evaluated/projected releases.
- B. **ASSIST** and **ADVISE** the Radiological Assessment Director (EOF) as the situation warrants.
- C. **NOTIFY** the Radiological Assessment Director (EOF) of results of evaluations.



## 6.2 Operation (Continued)

- D. **SUPPORT** the Maryland Department of the Environment, Accident Assessment Center, in sampling and evaluating ingestion pathway deposition.
- E. Recovery

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### NOTE

During the recovery phase, the Environmental Assessment Director (EOF) may return to the Plant Chemistry Unit Laboratory and function according to Standard Operating Procedures.

- 1. Based on environmental data:
  - a. **CONSIDER** providing state and federal ingestion pathway assistance with:
    - Attachment 3, *Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies*.
    - Attachment 4, *Relocation*, for return and relocation policies.
    - Population dose calculations.
    - Assessment of the source term.
  - b. **DESIGN** a long-term radiological monitoring program for the area(s) affected by the accident.

## 6.3 Deactivation

**ON** deactivation of the Emergency Operations Facility, **THEN FORWARD** emergency records to the Director-Emergency Preparedness.

## 7.0 POST PERFORMANCE ACTIVITIES

None

## 8.0 BASES

None



## 9.0 RECORDS

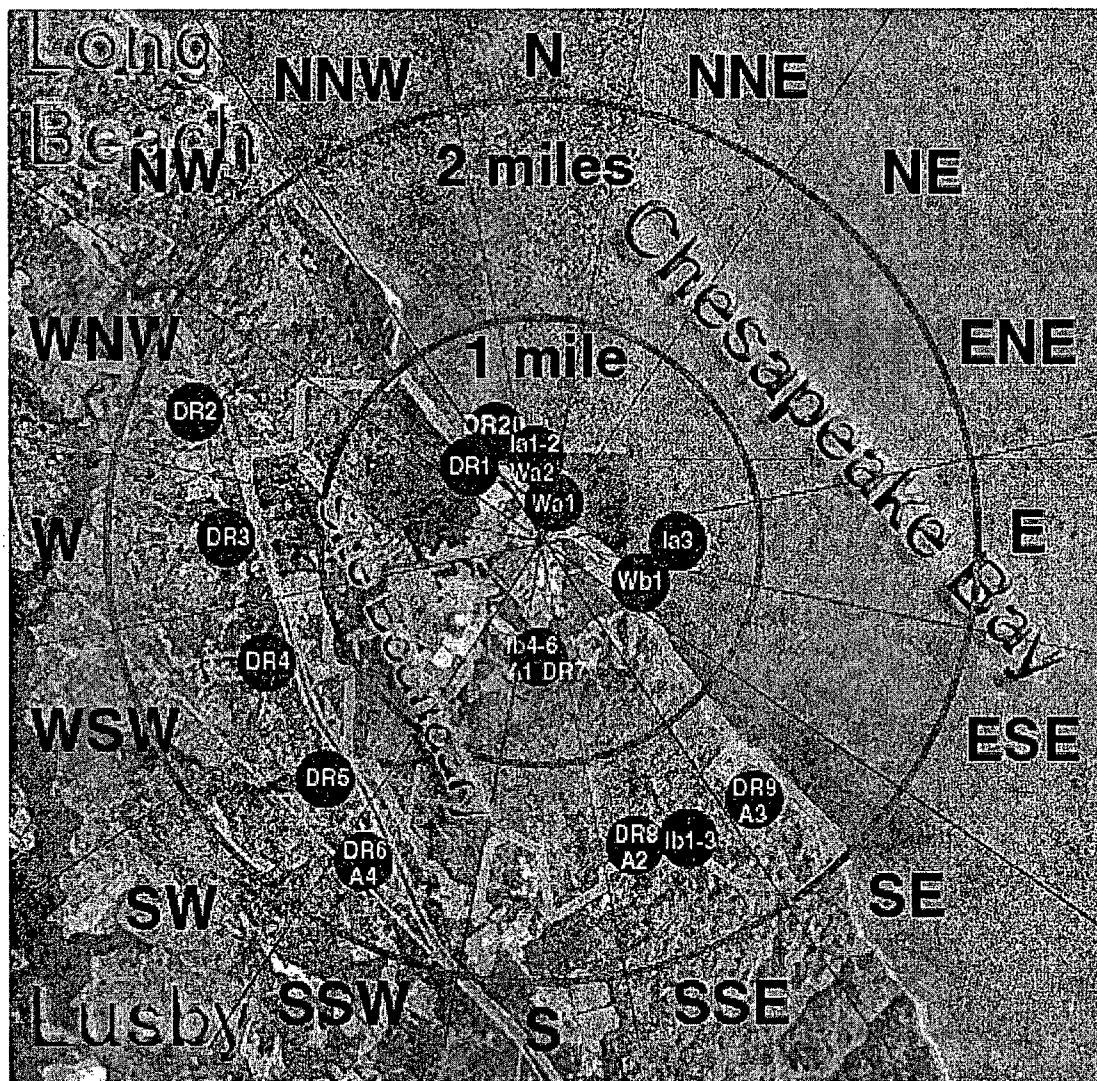
Records generated by this procedure may be permanent, non-permanent, or lifetime radiological records depending on the circumstances under which they are generated. Records shall be captured and controlled as follows:

- A. During an actual event as described in the purpose statement of this procedure, records shall be considered **permanent** records and submitted to the Emergency Preparedness Unit for final disposition according to CNG-PR-3.01-1000.
- Attachment 1, *Environmental Radiation Monitoring Sample Points in the Vicinity of CCNPP*
  - Attachment 2, *Background Levels*
  - Attachment 3, *Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies*
  - Attachment 4, *Relocation*
- B. During an actual event as described in the purpose statement of this procedure, dosimetry records, that is, any dose-related record including access history records, are considered **radiological lifetime records** and are to be handled and maintained according to standard practices and unit procedures.
- None
- C. During a drill or exercise, records generated shall be considered **non-permanent** records and submitted to the Emergency Preparedness Unit for evaluation.
- Attachment 1, *Environmental Radiation Monitoring Sample Points in the Vicinity of CCNPP*
  - Attachment 2, *Background Levels*
  - Attachment 3, *Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies*
  - Attachment 4, *Relocation*

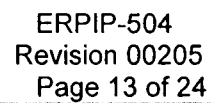


ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE  
VICINITY OF CCNPP

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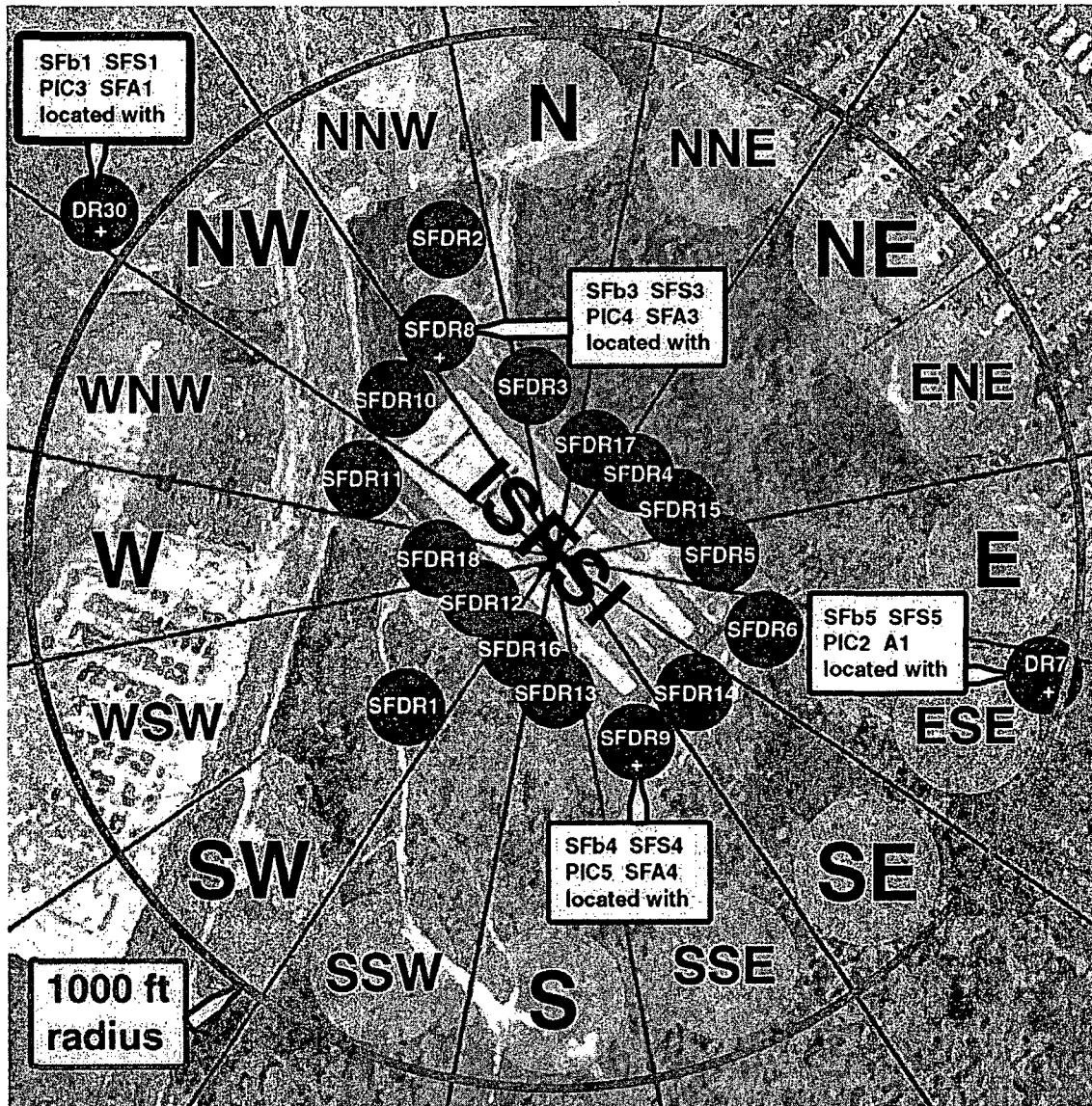




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ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE VICINITY OF CCNPP

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**ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE VICINITY OF CCNPP**

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	STATION DESCRIPTION	DISTANCE*		DIRECTION* (SECTOR)	TYPE OF SAMPLE
		KM	MILES		
A1	On Site before entrance to Camp Conoy (TS)	0.7	0.4	S	Air Sample
A2	Camp Conoy Rd near emergency siren (TS)	2.5	1.6	SSE	Air Sample
A3	Bay Breeze Rd (TS)	2.6	1.6	SE	Air Sample
A4	Route 765 Lusby (TS)	2.9	1.8	SSW	Air Sample
A5	Emergency Operations Facility (EOF) (TS)	19.3	12.0	WNW	Air Sample
A6	Long Beach (NTS)	4.4	2.7	NW	Air Sample
A7	Taylor's Island, Carpenter Property (NTS)	12.6	7.8	ENE	Air Sample
A8	Cambridge, U of MD Estuarine Center (NTS)	32	19.9	NE	Air Sample
DR1	On Site along cliffs (TS)	0.6	0.4	NW	DLR
DR2	Route 765 auto dump (TS)	2.7	1.7	WNW	DLR
DR3	Route 765 Giovanni's Tavern (Knotty Pine) (TS)	2.3	1.4	W	DLR
DR4	Route 765 across from White Sands sign (TS)	2.0	1.2	WSW	DLR
DR5	Route 765 John's Creek (TS)	2.4	1.5	SW	DLR
DR6	Route 765 Lusby (TS)	2.9	1.8	SSW	DLR
DR7	On Site before entrance to Camp Conoy (TS)	0.7	0.4	S	DLR
DR8	Camp Conoy Rd near emergency siren (TS)	2.5	1.6	SSE	DLR
DR9	Bay Breeze Rd (TS)	2.6	1.6	SE	DLR
DR10	Calvert Beach Rd and Decatur Street (TS)	6.4	4.0	NW	DLR
DR11	Dirt road off Mackall & Parran Rds (TS)	6.6	4.1	WNW	DLR
DR12	Mackall & Bowen Rds (TS)	6.7	4.2	W	DLR
DR13	Mackall Rd near Wallville (TS)	6.1	3.8	WSW	DLR
DR14	Rodney Point (TS)	6.4	4.0	SW	DLR
DR15	Mill Bridge & Turner Rds (TS)	6.2	3.9	SSW	DLR
DR16	Across from Appeal School (TS)	6.5	4.0	S	DLR
DR17	Cove Point & Little Cove Point Rds (TS)	5.9	3.7	SSE	DLR
DR18	Cove Point (TS)	7.1	4.4	SE	DLR
DR19	Long Beach (TS)	4.4	2.7	NW	DLR
DR20	On Site near shore (TS)	0.4	0.2	NNW	DLR
DR21	Emergency Operations Facility (EOF) (TS)	19.3	12.0	WNW	DLR
DR22	Solomons Island (TS)	12.5	7.8	S	DLR
DR23	Taylor's Island (TS)	12.6	7.8	ENE	DLR
DR24	Rt. 4 and Parran Road (NTS)	3.0	1.9	WNW	DLR
DR25	Onsite guard house off Camp Conoy (NTS)	1.0	0.6	S	DLR

\* Distance &amp; Direction from the central point between the two containment buildings.

TS = Technical Specification Site

NTS = Non Technical Specification Site

ISFSI = Interim Spent Fuel Storage Installation





**ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE VICINITY OF CCNPP**

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STATION DESCRIPTION		DISTANCE*		DIRECTION*	TYPE OF
		KM	MILES	(SECTOR)	SAMPLE
DR26	Rt. 235 & Clark's Landing Road (NTS)	20.5	12.7	SW	DLR
DR27	Rt. 231 & Rt. 4 (NTS)	23	14.3	NW	DLR
DR28	Taylor's Island siren #35 Hooper Neck Rd (NTS)	12.3	7.6	ENE	DLR
DR29	Taylor's Island siren #38 Punch Island Rd (NTS)	12.5	7.8	E	DLR
DR30	Meteorological Station (TS)	0.8	0.5	WSW	DLR
DR31	Cambridge, Horn Point Rd (NTS)	32	19.9	NE	DLR
DR32	Taylor's Island, Twining Property (NTS)	12.3	7.6	NE	DLR
DR33	Taylor's Island, P.A. Ransome Property (NTS)	14.8	9.2	ESE	DLR
DR34	Intake Trailer (NTS)	0.2	0.1	NE	DLR
PIC1	Carpenter Property, Taylor's Island, (NTS)	12.6	7.8	ENE	Ion Chamber
PIC2	Plant Garden Site (NTS)	0.7	0.4	S	Ion Chamber
PIC3	Site Meteorological Station (NTS)	0.8	0.5	WSW	Ion Chamber
PIC4	Site NNW Corner of ISFSI (NTS)	0.6	0.4	SW	Ion Chamber
PIC5	Site South of ISFSI (NTS)	0.6	0.4	SW	Ion Chamber
PIC8	Visitor's Center (NTS)	0.3	0.2	NW	Ion Chamber
SFA1	Meteorological Station (TS)	0.8	0.5	WSW	Air Sample
SFA2	Site Visitor's Platform (TS)	0.3	0.2	NW	Air Sample
SFA3	North North West Corner of ISFSI (TS)	0.6	0.4	SW	Air Sample
SFA4	South Corner of ISFSI (TS)	0.6	0.4	SW	Air Sample
SFDR1	Collocated with Plant DLR #159 (TS)	0.8	0.5	SW	DLR
SFDR2	Collocated with Plant DLR #160 (TS)	0.7	0.4	SW	DLR
SFDR3	Collocated with Plant DLR #161 (TS)	0.6	0.4	SW	DLR
SFDR4	Collocated with Plant DLR #162 (TS)	0.6	0.4	SW	DLR
SFDR5	Collocated with Plant DLR #163 (TS)	0.7	0.4	SW	DLR
SFDR6	Collocated with Plant DLR #164 (TS)	0.7	0.4	SSW	DLR
SFDR7	Site Visitor's Center (TS)	0.3	0.2	NW	DLR
SFDR8	NNW Corner of ISFSI (TS)	0.6	0.4	SW	DLR
SFDR9	South of ISFSI (TS)	0.6	0.4	SW	DLR

\* Distance & Direction from the central point between the two containment buildings.

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**ERPIP****ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE VICINITY OF CCNPP**

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STATION DESCRIPTION		DISTANCE *		DIRECTION	TYPE OF
		KM	MILES	(SECTOR)	SAMPLE
SFDR10	NNW of ISFSI (TS)	0.6	0.4	SW	DLR
SFDR11	WNW of ISFSI (TS)	0.7	0.4	SW	DLR
SFDR12	West of ISFSI (TS)	0.7	0.4	SW	DLR
SFDR13	SSW of ISFSI (TS)	0.7	0.4	SW	DLR
SFDR14	SSE of ISFSI (TS)	0.8	0.5	SSW	DLR
SFDR15	ENE of ISFSI (TS)	0.6	0.4	SW	DLR
SFDR16	WSW of ISFSI (TS)	0.7	0.4	SW	DLR
SFb1	Meteorological Station (TS)	0.8	0.5	WSW	Vegetation
SFb2	Visitor's Center (TS)	0.3	0.2	NW	Vegetation
SFb3	North NorthWest of ISFSI (TS)	0.6	0.4	SW	Vegetation
SFb4	South of ISFSI (TS)	0.6	0.4	SW	Vegetation
SFb5	Onsite before Entrance to Camp Conoy (TS)	0.7	0.4	S	Vegetation
SFS1	Meteorological Station (TS)	0.8	0.5	WSW	Soil
SFS2	Visitor's Center (TS)	0.3	0.2	NW	Soil
SFS3	North NorthWest of ISFSI (TS)	0.6	0.4	SW	Soil
SFS4	South of ISFSI (TS)	0.6	0.4	SW	Soil
SFS5	Onsite before Entrance to Camp Conoy (TS)	0.7	0.4	S	Soil

\* Distance &amp; Direction from the central point between the two containment buildings.

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**ATTACHMENT 1, ENVIRONMENTAL RADIATION MONITORING SAMPLE POINTS IN THE VICINITY OF CCNPP**

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	STATION DESCRIPTION	DISTANCE *		DIRECTION * (SECTOR)	TYPE OF SAMPLE
		KM	MILES		
Wbs1	Plant Site Intake Area (NTS)	0.2	0.1	NE	Bottom Sediment
Wbs2	Plant Site Discharge Area (NTS)	0.3	0.2	N	Bottom Sediment
Wbs3	Long Beach (NTS)	4.4	2.7	NW	Bottom Sediment
Wbs4	Camp Conoy/Rocky Point (NTS)	3.0	1.9	SE	Bottom Sediment
Vw1	Taylors Island, Carpenter Property (NTS)	12.6	7.8	ENE	Well Water
Ib1,2,3+	Bay Breeze Road (TS)	2.6	1.6	SSE	Vegetation
Ib4,5,6+	Onsite Before Entrance to Camp Conoy (TS)	0.7	0.4	S	Vegetation
Ib7,8,9+	Emergency Operations Facility (TS)	19.3	12.0	WNW	Vegetation
Ia1,2	Plant Site Discharge Area (TS)	0.3	0.2	N	Fish
Ia4,5	Patuxent (TS)	N/A	N/A	N/A	Fish
Ia3	Camp Conoy (TS)	0.9	0.6	E	Oysters
Ia6	Kenwood Beach (TS)	10.7	6.6	NNW	Oysters
Wa1	Plant Site Intake Area (TS)	0.2	0.1	NNE	Bay Water
Wa2	Plant Site Discharge Area (TS)	0.3	0.2	N	Bay Water
Wb1	Camp Conoy (TS)	0.6	0.4	ESE	Shoreline

\* Distance &amp; Direction from the central point between the two containment buildings.

+ Garden Vegetation typically available June - November.

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## ATTACHMENT 2, BACKGROUND LEVELS

CCNPP DLR NETWORK					EMERGENCY SURVEY NETWORK
STATION	DIST (mi)	DIRECTION	AVERAGE (a) EXPOSURE RATE ( $\mu$ R/h)	1.5 TIMES BACKGROUND ( $\mu$ R/h)	STATION
DR1	0.4	NW	6.6	9.9	
DR2	1.7	WNW	5.3	8.0	
DR3	1.4	W	5.3	8.0	
DR4	1.2	WSW	6.2	9.3	
DR5	1.5	SW	6.0	9	
DR6	1.8	SSW	5.0	7.5	
DR7	0.4	S	5.0	7.5	
DR8	1.6	SSE	7.2	10.8	EMERGENCY 57
DR9	1.6	SE	5.8	8.7	
DR10	4.0	NW	5.1	7.7	
DR11	4.1	WNW	5.5	8.3	
DR12	4.2	W	5.3	8.0	
DR13	3.8	WSW	5.6	8.4	
DR14	4.0	SW	6.3	9.5	EMERGENCY 21
DR15	3.9	SSW	5.8	8.7	EMERGENCY 27
DR16	4.0	S	5.6	8.4	
DR17	3.7	SSE	5.9	8.9	EMERGENCY 34
DR18	4.4	SE	5.0	7.5	EMERGENCY 36
DR19	2.7	NW	5.3	8.0	EMERGENCY 1
DR20	0.2	NNW	6.5	9.8	
DR21	12.0	WNW	6.2	9.3	
DR22	7.8	S	4.8	7.2	
DR23	7.8	ENE	7.1	10.7	

a. Average values calculated using monthly CCNPP DLR measurements between March 1985, and July 1988.



**ATTACHMENT 3, ACCIDENTAL RADIOACTIVE CONTAMINATION OF HUMAN FOOD AND ANIMAL FEEDS: RECOMMENDATIONS FOR STATE AND LOCAL AGENCIES**

Page 1 of 3

**I. PROTECTIVE ACTION GUIDES**

- 5mSv (0.5 rem) CEDE
- 50mSv (5 rem) CDE to individual tissue and organ

**II. DERIVED INTERVENTION LEVELS (DILs)**

- Above doses converted to concentration.
- Limit of acceptable concentration in human food.
- Each DIL is set to the most vulnerable population segment.
- Limits are given by isotope.
- Each isotope is evaluated independently.
- Each food type is evaluated independently.

**III. GROUPING OF NINE RADIONUCLIDES FOR WHICH THE DILs WERE DEVELOPED.**

- Sr-90 grouping
- I-131 grouping
- Cs-134 + Cs-137 grouping
- Ru-103 + Ru-106 grouping
- Pu-238 + Pu-239 + Am-241 grouping

**IV. PRINCIPAL RADIONUCLIDES FOR NUCLEAR REACTORS**

- I-131 Grouping
- Cs-134 + Cs-137 grouping
- Ru-103 + Ru-106 grouping

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**V. RECOMMENDED DERIVED INTERVENTION LEVEL (DIL) OR CRITERION FOR EACH RADIONUCLIDE GROUP <sup>(a), (b)</sup>****ALL COMPONENTS OF THE DIET**

Radionuclide Group	(Bq/kg)	(pCi/kg)
Sr-90	160	4300
I-131	170	4600
Cs-134 + Cs-137	1200	32,000
Pu-238 + Pu-239 + Am-241	2	54
Ru-103 + Ru-106 <sup>(c)</sup>	$\frac{C_3}{6800} + \frac{C_6}{450} < 1$	$\frac{C_3}{180,000} + \frac{C_6}{12,000} < 1$

Notes:

- (a) The DIL for each radionuclide group (except for Ru-103 + Ru-106) is applied independently. Each DIL applies to the sum of the concentrations of the radionuclides in the group at the time of measurement.
- (b) Applicable to foods as prepared for consumption. For dried or concentrated products such as powdered milk or concentrated juices, adjust by a factor appropriate to reconstitution, and assume the reconstitution water is not contaminated. For spices, which are consumed in very small quantities, use a dilution factor of 10.
- (c) Due to the large difference in DILs for Ru-103 and Ru-106, the individual concentrations of Ru-103 and Ru-106 are divided by their respective DILs and then summed. The sum must be less than one.  $C_3$  and  $C_6$  are the concentrations, at the time of measurement, for Ru-103 and Ru-106, respectively.

Ref: Table 2, Accidental Radioactive Contamination of Human and Animal Feeds: Recommendations for State and Local Agencies, August 13, 1998. U.S. Department of Health and Human Services, Food and Drug Administration.

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**VI. PROTECTIVE ACTIONS PRIOR TO CONFIRMATION**

Protective actions can be taken prior to a release or confirmation of contamination and can include:

- Precautionary action such as covering exposed products, sheltering animals, use of stored feed:
  - ◆ Can be considered early.
  - ◆ Should avoid placing persons implementing actions in jeopardy.
- Temporary embargoes of food.
  - ◆ Should be issued only if a General Emergency is declared.
  - ◆ Predictions of extent and magnitude are persuasive.
  - ◆ Should remain in effect until sample results are obtained.

**VII. PROTECTIVE ACTIONS AFTER CONFIRMATION**

Protective actions which should be implemented when contamination in food equals or exceeds DILs consists of:

- Temporary embargoes of food.
  - ◆ Can be considered when presence of contamination is confirmed but concentrations are not yet known.
- Normal food production and processing actions that reduce contamination in or on food below DILs.
  - ◆ Holding for decay, washing, peeling.

**VIII. PROTECTIVE ACTIONS**

- Milk animals – stored feed, uncontaminated water.
- Milk – withhold fresh milk from market, divert to powdered milk, storage for decay.
- Fruits and vegetables – washing, brushing, scrubbing and peeling to remove contamination, storage for decay by canning or freezing.
- Grains – milling and polishing. Do not harvest.
- Other food products – process to remove surface contamination.
- Meats and meat products – case-by-case basis, place on uncontaminated feed and water.
- Water – cover open wells, cisterns, tanks, disconnect filter pipes from run off supplies, close water intakes.
- Soil – Idling or dispose, deep plowing, alternating crops, liming.

**ATTACHMENT 4, RELOCATION**

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**Protective Action Guides For Exposure To Deposited  
Radioactivity During The Intermediate Phase Of A Nuclear Incident**

Protective Action	PAG (projected dose) <sup>a</sup>	Comments
Relocate the general population. <sup>b</sup>	$\geq 2$ rem	Beta dose to skin may be up to 50 times higher
Apply simple dose reduction techniques. <sup>c</sup>	$< 2$ rem	These protective actions should be taken to reduce doses to as low as practicable levels.
<p>a. The projected sum of effective dose equivalent from external gamma radiation and committed effective dose equivalent from inhalation of resuspended materials, from exposure or intake during the first year. Projected dose refers to the dose that would be received in the absence of shielding from structures or the application of dose reduction techniques. These PAGs may not provide adequate protection from some long-lived radionuclides.</p> <p>b. Persons previously evacuated from areas outside the relocation zone defined by this PAG may return to occupy their residences. Cases involving relocation of persons at high risk from such action (for example, patients under intensive care) should be evaluated individually.</p> <p>c. Simple dose reduction techniques include scrubbing and/or flushing hard surfaces, soaking or plowing soil, minor removal of soil from spots where radioactive materials have concentrated, and spending more time than usual indoors or in other low exposure rate areas.</p>		

Source - PMT-409 6/90





## ATTACHMENT 4, RELOCATION

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**Recommended Surface Contamination Screening Levels for Persons  
And Other Surfaces At Monitoring Stations in Low Background  
Radiation Areas (<0.1 mR/h Gamma Exposure Rate)**

Condition	Geiger counter thin window <sup>a</sup> reading	Recommended action
Before decontamination	<2X bkgd	Unconditional release
	>2X bkgd	Decontaminate
After simple <sup>b</sup> decontamination effort	<2X bkgd	Unconditional release
	>2X bkgd	Full decontamination <sup>c</sup>
After full <sup>c</sup> decontamination effort	<2X bkgd	Unconditional release
	>2X bkgd	Continue to d-con persons
After additional full decontamination effort	<0.5 mR/h <sup>d</sup>	Release animals and equipment
	<2X bkgd	Unconditional release
	>2X bkgd	Send persons for special evaluation
	<0.5 mR/h <sup>d</sup>	Release animals and equipment
	>0.5 mR/h <sup>d</sup>	Refer, or use informed judgment on further control of animals and equipment

- a. Windown thickness of approximately 30mg/cm<sup>2</sup> is acceptable. Recommended limits for open window readings are expressed as twice the existing background (including background) in the area where measurements are being made. Corresponding levels, expressed in units related to instrument designations, may be adopted for convenience. Levels higher than twice background (not to exceed the meter readings corresponding to 0.1 mR/h) may be used to speed the monitoring of evacuees in very low background areas.
- b. Flushing with water and wiping is an example of a simple decontamination effort.
- c. Washing or scrubbing with soap or solvent followed by flushing is an example of a full decontamination effort.
- d. Closed shield reading including background.