THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI, OHIO 45201

E. A. BORGMANN
SENIOR VICE PRESIDENT

April 19, 1982

Docket No. 50-358

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

RE: WM. H. ZIMMER NUCLEAR POWER STATION-
UNIT 1 - NRC EMERGENCY PREPAREDNESS
REVIEW

Dear Mr. Denton:

This is in response to the NRC letter dated January 22, 1982 from B. J. Youngblood to E. A. Borgmann regarding the status of the Emergency Preparedness Review for the Wm. H. Zimmer Nuclear Power Station and also addresses NRC comments transmitted by NRC letter dated November 12, 1981 from Mr. Youngblood to Mr. Borgmann.

Attached are the responses to the NRC comments referenced above following the format of the NRC January 22, 1982 letter. Ten copies of each of the comment responses are enclosed. In addition, three copies of each are being forwarded to NRC Region III for their review.

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A005
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1/10

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Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By E. A. Borgmann
E. A. BORGMANN

EAB:dew
Enclosures
cc: John H. Frye III
M. Stanley Livingston
Frank F. Hooper
Troy B. Conner, Jr.
James P. Fenstermaker
Steven G. Smith
William J. Moran
J. Robert Newlin
James D. Flynn
W. F. Christianson
James H. Feldman, Jr.
John D. Woliver
Deborah F. Webb
David K. Martin
George E. Pattison
Andrew B. Dennison
NRC Region III Incident Response Center (3/3)
Samuel H. Porter

State of Ohio)
County of Hamilton) ss

Sworn to and subscribed before me this 19th day of April, 1982.

Alice M. Leurck
Notary Public
ALICE M. LEURCK
Notary Public, State of Ohio
My Commission Expires December 16, 1986

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WM. H. ZIMMER NUCLEAR POWER STATION-UNIT 1

RESPONSES TO NRC COMMENTS

RELATING TO THE ZPS EMERGENCY PLAN

APRIL, 1982

THE CINCINNATI GAS & ELECTRIC COMPANY

CINCINNATI, OHIO 45201

E. A. BORGMANN
SENIOR VICE PRESIDENT

April 19, 1982

Docket No. 50-358

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Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
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Notary Public, State of Ohio
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RESPONSES TO JANUARY 22, 1982 NRC LETTER

COMMENT

Submit the final State and local emergency response plans in accordance with 10 CFR 50.33. This should include the plans for the States wholly or partially within the ingestion pathway EPZ.

RESPONSE

Emergency response plans for all States and counties located within the plume exposure EPZ have been previously submitted in draft form. State plans for the 50-mile Ingestion Pathway EPZ have also been submitted, with the exception of the Indiana Radiological Emergency Response Plan for Fixed Nuclear Facilities. A copy of revision 4 dated May, 1980 is attached. Final plans will be submitted upon completion.

COMMENT

Receive and review FEMA findings and determinations as to whether the State and local emergency response plans are adequate.

RESPONSE

(This is an NRC item)

COMMENT

Correct the deficiencies identified in the November 12, 1981 letter to the applicant and address the enclosed comments (attached) to ensure conformance with the standards in 10 CFR 50.47(b).

RESPONSE

Responses are included with this submittal.

COMMENT

Complete an onsite appraisal and correct any deficiencies that indicate the applicant's plan cannot be implemented.

RESPONSE

This item will be completed prior to fuel load.

COMMENT

Correct the deficiencies identified during the November 18, 1981 exercise.

RESPONSE

This item will be completed prior to fuel load.

COMMENT

Provide supporting information for the evacuation time estimate study.

RESPONSE

Supporting information for evacuation time estimates was provided by CG&E letter dated February 12, 1982 (E. A. Borgmann to Harold Denton).

COMMENT

In accordance with 10 CFR 50, Appendix E, IV, (D) (2) the Plan must demonstrate that State/local officials have the capability to make a public notification decision promptly (within 15 minutes for situations requiring urgent action). The Plan must identify each step in the protective action decisionmaking chains, the authority of the decision makers, their backups, provision for backup communication, and the basis on which they will make decisions to demonstrate that the requirements of 10 CFR 50, Appendix E are addressed. This description must be reflected in the appropriate State and local plans or be supported by letters of agreement.

RESPONSE

1. Actions Planned and Criteria for Their Implementation

There are various types of protective actions which can be taken by the public. These include the following:

a. Evacuation

b. Shelter

c. Access control

d. Food, milk, and water distribution control

e. Prophylaxis (e.g., radioprotective drugs)

The Emergency Duty Supervisor (EDS) at ZPS-1 has the authority to recommend that these protective actions be taken. Table F.6-2 lists protective actions that may be recommended to offsite authorities by the EDS for various accident phases (keyed to approximate time periods following the accident) as a function of exposure pathways during a radiological emergency.

One of the initial protective action recommendations that the EDS could make to offsite authorities is that the population-at-risk take shelter and await further instruction. The recommendation by the EDS that the public evacuate the affected areas in many cases requires that an evaluation be performed to determine if evacuation produces the greatest dose savings. For this reason, an EDS protective action recommendation that the population-at-risk evacuate the affected areas is generally considered to be a follow-up recommendation, although it may be that evacuation is the first recommended protective action.

An evaluation of the efficacy of public evacuation must use the recommendations set forth in Table F.4-2 as a basis. Projected doses to the public are correlated to the dose ranges and accompanying recommended actions in Table F.4-2. However, these projected doses to the population sectors under consideration are determined by such factors as the kind and amount of release, release duration, and weather conditions. Projected doses are compared with the projected public radiation exposure if the population were evacuated (taking into account the results of the evacuation time studies) and with the projected exposure if the same population were sheltered (taking into account the shelter shielding factors in Tables F.6-3 and F.6-4) in order to determine which recommended action in Table F.4-2 is preferable. The details of this assessment and decisionmaking process are covered in the offsite dose assessment Emergency Plan Procedure (EPP).

2. Offsite Protective Action Decisionmaking

As stated earlier, it is the responsibility of the EDS to recommend protective actions to offsite authorities. However, it is the responsibility of the offsite authorities to decide which protective actions to implement. In Ohio, the Clermont County Sheriff's Office and the Clermont County Disaster Services Agency (CCDSA) are notified of an emergency and any recommended protective actions simultaneously, via the ZPS-1 private microwave system. The Sheriff's Office maintains a 24-hour manned dispatching service, and serves as the 24-hour contact for Clermont County. Back-up communications for the microwave system is commercial telephone.

The Clermont County Sheriff has been designated by the Clermont County Commissioners as the person with overall command authority for protective action decisionmaking. In the absence of the Sheriff, that authority passes on to the senior Inspector, one of whom is on duty at all times. The CCDSA Director also has the authority to call for protective actions for the public under the Ohio Revised Code (ORC)-Section 5915, and may also assume that authority in the absence of the above mentioned officials.

The Sheriff, or one of his alternates, will base a protective action decision upon the recommendation from the EDS, as well as recommendations from the State of Ohio and Clermont County dose assessment teams. These offsite dose assessment teams will perform an independent assessment of the emergency. They will utilize plant

parameters and meteorological data provided by a computer terminal linked via microwave to the ZPS-1 onsite computer. For situations requiring urgent actions, the appropriate offsite official has the authority to render a protective action decision based solely upon the recommendation of the EDS.

The Kentucky Disaster and Emergency Services Duty Officer is notified by the ZPS-1 EDS over a microwave link. Bracken, Pendleton, and Campbell Counties are notified simultaneously by the ZPS-1 EDS over a microwave link during working hours. Campbell County is the only location where the microwave link is manned on a 24-hour basis. The method of notification during non-working hours in Bracken County is by two-way radio and in Pendleton County is by radio monitor receiver. Alternate means of notification are by telephone.

At the State level, the Governor has the authority to recommend the appropriate protective actions to the County Judge/Executives. In his absence the authority lies with the Adjutant General, DES Executive Director, and the Director of Operations, in that order. The decision will be based on the recommendations from the ZPS-1 EDS and the Radiation Control Branch which is the responsible State agency for performing the independent dose assessment function.

The County Judge/Executives are the authorities which make the final protective action recommendation to the population within their jurisdiction. They will receive the protective action recommendation from the ZPS-1 EDS and the State over separate microwave links. The

State can also provide hard copy information over a microwave data link. The Judge/Executive may, however, choose to implement a protective action based solely on the recommendation from the ZPS-1 EDS for a situation which warrants immediate public action. In the absence of the Judge/Executive, the Deputy Judge/Executive and then the County DES Director have the authority to recommend a protective action to the public.

The above descriptions of the offsite protective action decisionmaking process are reflected in the appropriate State and local radiological emergency plans. The following table reflects primary and back-up communications with the key decisionmakers and is consistent with the present State and local plans:

Jurisdiction	Decision-Maker	Communications
Clermont County, Ohio	1. Sheriff	1. Microwave
		2. Commercial Telephone
	2. CCDSA Director	1. Microwave
		2. Radio-activated Pager via Sheriff's Dispatcher
		3. Commercial Telephone
Bracken County, Ky.	1. Cty. Judge/Executive	1. Microwave
	2. Deputy Judge/Executive	2. Commercial Telephone
	3. County DES Director	3. Radio

Campbell County, Ky.	1. Cty. Judge/Executive	1. Microwave
	2. Deputy Judge/Executive	2. Commercial Telephone
	3. County DES Director	
Pendleton County, Ky.	1. Cty. Judge/Executive	1. Microwave
	2. Deputy Judge/Executive	2. Commercial Telephone
	3. County DES Director	3. Monitor Radio

COMMENT

Specify all of the functions to be performed by the CAS operator as "communicator" and discuss why these functions will not interfer with the performance of his normally assigned duties.

RESPONSE

During any emergency situation, the Central Alarm Station (CAS) staff, normally consisting of a single person (i.e., the CAS operator), is increased to two persons - one assigned to handle the normal duties and one assigned to handle functions associated with the emergency.

COMMENT

In accordance with the revision of 10CFR50, Appendix E, IV(D)(3) {46FR63032} the applicant must conduct a test of the prompt notification system and correct any deficiencies identified. Provide, along with the description of the system in the Plan, the results of this test that demonstrates that the design objective of the system has been met.

RESPONSE

The prompt notification system will be tested to demonstrate that the design objective of the system has been met and results of this test submitted prior to fuel loading.

COMMENT

The handbook should be expanded to include: a discussion of methods of improvised respiratory protection, site specific evacuation maps, and a discussion of the physical form of releases (e.g., gas) and its relationship to recommended protective actions that demonstrate the importance of taking the actions recommended.

RESPONSE

Subject to the approval of State and local planners, the handbook will be expanded to include a discussion of methods of improvised respiratory protection, site specific evacuation maps, and a discussion of the physical form of releases (e.g., gas) and its relationship to recommended protective actions that demonstrate the importance of taking the actions recommended.

COMMENT

Specify the assumptions on which the offsite dose projection methods will be based. Describe the job aids that will be used to perform offsite dose projections and alternates 1, 2, 3, and 5 discussed on page 6-5 of the Plan.

RESPONSE

The Emergency Plan Section F.6.2.5 which addresses alternate sources for determining release rates in the event of offscale or inoperative stack monitoring instruments is being revised.

The attached report on "Data and Procedures for Estimating Radioactivity Release Rates When Stack Monitors Are Not Available" provide the assumptions and job aids that will be used to initially determine release rates of noble gases and iodines for use in either the Rad/Met computer or manual overlay method for performing offsite dose projections.

A post accident sampling system is also provided to allow subsequent sampling of stack effluents for laboratory analysis. Therefore, initial dose projections may be further refined based on effluent sample analysis.

WM. H. ZIMMER NUCLEAR POWER STATION

DATA AND PROCEDURES FOR ESTIMATING RADIOACTIVITY RELEASE RATES WHEN STACK MONITORS ARE NOT AVAILABLE

2.0 FORMULAS, PROCEDURES, AND DATA

This section provides formulas, procedures, and data for estimating various parameters.

2.1 Radioactivity Units

The subscript "i" on quantities involving amount of radioactivity denotes "Xe-133" or "I-131." The radioactivity is in units of "equivalent µCi", which denotes, accordingly, either "Xe-133-equivalent µCi" or "I-131-equivalent µCi."

2.2 Stack Effluent Concentration

$$C_i = K_i \dot{X} \qquad (2.1)$$

where

C_i = effluent radioactivity concentration [equivalent µCi/cc]

K_i = effluent concentration factor [(equivalent µCi/cc)/(mR/hr)]

$\dot{X}$ = exposure rate [mR/hr]

The exposure rate must be measured by a specified fixed monitor or at a specified point, as indicated below. Data for K_i for the time period 1 hour to 10 days is presented as indicated below.

a. Factors for Determining SGTS Effluent Concentration from the Refueling Floor High Range Area Radiation Monitor 1D21-N004

Measuring Point: Fixed monitor

Concentration Factors:

K_{Xe-133}: Fig. 2.0-1

K_{I-131}: Fig. 2.0-2

1.0 INTRODUCTION

This document provides information for estimating the post-accident radioactivity release rate from a stack when data from the stack monitor is not available. The following release points are considered:

- Standby Gas Treatment System (SGTS) Vent Stack;
- Main Plant Vent Stack.

Effluent radioactivity concentrations are estimated from exposure rates measured at specified locations. These concentrations are used to obtain release rates. The rates are in units of Xe-133-equivalent for estimating dose equivalent rate to the whole body or in units of I-131-equivalent for estimating dose equivalent rate to the thyroid. The release rates can also be used to determine the Emergency Action Level classification. Applicable formulas, procedures and data are given in Section 2.0.

An important parameter in the estimates is the effluent concentration factor K_i (i = Xe-133 or I-131). This factor is the ratio of effluent concentration to exposure rate. The value of K_i depends strongly on the isotopic composition of the source. After an accident this composition will vary with time. Section 2.0 contains graphs of values of K_i for the time period 1 hour to 10 days after reactor shutdown. The values are based on the isotopic compositions of an assumed scenario which is described in Section 3.0.

DATA AND PROCEDURES FOR ESTIMATING RADIOACTIVITY RELEASE RATES WHEN STACK MONITORS ARE NOT AVAILABLE

TABLE OF CONTENTS

b. Factors for Determining SGTS Effluent Concentration from "Shine" Exposure Rate on the Auxiliary Building Roof

Measuring Point: Exposure rate $\dot{X}$ due to "shine" from the refueling floor is measured on the roof of the Auxiliary Building (Elev. 591'7") outside the Elevator Machine Room at its southeast corner (see Fig. 2.0-3).

Concentration Factors:

$K_{Xe-133} = 6.67 \times 10^{-3}$ (μCi/cc Xe-133-equiv.)/(mR/hr) (2.1a)

K_{I-131}: Fig. 2.0-5

c. Factors for Determining Main Plant Vent Stack Effluent Concentration from Exposure Rate Near the Stack

Measuring Point: Exposure rate is measured on Elevation 525'7" at 30" above the floor at 0', 5', or 10' from the stack wall.

Concentration Factors:

K_{Xe-133} (0', 5', 10'): Fig. 2.0-6

K_{I-131} (0'): Fig. 2.0-7

K_{I-131} (5', 10'). Fig. 2.0-8

2.3 Release Rate

$$\dot{Q}_i = (4.72 \times 10^2)\ W\ C_i \qquad (2.2)$$

where

$\dot{Q}_i$ = release rate [equivalent μCi/sec]

W = stack flow rate [ft^3/min]

C_i = effluent radioactivity concentration [equivalent μCi/cc]

2.4 Emergency Action Level Classification

Status with respect to two Emergency Action Level Classifications (Site Emergency or General Emergency) can be obtained by comparing the calculated value of $\dot{Q}_i$ with the values tabulated in Table 2.0-1.

2.5 Site Boundary Dose Equivalent Rate

2.5.1 Whole Body

$$\dot{D}_{wb} = (4.14 \times 10^{-2}) (\chi/Q') \dot{Q}_{Xe-133} \qquad (2.3)$$

where

$\dot{D}_{wb}$ = maximum dose equivalent rate at the site boundary to the whole body [mrem/hr]

(χ/Q') = relative concentration factor [sec/m^3]

$\dot{Q}_{Xe-133}$ = release rate [Xe-133-equivalent μCi/sec]

Values of (χ/Q') are as given in Table 2.0-2

2.5.2 Thyroid

$$\dot{D}_{thy} = (1.85 + 3) (\chi/Q') \dot{Q}_{I-131} \qquad (2.4)$$

where

$\dot{D}_{thy}$ = maximum dose equivalent rate at the site boundary to a child thyroid due to iodine inhalation [mrem/hour of inhalation]

$\dot{Q}_{I-131}$ = release rate [I-131-equivalent μCi/sec]

Values of (χ/Q') are as given in Table 2.0-2.

Fig. 2.0-1

SGTS Noble Gas Effluent Concentration Factor K_{Xe-133} For the Refueling Floor High-Range Area Radiation Monitor 1D21-N004

1 Hour to 10 Days

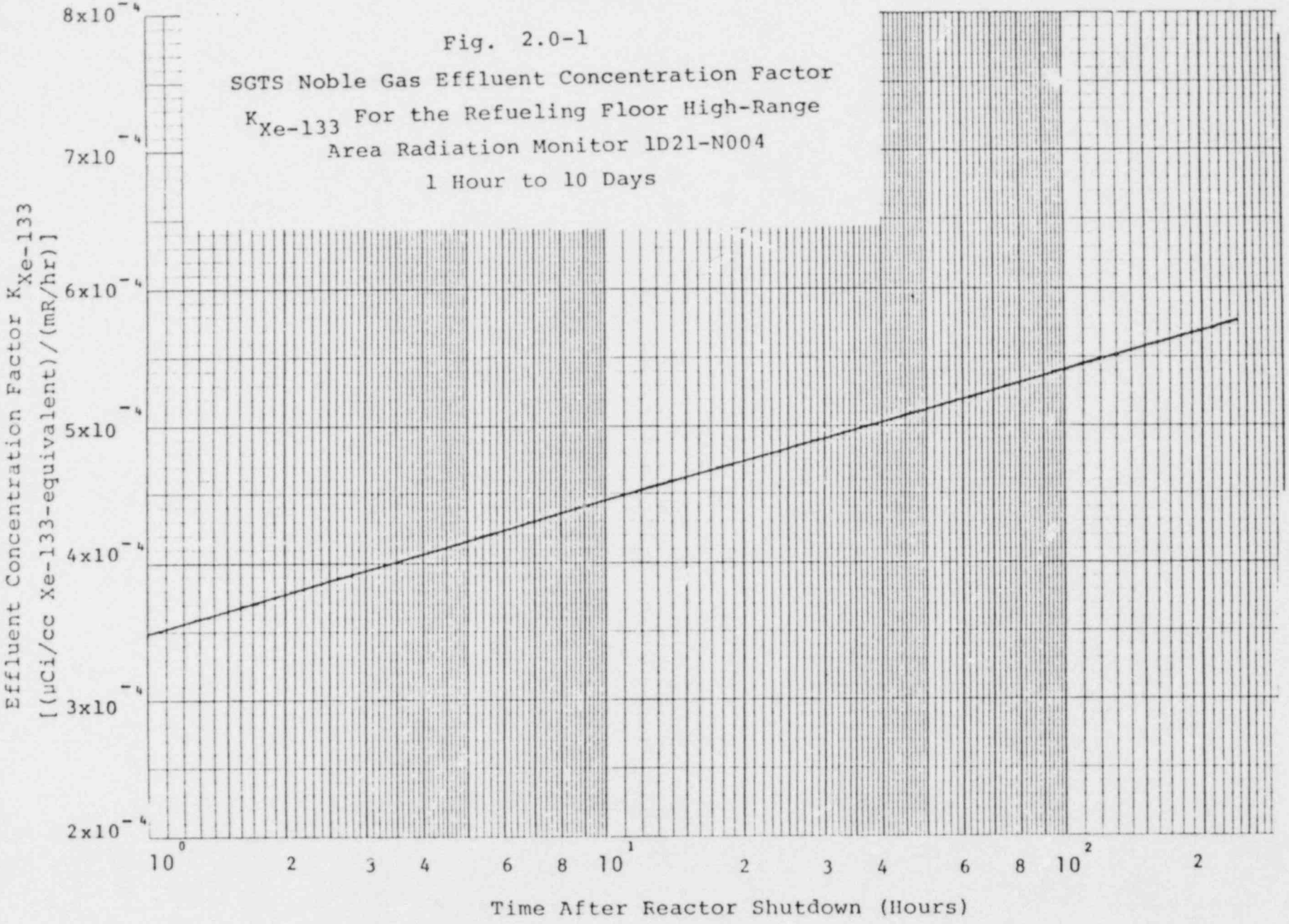
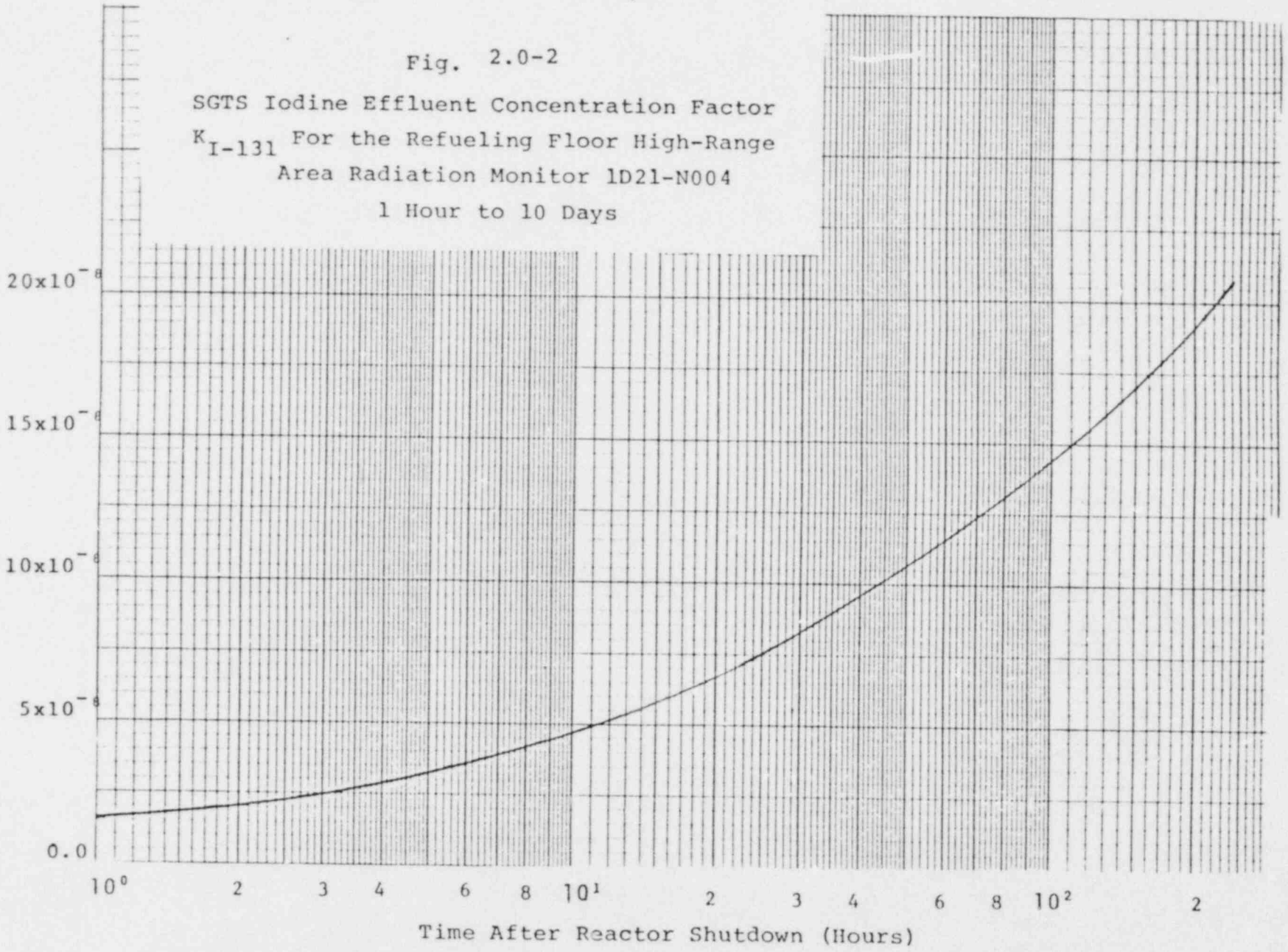


Fig. 2.0-2

SGTS Iodine Effluent Concentration Factor K_{I-131} For the Refueling Floor High-Range Area Radiation Monitor 1D21-N004

1 Hour to 10 Days



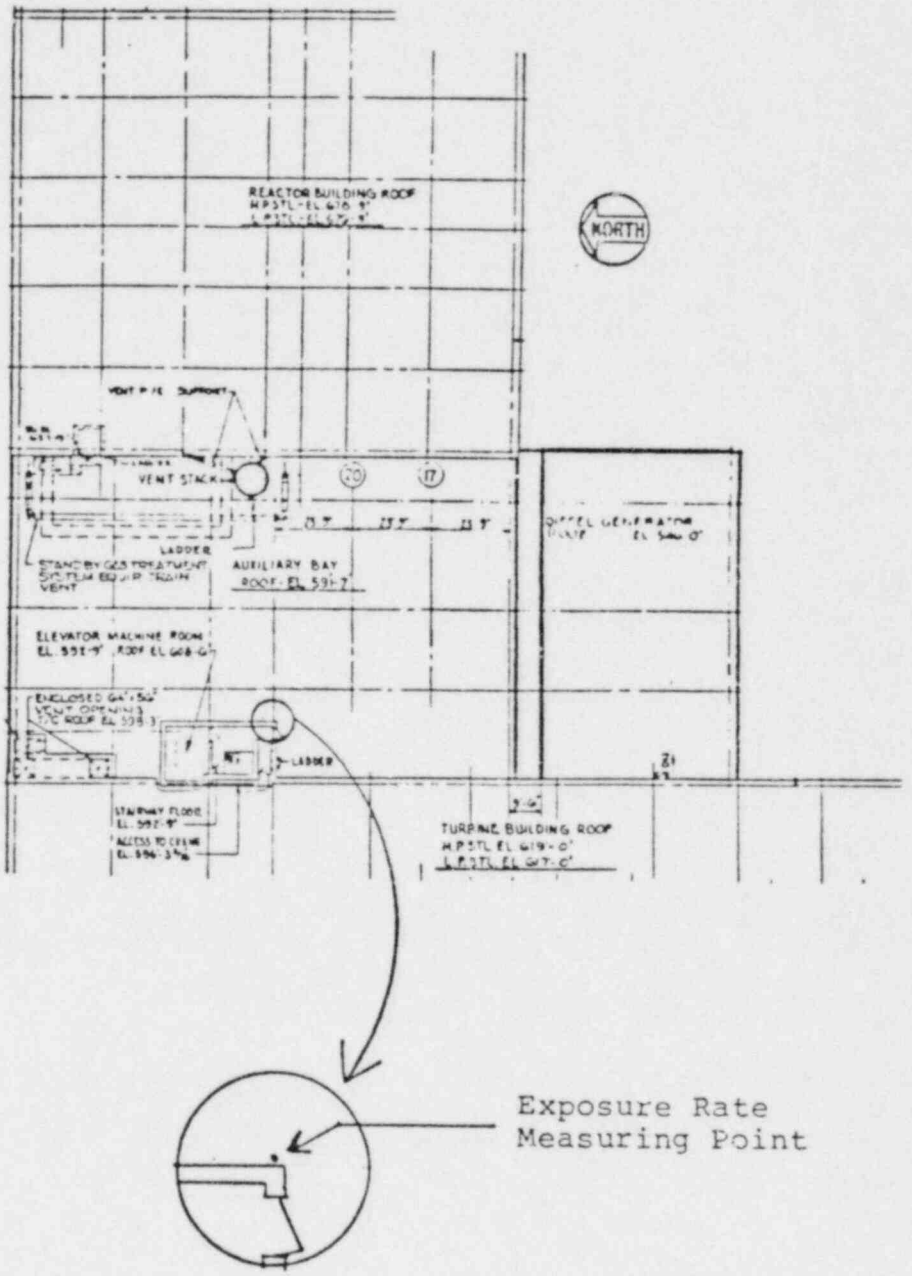


Fig. 2.0-3

Location of Refueling Floor Exposure Rate Measuring Point on Auxiliary Building Roof

Fig. 2.0-4

(Deleted)

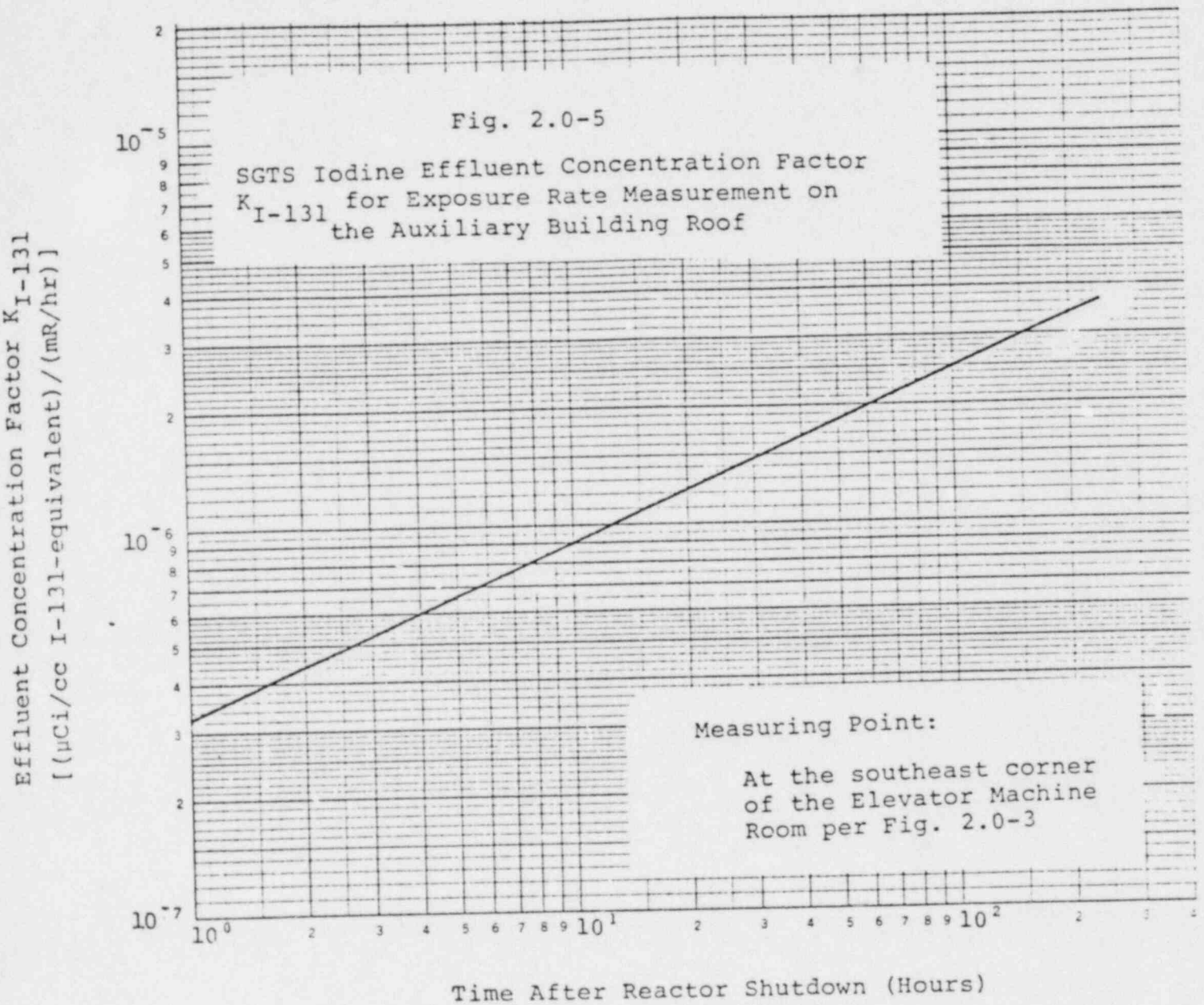


Fig. 2.0-5
SGTS Iodine Effluent Concentration Factor
K_{I-131} for Exposure Rate Measurement on
the Auxiliary Building Roof
Measuring Point:
At the southeast corner
of the Elevator Machine
Room per Fig. 2.0-3
Effluent Concentration Factor K_{I-131}
[(μCi/cc I-131-equivalent)/(mR/hr)]
Time After Reactor Shutdown (Hours)

Fig. 2.0-6

Main Plant Vent Stack Noble Gas Effluent Concentration Factor K_{Xe-133} For Exposure Rate Measurements Near Stack

1 Hour to 10 Days
X=0,5,10 FT

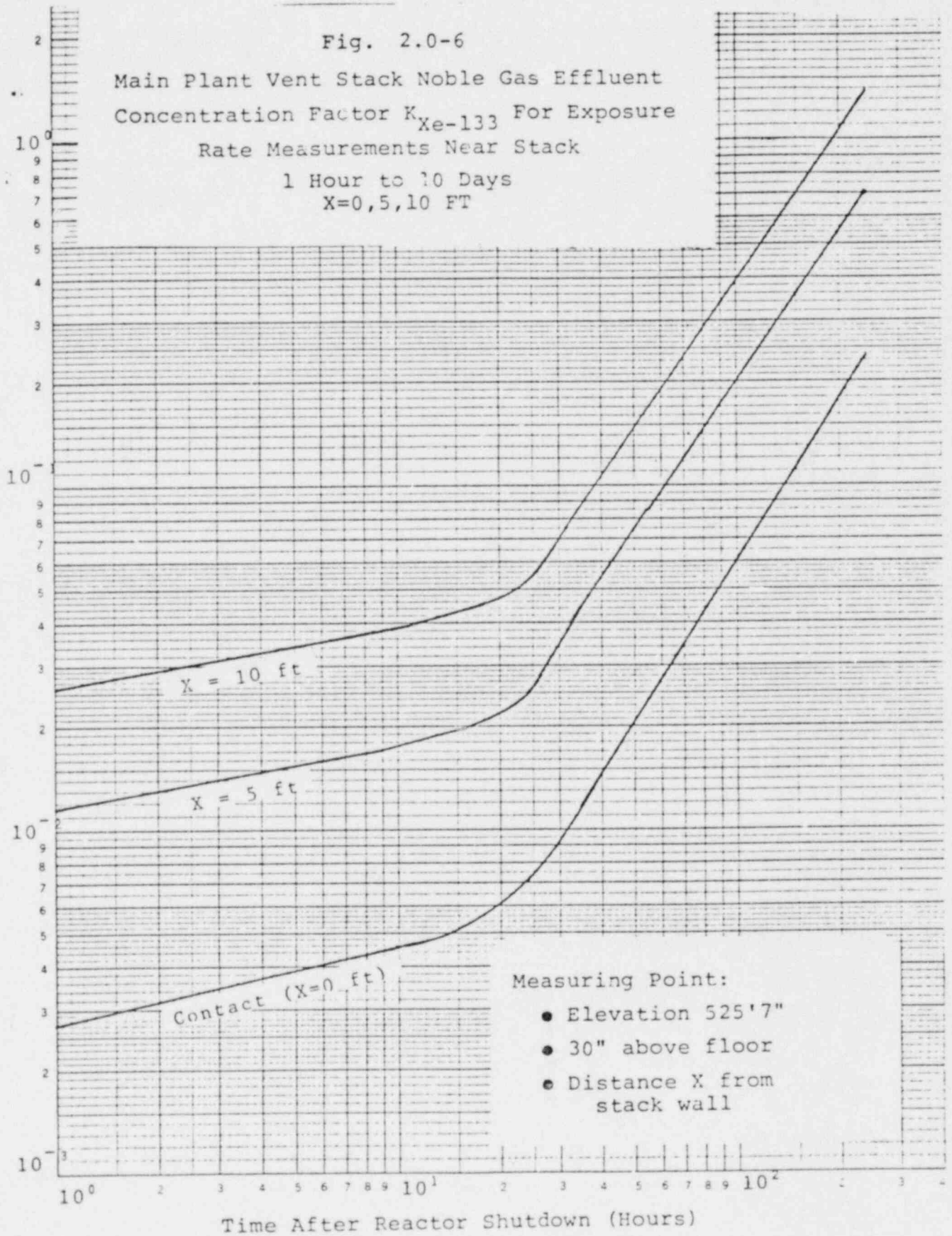


Fig. 2.0-7

Main Plant Vent Stack

Iodine Effluent Concentration Factor K_{I-131}

For Exposure Rate Measurements Near Stack

1 Hour to 10 Days

X = 0 FT

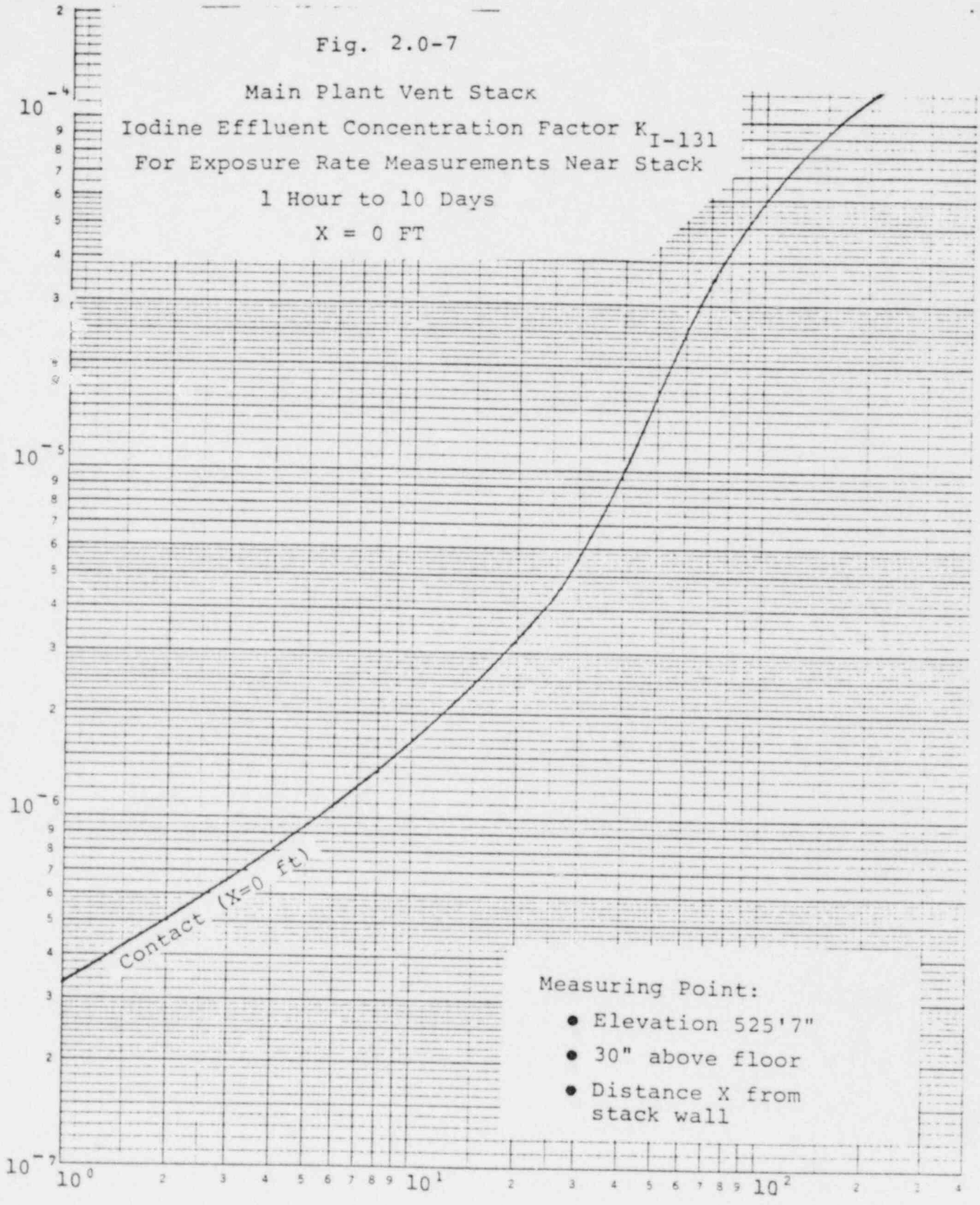


Fig. 2.08

Main Plant Vent Stack

Iodine Effluent Concentration Factor K_{I-131}

For Exposure Rate Measurements Near Stack

1 Hour to 10 Days

X = 5, 10 FT

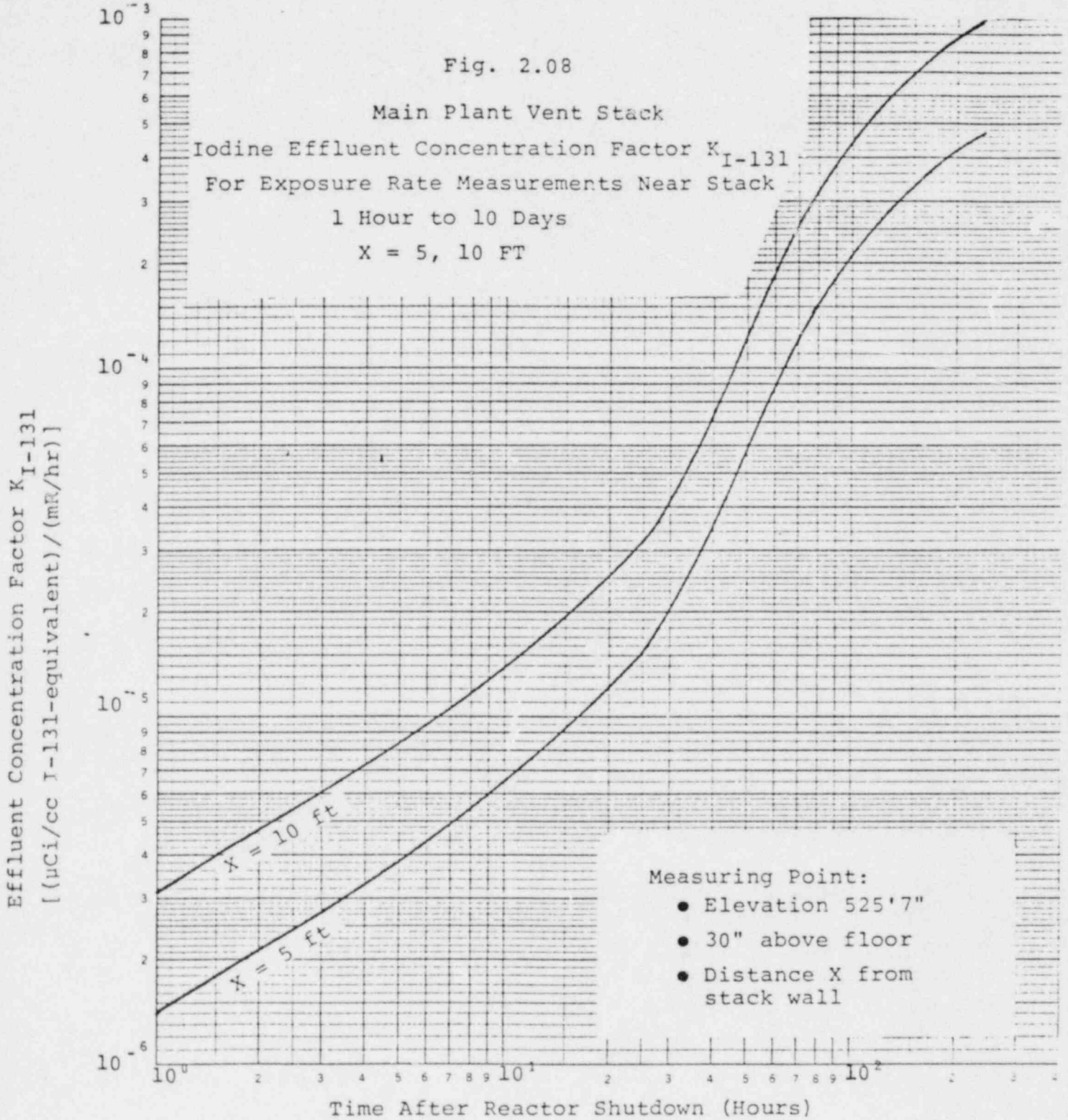


Table 2.0-1

Xe-133-equivalent and I-131-equivalent Release Rates for Site and General Emergency

		Release Rate	
1. Site Emergency[1]		(Xe-133-equivalent µCi/sec)	(I-131-equivalent µCi/sec)[2]
a.	30-minute	2.31 + 5[3]	2.58 + 1
b.	2- minute	2.31 + 6	2.58 + 2

		(Release Rate) ÷ (Wind Speed)	
2. General Emergency[4]		(Xe-133-equivalent µCi/sec)/(m/sec)	(I-131-equivalent µCi/sec/(m/sec)[2]
Stability Class	A	1.87 + 8	2.09 + 4
	B	1.05 + 8	1.17 + 4
	C	6.84 + 7	7.64 + 3
	D	4.54 + 7	5.07 + 3
	E	2.66 + 7	2.97 + 3
	F	1.15 + 7	1.28 + 3
	G	4.62 + 6	5.17 + 2

(1) 30-minute: Level corresponding to 50 mrem/hr to the whole body or 250 mrem/hr to the thyroid at the site boundary for adverse meteorology [$(\chi/Q') = 5.225 \times 10^{-3}$ sec/m^3].

2-minute: Ten times the above.

(2) Based on child thyroid and Regulatory Guide 1.109 parameters.

(3) Notation: 2.31 + 5 = 2.31×10^5.

(4) Level corresponding to 1 rem/hr to the whole body or 5 rem/hr to the thyroid for actual meteorology [(χ/Q') as specified in Table 2.0-2].

Table 2.0

Relative Concentration Factors (χ/Q')

For Determining Maximum Dose Equivalent

Rates at the Site Boundary (1)

Pasquill Stability Class	Relative Concentration Factor ÷ Wind Speed $\frac{1}{\bar{u}}\left(\frac{\chi}{Q'}\right)$ [(sec/m^3)/(m/sec)] (2)
A	1.292 - 4 (3)
B	2.305 - 4
C	3.533 - 4
D	5.326 - 4
E	9.099 - 4
F	2.106 - 3
G	5.225 - 3

(1) A ground level release is assumed.

(2) $\bar{u}$ = average wird speed (m/sec).

(3) Notation: 1.292 - 4 = 1.292 X 10^{-4}.

3.0 ASSUMPTIONS

3.1 Isotopic Composition

The isotopic composition of airborne radioactivity on the refueling floor and in an SGTS release is assumed to be the same as that of the scenario below. The composition of a release via the main plant vent stack is assumed to be the same as that of an SGTS release. The scenario is as follows:

1. Operation of the reactor for 926 days at 2550 MWt prior to shutdown.

2. Instantaneous release at shutdown to the Primary Containment atmosphere of 100% of core noble gases and p% of core halogens (see Item 6 for the value of p).

3. Instantaneous release to the Primary Containment atmosphere of 100% of any noble gases and p% of any halogens produced after shutdown (see Item 6 for the value of p).

4. Continuous leakage of airborne noble gases, halogens and daughter products from Primary Containment into one-half of the Reactor Building volume at a rate of 1.635%/day. This volume is designated the "affected half" of the Reactor Building. The refueling floor is considered to be within the affected half.

5. Continuous exhaust of the affected half at a rate of 250%/day. (For the Reactor Building volume of 2.65×10^6 ft^3 specified in Table 6.2-1 of Ref. 1, this exhaust rate is equivalent to an SGTS flow rate of 2300 cfm.) The exhaust is filtered through a filter which adsorbs 99% of halogens. The exhaust is released via the SGTS stack.

6. a. The halogen release percentage p (used in Items 2 and 3) is assumed to be

$$p = 0$$

for calculation of whole body dose equivalent rates, associated exposure rates at monitoring points, and Xe-133-equivalent release rates.

b. The halogen release percentage p is assumed to be

$$p = 25$$

for calculation of thyroid dose equivalent rates, associated exposure rates at monitoring points, and I-131-equivalent release rates.

The noble gas and iodine isotopic compositions of the releases resulting for the case in which p = 25 are specified in Tables 3.0-1 and 3.0-2 for various times from 1 hour to 10 days. These tables list the fraction f_i that each isotope represents of the total amount of noble gases and iodines in the release. Also listed are various parameters of the released mixes.

3.2 Site Boundary Dose Equivalent Rates

3.2.1 Whole Body Dose Equivalent Rate Due to Noble Gases

The dose equivalent rate to the whole body due to noble gases is calculated by the semi-infinite cloud formula:

$$\dot{D}_{wb} = (0.25)(3600)(10^3)(10^{-6}) \times (\chi/Q')\, \dot{Q}_n \bar{E}_{\gamma n} \qquad (3.1)$$

$$\bar{E}_{\gamma n} = \sum_{\text{nobles}} f_i\, \bar{E}_{\gamma i} / \sum_{\text{nobles}} f_i \qquad (3.2)$$

where

$\dot{D}_{wb}$ = dose equivalent rate to the whole body [mrem/hr]

(χ/Q') = relative concentration factor [sec/m^3]

$\dot{Q}_n$ = noble gas release rate [μCi/sec]

$\bar{E}_{\gamma n}$ = average noble gas gamma energy [MeV]

f_i = fraction that isotope i represents of the total release rate (nobles and iodines)

$\bar{E}_{\gamma i}$ = average gamma energy of isotope i [MeV]

3600 = seconds per hour

10^3 = mrem per rem

10^{-6} = Ci per μCi

Parameter values used to evaluate $\dot{D}_{wb}$ are as follows:

- (χ/Q') per Table 2.0-2 [These values yield maximum values of $\dot{D}_{wb}$ at the site boundary.]
- $\bar{E}_{\gamma i}$ per Table 3.0-1

3.2.2 Thyroid Dose Equivalent Rate Due to Iodines

The dose equivalent rate to the thyroid due to inhalation is calculated by the following formulas:

$$\dot{D}_{thy} = \frac{10^6}{8766} R_a (\chi/Q') \dot{Q}_T Z \qquad (3.3)$$

$$Z = \sum_{\text{iodines}} f_i DFA_{ija} \exp\left(-\frac{0.693}{T_i}\frac{R}{3600\ \bar{u}}\right) \qquad (3.4)$$

In these formulas

$\dot{D}_{thy}$ = dose equivalent committed to thyroid per hour of inhalation [mrem/hr]

R_a = breathing rate [m^3/hr]

(χ/Q') = relative concentration factor [sec/m^3]

$\dot{Q}_T$ = total release rate of nobles and iodines [μCi/sec]

Z = dose factor summation [mrem/pCi inhaled]

f_i = fraction that isotope i represents of total release rate

DFA_{ija} = thyroid dose commitment factor for isotope i [mrem/pCi inhaled]

T_i = half-life of isotope i [hours]

R = distance from release point to closest point on site boundary [m]

$\bar{u}$ = average wind speed

Parameter values used to evaluate $\dot{D}_{thy}$ are as follows:

- R_a = 3700 m^3/yr (value for child thyroid per Ref. 2, Table E-4)
- (χ/Q') per Table 2.0-2 [These values yield maximum values of $\dot{H}_{thy}$ at the site boundary.]
- DFA_{ija} per Table 3.0-2 (values for child thyroid per Ref. 2, Table E-9)
- T_i per Table 3.0-2
- R = 229 m(per Ref. 3, Table 7.2-4)
- $\bar{u}$ = 1 m/sec (assumed for conservatism)

3.3 Equivalent Radioactivity

3.3.1 Xe-133-equivalent

The Xe-133-equivalent radioactivity release rate radioactivity for a mix of noble gases is defined as the release rate of Xe-133 producing the same dose-equivalent rate in a semi-infinite cloud as the actual mix. From Equation (3.1) it is apparent that

$$\dot{Q}_{Xe\text{-}133} = \dot{Q}_n(\bar{E}_{\gamma n}/\bar{E}_{\gamma Xe\text{-}133}) \qquad (3.5)$$

where

$\dot{Q}_{Xe\text{-}133}$ = the Xe-133-equivalent release rate

$\bar{E}_{\gamma Xe\text{-}133}$ = the average gamma energy of Xe-133

and the other parameters were defined earlier.

A similar formula applies to concentration C; i.e.,

$$C_{Xe\text{-}133} = C_n(\bar{E}_{\gamma n}/\bar{E}_{\gamma Xe\text{-}133}) \qquad (3.6)$$

3.3.2 I-131-equivalent

The I-131-equivalent release for a mix of iodines is defined as the release rate of

I-131 producing the same thyroid dose equivalent rate per Equation (3.3) as the actual mix. From Equation (3.3) it is apparent that

$$\dot{Q}_{I-131} = \frac{\dot{Q}_T \, Z}{DFA_{I-131} \exp\left(\frac{-0.693}{T_{I-131}} \; \frac{R}{3600\bar{u}}\right)} \quad (3.7)$$

where

$\dot{Q}_{I-131}$ = the I-131-equivalent release rate

DFA_{I-131} = dose commitment factor for I-131

T_{I-131} = half-life for I-131

and the other parameters were defined earlier.

A similar formula applies to concentration; i.e.

$$C_{I-131} = \frac{C_T \, Z}{DFA_{I-131} \exp\left(-\frac{0.693}{T_{I-131}} \; \frac{R}{3600\bar{u}}\right)} \quad (3.8)$$

3.4 Relative Concentration Factors (χ/Q')

The relative concentration factors (χ/Q') in Table 2.0-2 are for a distance of 250 m from the SGTS release point. They are based on a ground level release with no plume rise and no terrain effects; however, building wake is included.

3.5 Exposure Rate

Exposure rate $\dot{X}$ is related to absorbed dose rate in air $\dot{D}$ as follows

$$\dot{X} = \left(\frac{1}{0.875}\right) \dot{D} = 1.143 \, \dot{D}$$

since there are 0.875 rad (air) per R (Reference 4, p. 393).

Table 3.0-1

Noble Gas Isotopic Composition of Releases (1)

i	$\bar{E}_{\gamma i}$ (2) (MeV)	Release Fraction f_i (3) 1 hr	8 hr	1 d	3 d	10 d
Kr-83m	2.58-3 (4)	2.153-2	6.330-3	1.079-4	0.0	0.0
Kr-85m	1.58-1	3.876-2	1.661-2	1.618-3	1.232-6	0.0
Kr-85	2.23-3	2.773-3	3.579-3	4.337-3	6.356-3	1.561-2
Kr-87	8.04-1	5.445-2	1.525-3	2.913-7	0.0	0.0
Kr-88	1.98+0	1.077-1	2.458-2	5.676-4	5.773-9	0.0
Kr-89	1.71+0	3.798-7	0.0	0.0	0.0	0.0
Xe-131m	2.00-2	2.691-3	3.443-3	4.106-3	5.796-3	1.192-2
Xe-133m	4.15-2	1.405-2	1.717-2	1.829-2	1.681-2	5.373-3
Xe-133	4.60-2	5.412-1	6.852-1	7.916-1	9.558-1	9.649-1
Xe-135m	4.31-1	7.147-2	2.551-1	5.543-3	5.750-5	0.0
Xe-135	2.48-1	1.169-1	2.127-1	1.715-1	1.319-2	1.161-7
Xe-137	1.82-1	1.315-5	0.0	0.0	0.0	0.0
Xe-138	1.13+0	2.374-2	0.0	0.0	0.0	0.0
$f_n \equiv \sum_i f_i$ =		9.952-1	9.967-1	9.976-1	9.981-1	9.978-1
$\bar{E}_{\gamma n} \equiv \frac{1}{f_n} \sum_i f_i \bar{E}_{\gamma i}$ =		3.771-1	1.491-1	8.375-2	4.819-2	4.498-2

(1) This table applies to the scenario of Section 3.1 with the halogen release percentage (see Items 2 and 3 of the scenario) taken as p = 25.

(2) $\bar{E}_{\gamma i}$ is average gamma energy for isotope i.

(3) f_i = fraction that isotope i is of total release of nobles and iodines.

(4) Notation: 2.58-3 = 2.58×10^{-3}.

TABLE 3.0-2

Iodine Isotopic Composition of Releases

i	DFA_{ija} (2) (mrem/pCi)	T_i (3) (hr)	Release Fraction f_i (4) 1 hr	8 hr	1 d	3 d	10 d
I-130	4.99-4 (5)	1.235+1	1.450-5	1.272-5	6.385-6	6.690-7	0.0
I-131	4.39-3	1.930+2	7.221-4	9.142-4	1.058-3	1.353-3	1.994-3
I-132	5.23-5	2.302+0	8.784-4	5.573-4	3.820-4	3.466-4	2.132-4
I-133	1.04-3	2.081+1	1.037-3	1.080-3	7.783-4	2.397-4	2.446-6
I-134	1.37-5	8.772-1	9.254-4	1.124-5	0.0	0.0	0.0
I-135	2.14-4	6.600+0	1.194-3	7.483-4	1.743-4	1.825-6	0.0
		$f_I \equiv \sum_i f_i$ =	4.771-3	3.324-3	2.399-3	1.942-3	2.210-3
	$Z \equiv \sum_i f_i \, DFA_{ija} \exp\left(-\frac{0.693}{T_i}\,\frac{R}{3600\,\bar{u}}\right)$ =		4.563-6	5.327-6	5.510-6	6.205-6	8.765-6

[Calculation of Z based on R = 229 m and $\bar{u}$ = 1 m/sec.]

(1) This table applies to the scenario of Section 3.1 with the halogen release percentage (see Items 2 and 3 of the scenario) taken as p=25.

(2) DFA_{ija} is inhalation dose factor for a child thyroid per Table E-9 of Ref. 2.

(3) T_i = half-life of isotope i.

(4) f_i = fraction that isotope i is of total release of nobles and iodines.

(5) Notation: 4.99-4 = 4.99 X 10^{-4}.

4.0 REFERENCES

1. The Cincinnati Gas & Electric Company, "Wm. H. Zimmer Nuclear Power Station, Unit 1, Final Safety Analysis Report."

2. USNRC, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Regulatory Guide 1.109, Revision 1, October 1977.

3. The Cincinnati Gas & Electric Company, "Wm. H. Zimmer Nuclear Power Station Off-Site Dose Calculation Manual," Revision 1, October, 1980.

4. J. R. Lamarsh, "Introduction to Nuclear Engineering" (Addison-Wesley, Reading, MA, 1975).

Address the comments concerning the following EALs found in NUREG-0818, "Emergency Action Levels for Light Water Reactors"

Unusual Event	1, 2,
Alert	2, 7, 11, 12,
Site Area	2, 6, 10, 11, 14, 15 and
General	3

COMMENT

Unusual Event Initiating Condition No. 1

Emergency Core Cooling System (ECCS) initiated and discharge to vessel.

Draft EALs

1. Low Reactor Water Level:

   a. Level indication on 1H13-P603 panel; setpoint - 134" (-42" for HP and RI)

or

2. High Drywell Pressure:

   b. Drywell pressure indication on 1PM06J panel; setpoint +1.8#

with or without

3. Loss of power on 4160 V AC distribution busses; swgps A, B, or C; annunciated on 1PM04J.

Discussion

The draft EALs were written for the initial version of the initiating conditions, which differs from the revised version in that it calls only for "ECCS initiated." Therefore, the first two EALs are no longer adequate. Indications of flow in one or more of the ECCS subsystems must be given. In addition, EAL No. 3, referring to loss of power, should be deleted. A further complication is that the licensee's EALs for ECCS initiation (and flow) are identical to those given later for a LOCA (Site Area Emergency Initiating Condition No. 1). Therefore, a "Shift supervisor's opinion" EAL should be added, as shown on the generic EALs in Figure 27. The purpose of obtaining the shift supervisor's opinion is to determine whether or not an emergency should be declared.

ECCS activation occasionally occurs under conditions that may not qualify as an unusual event. One of these is during the transient following loss of feedwater, which results in a reactor trip. These transients are frequent enough that excessive declarations of unusual events may occur.

RESPONSE

a) EAL 3 concerning with or without loss of power on 4160 AC distribution busses will be deleted since it has little effect on

EALs 1 and 2. Furthermore, this FAL is covered under Initiating Condition 7, EAL 2 for unusual event.

b) EALs 1 and 2 will be replaced with a new EAL stating:

"When it is determined that actual ECCS initiation (manual or auto) is occurring by observing respective ECCS activation annunciation with an indication of flow for the respective system on the appropriate flow indicator for that system."

c) The addition of a Shift Supervisor's opinion EAL is not considered necessary. Emergency events are also classified through the definition of the four emergency classes. This covers any Shift Supervisor opinion EAL.

COMMENT

Unusual Event Initiating Condition No. 2

Radiological effluent technical specification limits exceeded.

Draft EALs

1. Main plant vent stack monitor gaseous):

   a. Alarm high annunciated on panel 1H13-P601 and recorded on 1H13-P600; setpoint 0.071 ci/sec.

or

2. Service water discharge effluent monitor:

   a. Alarm high 1H13-P601; setpoint 3E-07 uci/cc.

Discussion

The basis for the curie measurements in the two EALs should be given. In addition, other effluent streams have been neglected. Monitors that should be considered for use as EALs include the radioactive waste effluent monitor, turbine building ventilation release duct monitor, condensate storage tank area floor drain monitor, and turbine building drain sump discharge monitor.

The 3E-7 uCi/cc given in EAL No. 2a appears to be a typographical error.

RESPONSE

a) Revised EALs are as follows:

Standby Gas Treatment System Noble Gas Monitor (1PLK2JA)

reading 1.56 uCi/cc Xe-133 EQUIV.

or

Main Plant Vent Stack Noble Gas Monitors (1PLK1JA and 1PLK3JA)

reading 7.57E-3, uCi/cc Xe-133 EQUIV on low range.

or

Service water discharge effluent monitor

Alarm High 1H13-P601; setpoint 3E-07 uCi/cc.

With regard to the Turbine and Radwaste Ventilation Systems, these systems discharge to the main plant vent stack and thus are covered in these EALs.

COMMENT

Alert Initiating Condition No. 2

Rapid gross failure of one steam generator tube with loss of offsite power.

Draft EALS

No EAL developed since initiating condition not relevant to BWR.

Discussion

The licensee's action meets the NUREG requirements.

RESPONSE

The example initiating condition given in NUREG-0654 addresses a rapid gross failure of one steam generator tube with loss of offsite power which is not relevant to the Zimmer Plant as steam generators are not utilized.

COMMENT

Alert Initiating Condition No. 7

Loss of offsite power and loss of all onsite AC power (see Site Area Emergency for extended loss).

Draft EALs

Turbine generator trip with RAT 21 and RAT 22 unavailable for service (one tagged out for maintenance with the other 86T device tripped or both 86T devices tripped) and failure of all diesel generators to start or synchronize.

Discussion

The loss of all AC power is a very serious event. If it persists for 15 min, a site area emergency must be called under Site Area Emergency Initiating Condition No. 6. A significant fraction of the shift supervisors and operations engineers we contacted expressed concern that if a power outage occurred, the shift supervisor and operators would be too busy trying to start the diesels to remember to note when 15 min has passed. They therefore felt that Alert Initiating Condition No. 7 should be eliminated and that a site area emergency should be declared as soon as it is clear that a power outage has occurred and that the diesels cannot be started from the control room.

Therefore, the following should be added to the proposed EALs:

"An alert shall be declared as soon as a power outage occurs. A site area emergency shall be declared if the blackout lasts for more than 15 minutes or if the shift supervisor leaves the control room at any time during the first 15 minutes.

If the shift supervisor is not in the control room when the blackout occurs, the senior remaining person in the control room shall assume the responsibility for declaring an alert. If 15 minutes elapse before the shift supervisor returns, or if the senior person leaves the control room during that period and before AC power is restored, the senior person shall declare a site area emergency."

Since the detailed organization of a control room is site dependent, specific EALs that meet the intent of the above statement should be prepared for each site.

RESPONSE

a) We concur that this initiating condition should be deleted from the alert class and EALs will be revised subsequent to its deletion.

COMMENT

Alert Initiating Condition No. 11

Failure of the reactor protection system to initiate and complete a scram which brings the reactor subcritical.

Draft EALs

Trip of at least one subchannel in each trip system (RPS A and RPS B) as indicated by annunciators and trip status lights on panel 1H13-P603 with failure of sufficient control rods to insert, as confirmed by full core display "full in" lights and process computer rod position information, failing to bring the reactor subcritical as confirmed by neutron count rate (SRM/IRM).

Discussion

Our interpretation of the EALs proposed by the licensee is shown in Figure 29 of NUREG-0818.

The requirements that the display and the computer indicate that the rods are not inserted should be deleted. All that is required is a valid scram signal (i.e., trip status lights) and a neutron count rate that indicates that the reactor has not been brought subcritical. Additional EALs only increase the likelihood of missing the initiating event. The logic we recommend is given in Figure 30 of NUREG 0818.

RESPONSE

The EAL will be changed to read as follows:

> Trip of at least one subchannel in each trip (RPS A and RPS B) system as indicated by annunciators and trip status lights on panel 1H13-P603 with a failue to bring the reactor subcritical as confirmed by an increasing neutron count rate (SRM/IRM).

The trip status lights and annunciators provide a means of verifying that a valid scram signal exists and by observing an increasing count rate on SRM/IRM would indicate reactor criticality.

COMMENT

Alert Initiating Condition No. 12

Fuel damage accident with release of radioactivity to containment or fuel handling building.

Draft EALs

Dropping, bumping or otherwise rough handling of new or spent fuel bundle resulting in a high alarm on the refueling floor area radiation monitors annunciated on panel 1H13-P601 and recorded on 1H13-P600.

Discussion

The proposed EALs are adequate.

RESPONSE

We are in agreement that the proposed EAL adequately covers the conditions.

COMMENT

Site Area Initiating Condition No. 2

Degraded core with possible loss of coolable geometry (indicators should include instrumentation to detect inadequate core cooling, coolant activity and/or containment radioactivity levels).

Draft EALS

Failure to (of) control rod(s) to fully insert on a scram or shutdown as indicated on full core display, panel 1H13-P603;

and

Upscale readings on LPRM strings (greater than 5 watts/CM) adjacent to not-fully-inserted rods;

and

Very high coolant activity as determined by sample analysis (greater than or equal to 300 uCi/gm equivalent of I-131).

Discussion

We interpret this initiating condition to mean that at least 1% of the cladding has failed. We recommend that NRC publish more specific description of such terms as "degraded core with possible loss of coolable geometry."

Tne intent of the licensee in preparing the proposed EALs was to use failure of the control rods to insert as a means of determining that core degradation had occurred. The EAL using the low-power range monitor (LPRM) reading of 5 W/cm2 indicates that power from fissioning is still being released and that local core melting may therefore occur. Finally, the coolant activity EAL is another means of determining fuel failure (the licensee has in mind activity in both the liquid coolant and the steam). Although the use of control rod insertion is a recognized diagnostic tool, making it coincident with the other EALs makes the criteria unacceptable.

A proposed set of generic EALs is shown in Figure 33 of NUREG-0818. Note that "Core uncovered" has been added as an EAL. With BWRs, adequate cooling will occur with two thirds of the core covered since the upper third of the core is cooled by froth and vapor. This consideration should be included in detailed definitions of the "Core uncovered" EAL.

More thought needs to be given to arriving at EALs that would indicate core blockage. The use of abnormally high core temperatures is not practial at present as BWRs are not routinely equipped with appropriate temperature sensors. The use of jet pump instrumentation anomalies has been suggested as a candidate EAL.

RESPONSE

Although the failure of control rods to insert could be indicative of a gross change in core geometry, it could also indicate other conditions not related to loss of core geometry. As this could be a point of confusion, this EAL will be deleted. Upscale LPRMs and high coolant activity are more than adequate EALs to indicate a possible loss of coolable goemetry.

The addition of an EAL addressing the core becoming uncovered is not necessary. Initiating Condition No. 1 of Site Area addresses a known Loss of Coolant accident greater than makeup pump capacity. Adding a core uncovered EAL to the above would just be repetitious.

COMMENT

Site Area Initiating Condition No. 6

Loss of offsite power and loss of onsite AC power for more than 15 minutes.

Draft FALs

1. Turbine generator trip annunciated on 1PM02J with RAT 21 and RAT 22 unavailable for service (one tagged out for maintenance with the other 86T device tripped or both 86T devices tripped) annunciated on 1PM01J;

and

Failure of all diesel generators to start or synchronize as indicated and annunciated on 1PM01J;

and

A 15 minute time lapse.

Discussion

The loss of all AC power is a very serious event. A significant fraction of the shift supervisors and operations engineers interviewed felt that a site area emergency should be declared immediately rather than waiting for 15 min.

For those licensees opting for the 15-min delay, the following statement should be included in the EALs (see the discussion under Alert Initiating Condition No. 7):

"An alert shall be declared as soon as a power outage occurs. A site area emergency shall be declared if the blackout lasts for more than 15 minutes or if the shift supervisor leaves the control room at any time during the first 15 minutes.

If the shift supervisor is not in the control room when the blackout occurs, the senior remaining person in the control room shall assume the responsibility for declaring an alert. If 15 minutes elapse before the shift supervisor returns, or if the senior person leaves the control room during that period and before AC power is restored, the senior person shall declare a site area emergency."

Since the detailed organization of a control room is site dependent, specific EALs that meet the intent of the above statement should be prepared for each site.

RESPONSE

a) The 15 minute time lapse will be deleted as a requirement for declaring a site emergency subsequent to the revision of the Site Area Initiating Condition No. 6.

COMMENT

Site Area Initiating Condition No. 10

Major damage to spent fuel in containment or fuel handling building (e.g., large object damages fuel or water loss below fuel level).

Draft EALs

1. Uncovering of spent fuel confirmed by low water level annunciation on panel 1PM08J, and possibly a high seam leak flow alarm annunciated on 1PM08J;

or

2. Dropping of a heavy object onto spent fuel confirmed by direct observation;

and

The following occurring as part of 1 and 2 above:

a) High alarm on fuel pool vent plenum radiation monitors annunciated on panel 1H13-P601 and recorded on 1H13-P600, instrument 1D13-R613 (4.5 Mr/Hr);

b) Secondary containment radiation monitor reading greater than or equal to 100 Mr/Hr but less than 5700 Mr/Hr on panel 1H13-P603.

Discussion

The proposed EALs cover accidents in the fuel storage area only. EALs applicable to the reactor area, such as high refuel floor alarm, should be included.

RESPONSE

Additional Area Radiation Monitors (ARM's) will be added to cover accidents in the reactor area. It should be noted that ARM's are grouped into common alarms on the 1H13-P603 panel. When an alarm is received the operator proceeds to the 1H13-P600 panel to determine which ARM has alarmed. This will be indicated by the yellow high level trip light on that particular ARM. New EALs are as follows:

1.a. Uncovering of spent fuel confirmed by low water level annunciation on panel 1PM08J, and possibly a high seam leak flow alarm annunciated on 1PM08J;

or

b. Dropping of a heavy object onto spent fuel confirmed by direct observation.

and

2.a. Receipt of a high level trip on any of the following ARMs located on the refueling floor:

1) Reactor Building Refueling Platform low level
2) Reactor Building Equipment Hatch
3) Reactor Building Spend Fuel Pool
4) Reactor Building Equipment Storage Pool Area as indicated at 1H13-P600.

and

b. Secondary Containment radiation monitor reading greater than or equal to 100 mRem/hr on panel 1H13-P603.

COMMENT

Site Area Initiating Condition No. 11

Fire compromising the functions of safety systems.

Draft EALs

Fire that results in losses of hot shutdown capability (Condition 8 above) or that cannot be extinguished as determined by on-duty shift supervisor.

Discussion

The licensee defined this initiating condition as "Fire beyond design level affecting safety system." The NUREG-0654 Rev. 1 Appendix 1 definition given above should be used.

The above EAL is too restrictive. An adequate EAL would be "Observation of major fire that affects redundant safety system trains or functions."

RESPONSE

It is not clear from NUREG-0654, Rev. 1, Appendix 1 how many functions of how many systems would have to be affected before the fire would result in the declaration of a site area emergency. The present EAL is considered to be more definitive in this matter.

COMMENT

Site Area Initiating Condition No. 14

Imminent loss of physical control of the plant.

Draft EALs

1. Mode switch in shutdown with the reactor subcritical and count rate increasing, as indicated on count rate meters 1C51-R600 A, B, C, or D, panel 1H13-P603, such that criticality is predicted within one (1) hour;

and

Loss of capacility to insert any control rod not fully inserted;

and

Loss of SC system capability to inject (inoperable).

Discussion

The licensee interpreted the initiating condition to mean loss of control of the nuclear reaction rather than a security plant takeover. The EAL should be "Physical attack on the plant involving imminent occupancy of the control room, auxiliary shutdown panels, and other vital areas as defined by the Modified Amended Security Plan."

RESPONSE

a) The proposed EAL will be adopted as modified below:

Physical attack on the plant involving imminent occupancy of the control room, auxiliary shutdown panels, and other vital areas as determined by the Shift Supervisor.

b) Communications between station security and the control room are covered in the security plan. The plan calls for initial notification of the control room and also updates of changing conditions. Thus, the addition of, "as determined by the shift supervisor", to the EAL would allow the shift supervisor to make the decision based on the conversation with security personnel.

COMMENT

Site Area Initiating Condition No. 15

Severe natural phenomena being experienced or projected with plant not in cold shutdown:

a) Earthquake greater than SSE levels

b) Flood, low water, tsunami, hurricane surge, seiche greater than design levels or failure of protection of vital equipment at lower levels

c) Sustained winds or tornadoes in excess of design levels.

Draft EALs

1. An earthquake greater than SSE levels detected on plant seismic instrumentation while in plant operational conditions (Modes) 1, 2 or 3.

or

2. River water level in excess of 546' MSL.

Discussion

The proposed EAL is deficient in that it does not cover winds quantitatively or low water.

RESPONSE

a) Sustained winds or tornadoes are considered to be adequately addressed under Unusual Event Initiating Condition No. 13 and Alert Initiating Condition No. 17.

b) Due to the design of the intake structure low river water level need not be addressed. The intake structure is designed to draw river water from levels extended down to the bottom of the river channel.

COMMENT

General Initiating Condition No. 3

Loss of physical control of the facility.

Draft EALs

1. The emergency action levels of initiating condition 13 of "Site Emergency" category have been reached;

and

The reactor is critical or supercritical as indicated on count rate meters 1C51-R600 A, B, C, or D, panel 1H13-P603.

Discussion

The EAL should read "Physical attack on the plant has resulted in unauthorized personnel occupying the control room or any other vital areas as described in the modified amended security plan."

RESPONSE

a) The proposed EAL will be adopted as modified below:

Physical attack on the plant which has resulted in unauthorized personnel occupying the control room or other vital areas as determined by the shift supervisor.

For a discussion refer to Item Site Area Emergency, Initiating Condition No. 14.

Provide EALs for the following NUREG-0654, Appendix 1, Example Initiating Conditions:

Unusual Event	4,
Alert	4, 16,
Site Area	8. and
General Emergency	Example BWR Sequences 6.b, 6.c and 6.d

COMMENT

Unusual Event Initiating Condition No. 4

Abnormal coolant temperature and/or pressure or abnormal fuel temperatures outside of technical specification limits.

Draft EALs

None

Discussion

The licensee has failed to respond to this initiating condition. Appropriate EALs should be prepared that give the coolant level, pressure bounds, and rate of coolant temperature change for normal operation.

RESPONSE

a) BWRs have a saturated steam system. In order to have an EAL, BWRs could give "pressure" safety limits. The following EAL will be adopted:

Reactor coolant system pressure greater than 1325 psig as measured on wide range pressure recorders located on 1H13-P601.

COMMENT

Alert Initiating Condition No. 4

Steamline break with significant (e.g., greater than 10 gpm) primary to secondary leak rate (PWR) or MSIV malfunction causing leakage (BWR).

Draft EALs

The licensee did not prepare EALs for this initiating condition.

Discussion

The licensee should prepare appropriate EALs for this initiating condition, particularly since this event can have serious radiological implications.

A proposed set of generic EALs is given in Figure 28 of NUREG-0818. The first two EALs indicate a steamline break inside of primary containment. The EALs for a break within the steamline tunnel are:

- High main steamline tunnel local temperature alarm
- High steam tunnel ventilation system differential temperature alarm.

The EALs for steam line breaks in the turbine building are:

- High turbine building local temperature
- Turbine building vent radiation alarm
- Turbine building atmosphere radiation alarm.

The EALs for MSIV malfunction are:

- Shift supervisor's opinion
- Continuing steam flow with evidence that steamline break is outside of primary containment.

The "Shift supervisor's opinion" EAL is included because determining that MSIVs are malfunctioning will require human judgment in many cases. The second EAL for MSIV malfunction covers those times when instrumentation alone suffices to demonstrate that an MSIV failure has occurred with a steamline break outside of primary containment.

RESPONSE

a) Steam line break with MSIV malfunction is covered in Site Emergency Initiating Condition 4 EAL 1 which deals with a steam line break outside of containment without isolation. The associated leakage aspects are already covered under ALERT

initiating conition 5. The addition of EALs for initiating condition 4 would only be repetitious.

COMMENT

Alert Initiating Condition No. 16

Ongoing security compromise.

Draft EALs

The licensee did not respond to this initiating condition.

Discussion

The licensee should prepare appropriate EALs. An adequate EAL would be "Security safeguards contingency event that results in adversaries commandering an area of the plant, but not controlling shutdown capability or any vital areas as defined in the Modified Amended Security Plan." The EAL should, when implemented, require that the security supervisor notify the shift supervisor, who will declare an alert.

RESPONSE

a) EALs appropriate for this initiating condition are as follows:

1.1 Security threat or attempted sabotage

1.2 Ongoing security compromise

1.3 As deemed necessary by the Duty Shift Supervisor

b) Communications between station security and the control room are covered in the security plan. The plan calls for initial notification of the control room and also update of changing conditions.

COMMENT

Site Area Initiating Condition No. 8

Complete loss of any function needed for plant hot shutdown.

Draft EALs

1. Inability to insert sufficient control rods (with either the RD system in normal operation or via the scram function) to bring the reactor subcritical as indicated by count rate and steam flow on 1H13-P603; instruments C51-R600A, B, C and D, and C34-R603A, B, C, and D, respectively;

and

Failure of both loops of standby liquid control to inject into the vessel indicated by zero pressure on instrument 1C41-R600, panel 1H13-P603; or as indicated by failure of valve 1C41-F008 position light on panel 1H13-P603 to indicate open; or as indicated by failure of explosive valves 1C41-F004 A and B position lights to indicate open (fired); following manual initiation of the system;

or

Failure of the SC system to bring the reactor subcritical following poison injection, also as indicated by count rate and steam flow on 1H13-P603.

Discussion

The proposed EALs address failure to scram the reactor, not loss of capability to bring the reactor from full power to hot shutdown. A method of accomplishing this operation with a minimum of safety-related equipment is to scram the reactor, then to cool the reactor by injecting coolant into it using either high-pressure core spray or high-pressure injection. Reactor pressure is kept within operating limits by the safety/relief valves, which also provide a path for coolant leaving the reactor is condensed in the suppression pool, which in turn is cooled by the RHR system. Thus, the minimum number of components that must be available to achieve hot shutdown by this method are:

- the scram system
- the standby liquid control system
- operable safety/relief valves
- high-pressure core spray or high-pressure coolant injection (depending upon reactor design)
- the RHR system, including its ultimate heat sink.

An alternative method of achieving hot shutdown is to use the safety/relief valves (either manually or with the ADS system) to depressurize the reactor by dumping steam to the suppression pool. The pool is cooled by the RHR system with its heat sink. This latter

method makes use of the same components as the first, but does not require high-pressure coolant injection. Another path is use of the main condenser with makeup via high-pressure core spray (HPCS) or the RCIC system. A generic set of EALs using these two shutdown paths is given in Figure 34.

RESPONSE

a) The example initiating condition from NUREG-0654 is a complete loss of any function needed for plant hot shutdown. Hot shutdown is defined by Zimmer Technical Specifications as the reactor mode switch in the shutdown or refuel position and average reactor coolant temperature greater 200 deg. F. Current Zimmer EALs address several conditions as abbreviated below:

i) inability to insert sufficient control rods to bring the reactor subcritical, and

ii) failure of standby liquid control system to inject, or

iii) failure of the SC system to bring the reactor subcritical following SC injection.

It is felt that these EALs adequately cover the intentions of the initiating conditions.

b) Systems such as RHR, HP, Service Water, etc. are not necessary to meet the initiating condition of functions needed for plant hot shutdown.

c) It should also be mentioned that Initiating Condition No. 10 of Alert category addresses the functions needed for plant cold shutdown.

COMMENT

General Initiating Condition No. 6b, 6c, & 6d

Small or large LOCA's with failure of ECCS to perform leading to core melt degradation or melt in minutes to hours. Loss of containment integrity may be imminent.

Draft EALs

Not applicable. See discussion under General Emergency Initiating Condition No. 4.

Discussion

This sequence is simply a LOCA with ECCS failure that has resulted in damaged fuel. If the ECCS continues to malfunction, core melting will occur. This is grounds for declaring a general emergency. A generic set of EALs is given in Figure 41 of NUREG-0818. The EALs for fuel damage and for a LOCA are the same as those shown in Figures 32 and 33 of NUREG-0818 The "Gap activity in primary containment" EAL indicates failure of the cladding and of the primary coolant boundary. The detailed EALs for ECCS malfunction will depend upon the particular plant.

Small or large LOCA occurs and containment performance is unsuccessful affecting longer term success of the ECCS. Could lead to core degradation or melt in several hours without containment boundary.

Draft EALs

Not applicable. See discussion under General Emergency Initiating Condition No. 4.

Discussion

The event described here is that a LOCA has occurred and the ECCS has functioned properly, keeping fuel damage to within allowed levels. However, containment cooling has failed. This situation will, in time, permit water in the containment sump to heat up to a point at which the pumps will cavitate. Alternately, cooling for the pump motors and/or bearings could be lost. Any of these events would cause loss of ECCS flow, which would ultimately lead to a core melt. Figure 42 gives a proposed set of generic EALs for this example sequence. We assume that the operator would be well aware that a LOCA had occurred, as some time would have passed before containment cooling became a crucial item (in fact, the need for containment cooling is a LOCA

EAL). Thus, the EALs have not been used in Figure 42. Containment failure EALs are either "Containment temperature excessive and still rising" (declare the emergency immediately) or "Containment cooling has become inadequate" (the operators are given 1/2 hr to rectify the problem before declaring an emergency). Additional time could be allowed if it was possible to draw water for the ECCS from the condensate storage tank.

Shutdown occurs but requisite decay heat removal system (e.g., RHR) or non-safety systems heat removal means are rendered unavailable. Core degradation or melt could occur in about ten hours with subsequent containment failure.

Discussion

Simply put, all heat sinks have been lost, including the main condenser which is cooled by the circulating water system, the RHR system which is cooled by the standby service water system, and the RCIC system which uses the suppression pool as a heat sink. The suppression pool in turn is cooled by the RHR system; if the RHR system has been lost, the suppression pool can still provide cooling for a time because of its thermal mass. Other systems may well be available; these would probably differ from one plant to another. A set of suggested generic EALs is given in Figure 43. The "Other heat sinks lost" EAL is a catchall for systems that have not been called out. The operators have been given 1/2 hour to correcct the problem since core melt is at least several hours away.

RESPONSE

a) As per our phone conversation with Tom McKenna of NRC Staff on 3/10/82, it was discussed that no response is necessary for Part b as these conditions have been adequately covered in EALs for General 2 condition (see General 2 response).

b) Part 6 addresses containment performance which would affect ECCS operation. Suppression pool temperature could result in ECCS pump cavitation due to inadequate NPSH. EALs will be adopted as follows:

LOCA has occurred

and

Suppression Pool temperature approaching

saturation conditions.

c) For Part (d), EALs will be adopted as follows:

A LOCA Has occurred in conjunction with the following:

Loss of both essential services water loops;

and

Loss of RHR loops .. and B;

and

Loss of main condenser systems with simultaneous loss of all relief valve capability and loss of the ADS function and loss of the RCIC system.

COMMENT

Discuss the method used to present the EALs to the Control Room staff to demonstrate that a system has been established that allows rapid accurate classification of events. This should include a description of the job aids used and provisions to have the system tested by the Control Room staff to demonstrate workability.

RESPONSE

The primary method of presenting EALS to control room personnel is through Emergency Plan Procedure EI.EPP.1.2, "Classification". The procedure is in table form. The following information is contained in the table: a) General category of emergency b) initiating conditions c) Emergency Action Levels and d) the Emergency Class. Eighteen general categories link similar initiating conditions for quick reference.

Where appropriate, tables listing EALs and Emergency Class have been included as a part in the Emergency Operating Procedures such that classification of emergencies can be accomplished at the earliest possible time.

Control room personnel are trained and tested on the use of emergency procedures in the Requalification Program. Subsequent drills are performed to demonstrate control room staff knowledge and understanding of the procedures.

COMMENT

Alert 5 - Can any of the specified DC systems be considered vital; if so, change the operator(s) to an "or".

RESPONSE

It should be noted that the above stated condition corresponds to Alert 8 and thus our response will be directed to Alert 8. This initiating condition "Loss of all onsite DC power" and EALs are being deleted from the Alert class. The EALs discuss a loss of the 250 VDC and 24 VDC distribution busses. Vital onsite DC power is supplied by the 125 VDC busses (A,B and C).

The loss of all vital onsite DC power is addressed in Site Area Initiating Condition No. 7 with at present a requirement for a sustained loss exceeding 15 minutes. The 15 minute time lapse will be deleted so that a site area emergency will be declared immediately upon loss of vital DC.

It should be noted that following a total loss of DC power control room personnel will possibly be too busy trying to regain control to note when the 15 minutes has elapsed. As this is a serious event, the 15 minute time delay will be deleted so that a higher class of emergency will be declared at an earlier time and to prevent any delay in declaring a Site Area Emergency in the event control room personnel become preoccupied trying to restore power. Although this action is more conservative, it will reduce the possibility of errors in classifying this event.

COMMENT

Alert 9 - Revise this EAL to address the condition specified in NUREG-0654.

REPONSE

The initiating condition for Alert 9 is a coolant pump seizure leading to fuel failure. In our discussion with Tom McKenna of NRC Staff on 2/26/82, it was determined that response to this initiating condition was not necessary as BWRs are much less prone to fuel damage resulting from loss of coolant pumps than are PWRs.

COMMENT

Alert 10 - Clarify the following:

"Some spurious annunciation may occur".

RESPONSE

It should be noted that the above stated phrase is contained in Alert 14. NUREG-0654 example initiating conditions for Alert 14 states Most or all alarms (annunciators) lost. The EAL for this condition is by direct observation by the control operator. The addition of the statement "some spurious annunciation may occur" was provided to indicate that even though some annunciation is occurring, it is not indicative that the annunciator system has been restored to service.

COMMENT

Alert 11 - Clarify the use of the "and/or" operator.

RESPONSE

The "and/or" operator basically represents an "or" statement. The inclusion of the "and" portion is to avoid any confusion in the event both EALs are met. By example and/or means either A or B, or A and B will result in declaration of the event.

COMMENT

Site Area 1 - Clarify how the EALs specified (1, 2, and 3) are used - provide "and", "or" operators.

RESPONSE

Per our discussion with Tom McKenna of NRC Staff on 2/26/82, it was determined that this comment was not relevant and that a response was not necessary.

COMMENT

Site Area 9 - Provide the assumption used to develop Figure B1 and its relationship to the specified dose rates.

RESPONSE

Emergency Plan Appendix (B) will be revised to include curves for defining the site and general emergency conditions based on containment radioactivity inventory. The curves indicate the relationship between both the primary containment high-range and primary ex-containment post accident radiation monitoring systems, and radioactive material available for release from containment for postulated core damage accidents. The site and general EALs for the seven stability classes out to seven hours after reactor shutdown for both whole body and thyroid PAG's are included on the new curves. In the unlikely event that atmospheric stability class cannot be readily determined, "G" stability EALs (1 m/sec wind speed) will be used to define the emergency classification.

The assumptions used as a basis for developing the curves:

a. Radioactivity is instantaneously released to the primary containment atmosphere at the time of reactor shutdown (defined as 0.0 hours).

b. The release consists of noble gases and iodines--the noble gases in proportion to their core inventory and the iodines in proportion to 25% of their core inventory.

c. This radioactivity leaks from primary containment to the reactor building at a rate of 1.635%/day if the MSIV leakage control system is operated, or 0.635%/day if the MSIV leakage control system is not operated.

d. The leakage into the reactor building is mixed in 50% of the reactor building volume.

e. The reactor building is exhausted to the atmosphere at a rate of 2300 cfm per day through an iodine filter of 99% efficiency.

f. The exhaust is released at ground level.

Assumptions used and the relationship between the Emergency Plan Appendix (B) EAL curves and the site boundary dose rates include:

a. Whole body dose rates are calculated with a semi-infinite gamma cloud model.

b. Thyroid dose rates are calculated for an awake adult (breathing rate 3,47 x 10 -3 m3/sec.)

c. For conservatism, Xe-135m and Xe-135 daughters of I-135 are ignored in calculating monitor readings.

d. The scenario of the calculation leads to a site boundary dose rate that is zero at time 0.0 hours, rises to a peak within a few hours, and then falls slowly toward zero. The EAL reading of the monitor at any time is not based on the dose rate at the time of

the reading; instead it is based on the peak dose rate reached in the scenario.

COMMENT

Provide EALs that relate to the lower limits of the EPA PAGs based on effluent monitor reading, and field monitor results. This must include the default release duration to be used in calculation of dose.

RESPONSE

Emergency Plan Table F.4-1 will be revised to include the numerical EALs relating to EPA PAGs based on effluent monitor readings from both the main plant vent stack and standby gas treatment system stack. Field monitor measurements relating actual measurements to EPA PAGs are provided in section E of table F.4-1.

Implementing procedures for offsite dose calculation and protective action methodology specify a 10 hour default release duration to be used in calculation of offsite dose.

COMMENT

General 1 - What are the assumptions used to develop Figure B-1?

Provide EALs for upper limits of the EPA PAGs to include a default release duration to be used in calculation of dose.

Provide EALs for field monitoring results.

RESPONSE

See response to "Site Area 9" above.

COMMENT

General 2 - Provide an EAL for Loss of Containment and Loss of Primary Coolant Boundary.

Provide an EAL based on reactor water level (below 1/2 for X minutes).

Address all containment failure modes (steam explosion, failure to isolate).

RESPONSE

The following EALs provide conditions for loss of containment (high containment pressure) and loss of cladding and primary coolant boundary(high radiation levels in contaiment). In addition, EALs based on failure of containment to isolate and reactor water level will be added. New EALs are as follows:

1. When either Primary In-Containment or Primary Ex-Containment post accident radiation monitors (1RE-CM086 and 1RE-CM087 or 1CE-CM007 and 1CE-CM015 respectively) reads above the curve shown in Attachments 9-14, monitor RIR-LD028, panel 1PM06J at the corresponding time (elapsed since reactor shutdown).

and

The Secondary Containment radiation monitor or the SGTS stack effluent radiation monitor or the Main Plant Vent Stack provides confirmation of increased effluent release (increase of one decade).

and

2. Containment pressure exceeds 50 PSIG as indicated on PI-CM010 or CM021, panel 1PM06J.

or

Failure of containment to isolate

3. Reactor water level below -72 inches as indicated on fuel zone indicator 1B21-R610 on panel 1H13-P601 (core 1/2 uncovered) for 20 minutes.

In addition, the EAL concerning a visual inspection of the containment is being deleted as this may be difficult or impossible to accomplish in a timely fashion.

COMMENT

General 4 - EAL 1 All transients should be addressed, not just loss of AC.

EAL 2 Specify the indicators that containment cooling is not functioning (pressure/temperature) in addition to activation of the system.

Address failure of the ECCS (e.g., water level below 1/2 for X minutes).

EAL 3 What is the relationship of Alert 8 to a General Emergency Conditon?

ATWS must be specifically addressed.

RESPONSE

EAL 1 The portion of the EAL addressing the loss of AC power is not necessary in this EAL and by our discursion with Tom McKenna of NRC Staff on 2/26/82, we are deleting this portion of the EAL.

EAL 2 The EAL should include indications that containment cooling is not functioning properly. This would be indicated by an increasing drywell pressure or temperature. Drywell pressure/temperature recorder will be located on 1H13-P601. The revised EAL will read as follows:

1. The emergency action levels of initiating condition 1 of "Site Emergency" category have been reached

and

Containment cooling has not been automatically or manually initiated following a 15 minute time lapse;

or

Malfunction of containment cooling equipment as indicated by an increasing drywell temperature or pressure on recorder at 1H13-P601.

So adding an EAL under this section which deals with water level below 1/2 for X minutes, would tend to be very repititious with EALs contained in General 2 (see earlier discussion). These EALs address radiation levels in containment and reactor water level.

Per our discussion with Tom McKenna of NRC Staff on 2/26/82, the comment pertaining to containment failure affecting long term ECCS operation was deleted.

EAL 3 Reference to Alert 8 is in error. The EAL should reference Alert 12 whose initiating condition addresses fuel damage accidents with release of radioactivity to containment or fuel handling building.

COMMENT

Emergency Response Facilities

The Zimmer Emergency Response Facility (ERF) design plan is still under review. However, the evaluation to-date indicates that inadequate information has been provided for the ERF design with regard to:

a. The Technical Support Center, including layout, information systems and physical features.

b. The Operational Support Centers overall description and features.

c. The Emergency Operations Facility, including location, structure, layout an features.

d. The interface of emergency functions with the Control Room.

e. The hardware and software specifications, data set, layout, communications and system operations for the data acquisition system for the ERF's.

RESPONSE

A revised design submittal will be submitted in the near future.

RESPONSES TO NOVEMBER 12, 1981 NRC LETTER

NRC COMMENT

A.1. Provide updated Letters of Agreement (LOA) with the following support agencies.

Moscow Life Squad
Washington Township Fire Department
U.S. Coast Guard
Ohio State University Nuclear Engineering Development
Battelle Memorial Institute
Monsanto Mound Laboratory
Commercial Aircraft Services

RESPONSE

Letters of Agreement are being updated or developed, as appropriate, for each of the organizations mentioned and will be included in Revision 2 to the Zimmer Emergency Plan.

NRC COMMENT

B.1. Specify how the shift staff will be augmented as shown in Table B-1, NUREG-0654. The July 1, 1981 response to NRC concerns identifies response times of 60 and 90 minutes and two hours; Table B.1, NUREG-0654 specifies 30 and 60 minute response times as acceptable. The licensee shall perform an analysis of the functional areas needed to augment the on-shift staff in an emergency to determine if timely augmentation will be achieved within the 30 and 60 minute time goals set forth in Table B-1, NUREG-0654. If shift augmentation does not conform to the staff guidance of 30 and 60 minutes, the licensee should identify compensatory measures designed to strengthen their augmentation capability (e.g., prioritization of call-in needs, duty officer system, etc.). A commitment should be made to conduct periodic unannounced drills designed to ensure the goals of Table B-1 can be achieved. The results of the above analysis should be forwarded to the NRC for evaluation.

RESPONSE

An analysis of the functional areas in which augmentation to the on-shift crew is needed in an emergency has been conducted to determine station capability to achieve the 30 and 60 minute time goals set forth in Table B-1, NUREG-0654. Based on this analysis, and depending on road, weather and traffic conditions, twelve additional personnel will be available on-site for communications, radiological accident assessment and operational support, in-plant protective actions, and plant system engineering and repair actions within 30 to 45 minutes. Fourteen additional persons will be available to augment the above mentioned functional areas within 60 to 75 minutes.

As described in Emergency Plan section F.5.2, ZPS-1 has a formal Emergency Duty Supervisor (EDS) System. The on-call EDS carries a pager for rapid notification and recall. Additionally, key personnel representing site, radiation protection, maintenance, operations, and technical engineering management carry pagers and, if requested by the EDS, or at the "Alert" or above emergency level, will be notified on a group page system. Shift augmentation is further strengthened with the recall, on a priority basis, of additional

personnel required to man all functional areas within the aforementioned time frames. Further, periodic unannounced drills will be conducted and documented to ensure continuing efforts toward these emergency shift augmentation goals.

COMMENT

E.1. Provide schedules, dates, commitments, types of equipment selected and design of coverage for the prompt notification system. This information was not provided in your July 1, 1982 response.

RESPONSE

Information concerning the prompt notification system was provided by CG&E letter dated August 18, 1981 (E. A. Borgmann to Mr. Harold Denton). Additional information on the sirens selected and installed is provided as follows:

Fixed (i.e., non-rotating) omni directional electronic siren
Federal Signal Corporation Model No. EOWSX115.

- 3 standard signals - 115 dB at 100 ft.
  steady (alert)
  wail (attack)
  hi-lo (fire)
- public address mode - 100 dB at 100 ft.
- radio activated
- primary power: 120 VAC,
  single phase
  60 Hertz
  8 amps
  backup power: battery
  30 minute operation
  independent of AC service)

The tone alert radio system has not been purchased as of the date of this report. A revised schedule for completion of the prompt notification system is provided as Attachment 1.

NRC COMMENT

E.2 -Provide examples of the messages intended for the public.
-Describe the message verification and authentication system.

RESPONSE

Sample messages to be used for broadcast by the Emergency Broadcast System (EBS) and NOAA tone-alert radio, will be provided in Appendix F of the Zimmer Station Plan (in Revision 2), and are provided here in Attachment 2.

NOAA and the EBS entry station verify messages by code words. Officials in Clermont County and the Commonwealth of Kentucky will use a code word when requesting activation of NOAA and EBS. Additionally, a dedicated line from Clermont County and the Commonwealth of Kentucky EOC's to the primary EBS entry station will be provided as part of the microwave communications system.

NRC COMMENT

F.1. Specify who will receive ZPS communication 24-hours per day, seven days per week for each principal response group/organization.

RESPONSE

Details of the 24-hour communications methods and contacts are provided in the station offsite notification procedures, and will be included as Table F.5-4 in Revision 2 of the Station Emergency Plan which is given in Attachment 3 to these responses.

NRC COMMENT

G.1. Submit for staff review, a copy of the "booklet" to be distributed to the public as identified in the July 1, 1981 response to NRC comments.

RESPONSE

A copy of the latest draft of "The Circle of Safety" is included with these responses (Attachment 4).

NRC COMMENT

G.4. With regard to rumor control, identify the "single channel" through which information will be coordinated.

RESPONSE

Public information during a radiological emergency will be issued by trained public information officers from the News Media Center, to be located near the Emergency Operations Facility (EOF) in Batavia, Ohio. Public Information representatives from the Commonwealth of Kentucky, State of Ohio, and Clermont County, Ohio will coordinate all media releases, from the EOF News Media Center.

COMMENT

H.2. The information regarding emergency response facilities (ERF's) does not provide the information needed for evaulation in accordance with NUREG-0696. Guidance on the depth of information on the design of the final facilities can be found in NUREG-0814.

RESPONSE

A revised Emergency Response Facility design report will be submitted in the near future.

NRC COMMENT

H.4 Specify how all personnel onsite will be afforded protection from inhalation exposure to ionizing radiation.

RESPONSE

The criteria for use of respiratory protection, recommending the use of KI, and area evacuation due to the presence of airborne contaminants is shown on the attached table.

AIRBORNE RADIOIODINE 131

	RADIOIODINE 131 CONCENTRATION uCi/cc	EQUIVALENT I-131 MPC HOURS FOR ACCIDENT DURATION	EQUIVALENT I-131 THYROID DOSE (RAD) FOR ACCIDENT DURATION	ACTION
I.	> 3E-09 but < 9E-09	N/A	N/A	1. Increased radiological surveillance 2. Identify and terminate source.
II.	> 9E-09 but < 1.5E-08	~ 500	5 to 10	1. Use respiratory protection. 2. Consider recommending KI if source reduction is not projected within 24 hours.
III.	> 1.5E-08 but < 5E-08	~ 500 to 2000	10 to 30	1. Recommend KI if source reduction is not projected within 6 hours. 2. Evacuate non-essential personnel within 12 hours if unable to reduce or terminate the source within 24 hours. 3. Essential OSC personnel report to habitable areas as directed by EDS.

COMMENT

H.5. CG&E should provide, prior to January 1, 1982, the following material to comply with NUREG-0737, Item III.A.2 and the criteria set forth in NUREG-0654, Appendix 2.

1) Functional description of meteorological measurements systems (primary, backup, and supplemental) needed to provide meteorological data to represent the area within the Plume Exposure Emergency Planning Zone.

2) Functional description of the dose calculational methodology which contains the Class "A" transport and diffusion module. This functional description shall include the technical basis and justification for model selection.

3) Functional description of the remote access scheme to deliver meteorological and radiological information to offsite agencies.

4) Schedule for installation and operation of systems and capabilities identified above.

Until such time that the systems and capabilities identified above are fully operational, provide a commitment to adopt the interim compensating measures outlined in Appendix 2 to NUREG-0654.

RESPONSE

The requested information will be supplied in a revised Emergency Response Facility design report in the near future.

NRC COMMENT

I.4.a. Submit a description of the training to be received by field monitoring personnel that will permit them to make rapid assessments of offsite radiological releases.

RESPONSE

Station personnel assigned to implement field radiological monitoring emergency procedures receive formal classroom training in offsite survey procedures. Written examinations are administered to evaluate the effectiveness of the training. Hands on field training is then conducted to ensure total familiarity with sampling and measurement equipment, personnel protective equipment, survey point locations, transportation, and communications equipment.

Practice drills are conducted periodically to maintain proficiency. Practice drills are critiqued to identify areas in which additional training is necessary.

Station, and state and local authority offsite field monitoring teams use the type of survey, sampling and analysis equipment described in FEMA-REP-2, Guidance on Offsite Emergency Radiation Measurement Systems, Phase 1 - Airborne Release, September, 1980. Field teams dispatched offsite from the station radio area dose rate and sample count rate measurement data to the station where programmable calculators are used to obtain rapid mathematical determinations of thyroid dose commitments for comparison to projections based on effluent monitoring and meteorological parameters. This procedure allows field teams to move expeditiously from one location to another without stopping to calculate sample results, thus permitting rapid assessment of offsite radiological releases.

NRC COMMENT

I.4.b. Specify the type and location of transportation that will be available to field monitoring teams.

RESPONSE

Primary, and backup or supplementary transportation is provided at the station for two field monitoring teams. The primary vehicles are vans, one of which also serves as a backup to the offsite ambulance arrangements described in the Plan. Other station and company vehicles are available at the station for use as needed.

NRC COMMENT

I.4.c. The Plan states, and the July 1, 1981 response does not elaborate, "the field monitoring teams will assemble at the ZPS facility or EOF then be deployed to the field". Specify how these teams will assemble and be deployed in the field to begin measurements and assessments within 60 minutes, in Ohio and Kentucky.

RESPONSE

Field monitoring team survey kits are maintained in readiness for deployment in the station guard house adjacent to the parking lot. Off duty personnel called in to perform field monitoring report to the guard house where the on-duty guard provides written instructions on the nature of the release, survey location, team personnel protective measures, and type of survey required. These written instructions are transmitted to the guard house from the EDS prior to field team arrival at the site. It is therefore, only necessary for the team to read the instructions on dosimetry, make a radio check with the dispatcher, take the survey kit and leave for the designated survey area.

This procedure minimizes time lost at the station. Estimated deployment times are provided in Table F.5.1 and discussed in response to question B.1.

NRC COMMENT

I.4.d. Specify the recall activation criteria.

RESPONSE

The operational support centers which include personnel designated to conduct field monitoring, are activated at the "Alert" or higher emergency level.

NRC COMMENT

I.4.e. Specify how individuals on the call lists are notified i.e., telephone, beeper.

RESPONSE

Criteria for recall of key management representatives is described in the response to question B.1. Recall of field monitoring team personnel is initiated by the on-call Radiation Protection Management Representative who, prior to departing for the station, telephones the station to acknowledge receipt of the recall notice and listens to a pre-recorded message concerning the event including, if appropriate, a request for recall of off-site monitors. A second telephone call initiates a cascading phone call list, on a priority basis, which includes recall of on and offsite monitoring teams

NRC COMMENT

I.4.f. Specify the types and range of the radio equipment used by field monitoring teams. Verify that these radios will be able to transmit from any location within the 10 mile EPZ and that control room personnel will be able to hear and understand all transmissions during all weather conditions.

RESPONSE

Portable two-way FM radios are used by field monitoring teams. Studies indicate that we have excellent coverage out to 10 miles with somewhat limited capability out to 15 miles. The system experiences no propagational effects due to weather conditions.

NRC COMMENT

I.4.g. List the range of survey monitoring equipment referred to in the July 1, 1981 response.

RESPONSE

The dose rate meters have a range of 0 to 50 R/Hr. The count rate meters have a range of 0-500,000 CPM. The capabilities and limitations of the air samples are in accordance with FEMA-REP-2.

NRC COMMENT

I.4.h. Describe the capabilities and limitations of the sampling equipment and supplies to be used inplant for monitoring during an emergency.

RESPONSE

The following equipment will be used for in-plant iodine sampling and analysis:

1. Fixed Airborne Activity Monitoring System (FAAM) consisting of six microprocessor based Continuous Air Particulate and Iodine (P/I) Channels monitoring the six major HVAC ducts leading to the plant vent stack. The six iodine channels consist of 2 inch x 2 inch NaI(Tl) crystals, AM-241 seed imbedded for automatic gain stabilization. The single channel analyzer (SCA) chassis are equipped with automatic background subtraction via a second SCA and NaI(Tl) crystal set on a window adjacent to the 364 Kev I-131 photopeak. Each FAAM has local and remote alarm and radout capability. Redundant remote terminals are provided, one in the Control Room and one in the Health Physics office.

2. Three air sample panels provide the capability to obtain remote grab air P/I samples from twenty-five rooms throughout the plant.

3. Eleven portable air samplers are available for obtaining grab air P/I samples throughout the plant.

4. Three portable Eberline Instrument Corp. Model SAM-2 SCA's are available for analyzing grab samples.

5. Silver Zeolite Iodine sample Cartridges are available for use with any of the sample systems described above.

6. The existing fixed counting facilities are located well below grade level in the Auxiliary Building. Direct radiation levels under Regulatory Guide 1.3 conditions are greater than 0.015 RAD/hr during the 30 day post-accident period. Existing fixed single and multichannel analyzer shields are sufficient to reduce direct radiation effects to levels under which concentrations of iodine below occupational MPC can be detected.

7. Under the accident conditions described above and with extremely adverse meteorology resulting in increased airborne levels in the counting room, again direct airborne radiation effects are acceptably ameliorated with detector shielding and the detector caves are purges with bottled nitrogen to preclude the admission of airborne contaminents therein.

8. Should it become necessary, space can be made available in the habitable TSC to set up SAM-2 SCA's for iodine counting.

9. Bottled nitrogen is also available to purge iodine cartridges for Noble gas removal.

NRC COMMENT

0.2. -Specify the established minimum level of competence for each of the nine categories of personnel for which training is described.

-Specify how the minimum level of competence is tested.

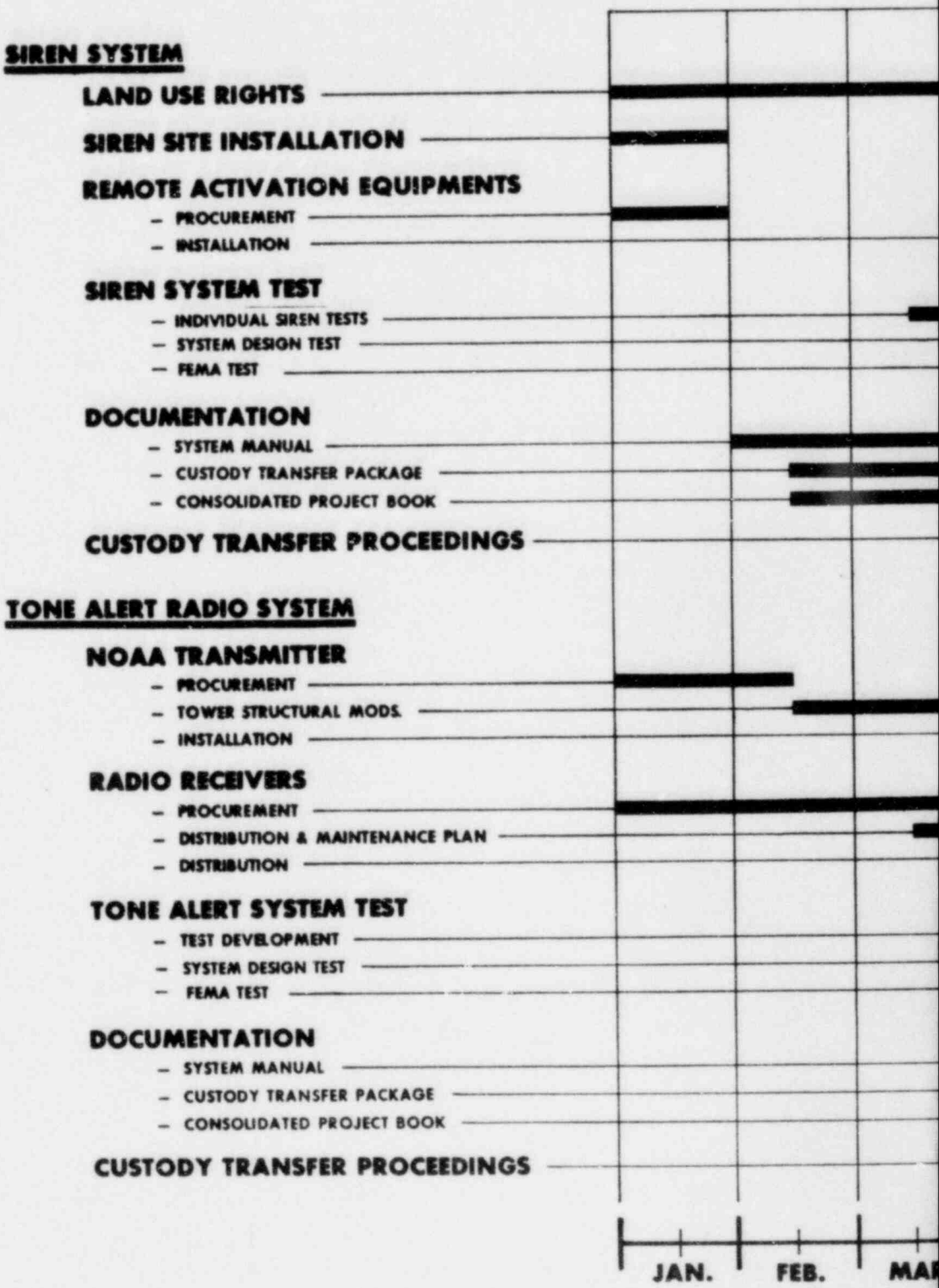
RESPONSE

Competence is tested by means of written examinations given in connection with training sessions. Minimum level of competence has been established as a score of 80% or greater on written exams. Competence is also tested by means of observed drills and exercises.

WM. H. ZIMMER NUCL

PROMPT NOTIFICATION SYSTEM IMPL

APRIL 1



EAR POWER STATION

EMENTATION SCHEDULE (PROJECTED)

3, 1982

SAMPLE EMERGENCY BROADCAST SYSTEM AND NOAA WEATHER RADIO MESSAGES

TEST

A test is being conducted today at the William H. Zimmer Nuclear Power Station to test the capabilities and preparedness of State and county agencies that would respond to emergencies at the nuclear power station. Again this is only a test. If this was an actual emergency, you would be instructed where to tune in your area for further instructions and official information. This is only a test.

NO ACTION NECESSARY

At _____ today, a (site area emergency, general emergency) was declared at the William H. Zimmer Nuclear Power Station. There has been no release of radioactive material and at this time no precautionary or protective actions are necessary on the part of the public.

State and local disaster and health service personnel are monitoring the situation. Further information will be provided by this station as it becomes available. Please stay tuned to this station for further information or instructions.

If you have heard this announcement and are familiar with radiological emergency procedures, and are not in need of assistance, please help verify this notification by signifying that you have been notified. To do this you should place the green "I HAVE BEEN NOTIFIED" card so that it is visible from the road, or tie a towel to your door knob, mailbox, or other location visible from the road. If you are in need of assistance, do not use the green card or hang a towel. Local police and fire department personnel will check all homes not displaying the card or towel and ask what assistance you require.

There is no immediate risk of radiation exposure or contamination.

Please stay tuned to this station for further information and instructions.

SHELTERING REQUIRED

This is an important emergency bulletin.

At _____ today, a (site area emergency, general emergency) was declared at the William H. Zimmer Nuclear Power Station. Some small releases of radioactive material (are expected to/did) occur. However, all efforts are being made by the plant staff to correct the malfunction.

The County Judge/Executive and State and local Disaster and Emergency Service organizations recommend that residents living (name of township or municipality, or other boundaries such as roads and township lines) take these protective acitons:

A. Close all windows and doors and remain indoors.

B. Turn off all air conditioners, fans or other ventilation systems which draw air from outside.

C. Wear outer garments such as a rain or overcoat, boots, hat and gloves if you must go outside. Upon reentry to your home, these garments should be removed and stored. As an added measure, you may wish to wash or shower off the parts of your body that were exposed.

D. Should respiratory protection become necessary, several household items may be utilized. The most effective respiratory protection include men's cotton handkerchiefs, toilet paper, and bath towels. The handkerchief should be folded to a thickness of 8 to 16 layers, commercially available toilet paper folded in three layers, and bath towels folded in two layers for best effect. Any of these items should be placed over the mouth and nose with a good seal to ensure effectiveness and reliability. Other items that can be utilized are a muslin sheet folded once, a cotton shirt folded once, a woman's handkerchief folded four times, a rayon slip and cotton dress material folded once. The latter group of items are less effective and should be utilized if other items are not readily available.

E. Wash off any home or locally grown fruits and vegetables before eating them.

F. Shelter grazing animals and put them on stored feed.

G. (Other)

Presently, a door-to-door verification is being conducted by local police and fire departments. If you have heard this announcement and are familiar with the radiological emergency procedures, and are not in need

of assistance, please help speed this verification by signifying that you have been alerted. To do this you should place the green "I HAVE BEEN NOTIFIED" card so that it is visible from the road, or tie a towel to your door knob, mailbox, or other object visible from the road.

If you need assistance, do not use the green card or hang a towel. Police and fire department personnel will check all buildings not displaying a card or towel, and ask what assistance you require.

State and local disaster and health services personnel are monitoring the situation. There is little or no danger of contamination or exposure at this time, provided you remain inside and follow these simple instructions. (Repeat A through F)

Please stay tuned to this station for further information and instructions.

EVACUATION NECESSARY

This is an urgent emergency bulletin.

At _____ today, a (general emergency) was declared at the William H. Zimmer Nuclear Power Station. There is a possibility that some radioactive material (may be/may have been) released into the environment. However, all efforts are being made by the plant staff to correct the malfunction.

The County Judge/Sheriff has ordered all residents living (name of township of municipality, or other boundaries such as roads) to evacuate.

Evacuation routes and sheltering locations are outlined in the Public Information Packet (Circle of Safety), and your local phone directory.

Presently, a door-to-door verification is being conducted by local police and fire departments. If you have heard this announcement and are familiar with the radiological emergency procedures, and are not in need of assistance, please help speed this verification by signifying that you have been alerted. To do this you should place the green, "I HAVE BEEN NOTIFIED" card so that it is visible from the road, or tie a towel to your door knob, mailbox or other object visible from the road. If you are in need of assistance please:

A. Do not display the green card or hang a towel.

B. Close all windows and doors and remain indoors.

C. Turn off all air conditioners, fans or other ventilation systems which draw air from outside until help arrives.

D. Should respiratory protection become necessary, several household items may be utilized. The most effective respiratory protection include mens cotton handkerchiefs, toilet paper, and bath towels. The handkerchief should be folded to a thickness of 8 to 16 layers, commercially available toilet paper folded in three layers, and bath towels folded in two layers for best effect. Any of these items should be placed over the mouth and nose with a good seal to ensure effectiveness and reliability. Other items that can be utilized are a muslin sheet folded once, a cotton shirt folded once, a woman's handkerchief folded four times, a rayon slip and cotton dress material folded once. The latter group of items are less effective and should be utilized if other items are not readily available.

Police and fire department personnel will check all buildings not displaying a card or towel, and ask what assistance is needed.

Please stay tuned to this station for further information or instructions.

ATTACHMENT 3

TABLE F.5-4

REVISION 1
January, 1982

Description of 24-Hour Communications Links

With Support Agencies

ORGANIZATION	DAY			NIGHT		
	CONTACT	MEANS		CONTACT	MEANS	
		PRIMARY	ALTERNATE		PRIMARY	ALTERNATE
U.S. Federal Govt.						
U.S. DOE Chicago Operations Office Region 5	Health-Physicist	Through Ohio Disaster Services Agency	Commer. Phone	(Night same as day)		
USNRC-Office of Inspection and Enforcement Region III		ENS Hotline	HPN Hotline	(Night same as day)		
USEPA-Region 5		Through Ohio Disaster Services Agency	Commer. Phone	(Night same as day)		
U.S. Coast Guard Marine Safety Office	Duty Officer	Radio	Commer. Phone	(Night same as day)		
State of Ohio						
Environmental Protection Agency	Duty Officer	Commer. Phone	Through Ohio Disaster Services Agency	(Night same as day)		
Adjutant General's Dept. (Disaster Services Agency)	Deputy Director	Microwave (Hotline Phone)	Commer. Phone	Answering Service	Commer. Phone	Commer. Phone

TABLE F.5-4 (Continued)

REVISION 1
January, 1981

ORGANIZATION	DAY			NIGHT		
	CONTACT	MEANS		CONTACT	MEANS	
		PRIMARY	ALTERNATE		PRIMARY	ALTERNATE
Commonwealth of Kentucky						
KY Division of Disaster and Emergency Services	Duty Officer	Microwave (Hotline Phone)	Commer. Phone	Duty Officer	Commer. Phone	Commer. Phone
Other Groups						
Clermont County (Ohio) Civil Def. Disaster Services Agency	Director	Microwave (Hotline Phone)	Commer. Phone	Sheriff's Duty Officer	Through Clermont County Sheriff	Commer. Phone
Moscow Life Squad	Chief	By Radio Through New Richmond P.D.	Commer. Phone	(Night same as day)		
New Richmond Life Squad	Chief	By Radio Through New Richmond P.D.	Commer. Phone	(Night same as day)		
Clermont County Sheriff	Sheriff	Microwave (Hotline Phone)	Commer. Phone	Duty Officer	Micro-wave (Hotline Phone)	Commer. Phone
New Richmond Police Department	Chief	Two-way Radio	Commer. Phone	Dispatcher	Two-way Radio	Commer. Phone
Washington Township Fire Dept.	Chief	By Radio Through New Richmond P.D.	Commer. Phone	(Night same as day)		
Cincinnati General Hospital	Director-Radio Isotope Labora-tory	Two-way Radio	Commer. Phone	Director/ Associate Director	Commer. Phone	Commer. Phone

ORGANIZATION	DAY			NIGHT		
	CONTACT	MEANS		CONTACT	MEANS	
		PRIMARY	ALTERNATE		PRIMARY	ALTERNATE
Other Groups (con't)						
Cincinnati Water Works	Operator on Duty	Microwave (Hotline Phone)	Commer. Phone	(Night same as day)		
Kenton County Water District No. 1	Operator on Duty	Two-way Radio	Commer. Phone	(Night same as day)		
Newport Water Works	Operator on Duty	Two-way Radio	Commer. Phone	(Night same as day)		
Bracken County EOC	Judge/Sheriff	Microwave (Hotline Phone)	Commer. Phone	County Dispatcher	2-way Radio	Commer. Phone
Campbell County EOC	County Dispatcher	Microwave (Hotline Phone)	Commer. Phone	(Night same as day)		
Pendleton County EOC	Judge/Sheriff	Microwave (Hotline Phone)	Commer. Phone	Duty Officer	Tone Alert Radio	Commer. Phone

DRAFT

ATTACHMENT 4

CIRCLE OF SAFETY

January 15, 1981

DRAFT

I. INTRODUCTION

It is unlikely that there will ever be an emergency at the Wm. H. Zimmer Nuclear Power Station which would affect you. State and local governments must, however, prepare a complete plan for you and others who live in this area to follow. If there is a chance you may be affected, that plan will be used. This handbook tells you about the plan and what you may be asked to do if there is an emergency. Here are some terms you need to know, since they will come up often as you read.

EMERGENCY -- means a Zimmer emergency and possible danger from radiation.

ZONE -- stands for Emergency Planning Zone, a circle about 10 miles in all directions from the Zimmer Plant.

PLAN -- a short term for the steps you are to follow if you live in the Zone. This handbook describes the Plan and tells you what steps to take if there ever is a Radiation Emergency.

PLEASE READ THIS HANDBOOK AND KEEP IT IN A SAFE PLACE SO YOU CAN LOOK AT IT LATER IF YOU NEED TO.

If you have any questions, call one of the phone numbers inside the back cover of the handbook. Be sure that all members of your family read this handbook too, if they can; tell those who cannot read what is in it. If you have neighbors who might need help, talk things over with them. The best way to be sure you and others are safe if there is a Radiation Emergency is to know what steps to take and to work together.

The Zimmer plant is on the east bank of the Ohio River in Washington Township of Clermont County, Ohio. Moscow, Ohio, the nearest town, is south of the plant. Campbell, Pendleton, and Bracken Counties of Kentucky are across the river from the plant. Cincinnati Gas & Electric Company runs the plant.

II. RADIATION EMERGENCIES

A Radiation Emergency occurs when radioactive matter is released, or if there is a chance that it may be. Most emergencies are so small that you need not do anything. When the emergency is greater, you may be asked to stay inside or even move to a safer place farther away from the Zimmer Plant. At such times, you should do what local and state officials tell you. A Radiation Emergency almost always develops slowly, so you will have plenty of time to listen to warnings on radio and TV. You will also have time to review the Plan in this handbook.

Radio and TV stations in your area are ready to broadcast special news about a Radiation Emergency if that is needed. Both the broadcasts and this handbook will tell you what, if anything, you should do. Nuclear power plants are built and run to hold down the chance of a really bad accident. They have special "engineered safeguards" to protect those who live and work around the plants if an accident occurs.

State and local police, along with other emergency workers, have always been in charge during disasters like floods and storms. They will also be in charge during a Radiation Emergency. They will ask you to cooperate with them if a Radiation Emergency ever occurs. They will have expert advice and can tell you the best steps to protect your health and safety. This handbook will help them and you.

III. RADIATION EMERGENCY PLANS

The Federal Emergency Management Agency and the Nuclear Regulatory Commission makes sure that the Radiation Emergency Plan for Zimmer meets strict new federal rules. All nuclear plants in the United States must be able to quickly reach all persons in the Zone and tell them of a serious emergency. The Plan for the Zimmer Plant has been made by the state and county agencies below.

Ohio Disaster Service Agency
Kentucky Division of Disaster and Emergency Services
Clermont County Disaster Services Agency
Disaster and Emergency Services agencies in
Campbell, Pendleton, and Bracken Counties

These agencies have decided together what to do if a Radiation Emergency occurs and who will be in charge.

A. The Zone (The Emergency Planning Zone)

The Zone covers a circle about 10 miles in all directions from a nuclear power plant. The Zone for the Zimmer plant covers parts of Clermont County in Ohio and parts of Campbell, Pendleton, and Bracken Counties in Kentucky. The Evacuation Route Map in the middle of this handbook shows the Zone.

LOCATE WHERE YOU LIVE IN THE ZONE AND MARK IT ON THE MAP.

B. Exposure to Radioactive Matter

Radiation occurs in nature in many forms. It comes from the sun and stars, from the soil, and even from our own bodies. Radiation comes from within the nucleus (inside) of the atom. Nuclear power plants use the heat produced when uranium atoms split to make electricity. Radiation comes from this split too. However, nuclear plants block the release of this radiation in a number of ways. The Plan described in this handbook can protect you if radiation is released by accident. You can get more details about radiation from the attached booklet called **RADIATION: MEASURE FOR MEASURE.**

C. Kinds of Emergencies

The Four classes of Radiation Emergencies can occur at the Zimmer plant are:

(1) Unusual Event

This is a minor problem. Experts at the plant expect the release of little or no radioactive matter. They tell the Nuclear Regulatory Commission and state and local agencies right away, but that is all. You might later hear of an Unusual Event from a newspaper or on the radio or TV. **You do not have to do anything.**

(2) Alert

This is still a minor problem. A small release of radioactive matter is possible, so this is more serious than an Unusual Event. Experts at the plant tell federal, state and local agencies about the problem. Checks outside the plant may be made as needed. Experts expect the release of matter only in the plant. **You do not have to do anything.**

(3) Site Area Emergency

This is more severe than an Alert. Some releases of radioactive matter have occurred, or experts believe they will occur outside the plant. They tell federal, state and local agencies so they can decide if you will need to know. These agencies then get ready to act. They begin to make continuous checks and reviews of the problem outside the plant area. **You may have to do something to protect yourself during a Site Area Emergency.** Official Emergency Broadcast System

stations or your special weather radio will tell you what to do.

(4) General Emergency

This is the most severe class. Releases of radioactive matter have occurred, or experts at the plant expect them. These releases could possibly expose persons outside the plant area to radiation. The experts at the plant tell federal, state, and local officials right away. **Official Emergency Broadcast System stations or your special weather radio will tell you what to do and how to protect yourself.**

IV. WAYS TO NOTIFY AND PROTECT YOU

If there is a Radiation Emergency the Zimmer plant will inform public officials. These officials might ask you to stay inside your home or to leave the Zone.

Please listen carefully when told how to protect yourself. Do not leave the Zone unless told to do so.

A. Ways to Notify You.

A Prompt Notification System will inform those who live or travel in the Zone. This system uses:

- Warning sirens
- Special weather radios in homes
- The Emergency Broadcast System

This system will give quick notice to those in the Zone.

Checks by persons going to each house or other building will be made later.

Most persons in the Zone should be able to hear warning sirens. Special weather radios will be placed in homes where the sirens cannot be heard. As an added measure, these radios will also be placed in all homes five miles or less from the Zimmer Plant. Thus, many homes can be reached through both sirens and radios.

If you are warned of a Radiation Emergency by siren or special weather radio, tune your own AM or FM radio or TV set to an Emergency Broadcast System station. Most radio and TV stations are part of this system. You will be told what to do in this way. Avoid use of the phone. DO NOT phone local police or fire officials for information.

B. Ways to Protect You

You may be told to take shelter or to move to a safer place. Please pay close attention to the broadcasts and this handbook so you will know what to do.

When you know what to do and need no more help, please show this by one of these two ways.

(1) Put the green card saying I HAVE BEEN NOTIFIED on your front door or window so it can be seen from the road. This is the card in the middle of this handbook.

(2) Tie a large towel or cloth on your front door or mailbox so it can be seen from the road.

Emergency workers will drive along all roads in the Zone to check on these signs. They will stop at all homes which do not show a sign to see if help is needed.

1. If Told to Take Shelter Where You Are

. If you are told to take shelter, enter your house or other building where you are at the time and **stay there.**

. Close doors, windows, and other openings to help keep out radioactive matter in the air.

. Turn off air conditioners or other systems which take in outside air.

. Added things you can do are listed below.

* When you go indoors, first take off your shoes. Then wash your face and hands, especially before you handle food or any objects in your house. This will help you to hold down the chance of spreading radioactive matter in the house.

* Cover up any food not already covered or put it in the refrigerator. If radioactive matter has come into your house, this will help to keep it out of your food.

* If possible, eat and drink only **from** sealed cans or bottles. After being told to take shelter, **do not eat fresh fruit or vegetables from the garden.** Broadcasts on the Emergency Broadcasting System or special weather radio will tell you what to do about food and water while you are inside your house or business.

2. If Told to Move to a Safer Place (Evacuate)

An emergency may require that some or all of you who live in the Zone move to a safer place. How many of you would have to move would depend on the weather and how severe the accident was. This move could last from a few hours to a week or so. Remember to keep your house locked properly to protect items of value you have left in it. If you have no car for the move, see if a neighbor will give you a ride. If this is not possible, emergency workers will provide a way to move you out of the area.

Please do not move, however, unless told to do so.

Be prepared at all times. You might have to move because of several kinds of emergencies, such as nuclear, floods, tornadoes, and chemical spills. Here are four good ways to prepare yourself to move quickly.

(1) Collect your important papers and store them in a safe place. Keep them all together so you will not waste time looking for them.

(2) Make a list of things you will need to take with you. Keep it handy.

a. Items to Take During a Move

Do not take more than you will need. The items below should be considered.

1. Personal items

- soap and towels
- shaving articles
- toothpaste and toothbrushes
- toilet paper
- required papers and cards (car registration, driver's license, credit cards, (etc.)
- prescription medicines and prescriptions

2. Infants' and children's supplies

- disposable diapers and baby powder
- baby bottles
- milk or baby formula (dry or canned only)

- favorite toys for going to sleep

3. Other supplies
   - flashlight
   - portable radio
   - plastic or paper bags
   - tools for car repairs.

Do not turn your pets loose and do not take them with you to the emergency Reception/ Relocation Center. You can shelter them in the house or take them out of the Zone to some other safe place. Police and other public officials will patrol the area to protect your property and the things you have left behind.

b. Transportation

1. Use your own car, or ride with a neighbor if you can.
2. Obey traffic signs and signals, and traffic officers.
3. Take your time when driving.

If you have special needs during a move, fill out and mail the Special Needs form in this handbook now.

c. Where to Go (Relocation)

The Evacuation Route Map in the middle of this handbook shows the names of Reception/Relocation Centers. If you are told to move, go to the Center nearest your home. Traffic officers will help you along the major routes on the Map.

When you arrive at the Center you will be asked to give your name and other details for the records. If you plan to go on from the Center, you will be asked where you are going and how you can be reached.

d. Children in School

If you have children in school during an emergency, please do not drive there or call the school. You will be told by radio or TV what has been done to keep your children safe. The three possible courses of action below can be taken at schools. State and local officials will recommend the one to follow.

1. Use the school as shelter.
2. Bus the children to the Reception/ Relocation Center chosen for your children's school.

3. Bus the children to another school outside the Zone until the end of the day and then to the chosen Center.

If the second or third course of action is followed, you should go to the Center chosen for your children and stay there with them.

Some children may live in the Zone but go to a school outside it. They will be bussed from their school to a Center where you can meet with them.

e. Special Needs

If you have special needs, put them down now on the Special Needs form in this handbook. If you are older or physically disabled, you can be taken to a Reception/Relocation Center by emergency workers. Complete the form and mail it. If your needs are temporary, use the form or call your local emergency office. The number is listed inside the back cover of this handbook. Call if you need more copies of the form.

f. Boating or Camping

If you are boating or fishing, you will be told of a Radiation Emergency through

a marine or aircraft message. It will also tell you of a nearby dock where you may be taken out of the Zone to a Reception/Relocation Center. If you are camping or visiting, you will also be told of the emergency and directed to a Center.

g. Entry into the Zone

You may have left the Zone before an emergency and find it blocked when you come back. The persons at road blocks can tell you what to do. If all members of your family understand the Plan in this handbook, they will also know what to do in an emergency.

Where to Write or Call for Special Help

If you think you or your family might need special help during an emergency, do one of the following:

(1) Fill out the SPECIAL NEEDS form in this handbook and mail.

(2) Write a letter to describe your special needs and send it to

THE CINCINNATI GAS & ELECTRIC COMPANY
Emergency Planning -- Room 362 - A
P. O. Box 960
Cincinnati, Ohio 45201

(3) Call your state or county emergency office listed below.

OHIO

OHIO DISASTER SERVICE AGENCY: _____

CLERMONT COUNTY DISASTER AGENCY _____

KENTUCKY

KENTUCKY DIVISION OF DISASTER & EMERGENCY SERVICES: _____

CAMPBELL COUNTY DISASTER & EMERGENCY SERVICES: _____

PENDLETON COUNTY DISASTER & EMERGENCY SERVICES: _____

BRACKEN COUNTY DISASTER & EMERGENCY SERVICES: _____

DRAFT

PROPOSED LAYOUT OF EMERGENCY PLAN

AS IT WOULD APPEAR IN
APPROPRIATE TELEPHONE DIRECTORIES

DRAFT

WHAT TO DO IF THERE IS AN EMERGENCY AT THE ZIMMER NUCLEAR POWER STATION

These nuclear emergency procedures have been developed by the Cincinnati Gas & Electric Company in cooperation with the Disaster Services Agency, State of Ohio and Clermont County, Ohio; and with the Disaster and Emergency Services, Commonwealth of Kentucky, Bracken, Campbell and Pendleton Counties, Kentucky.

●WHAT WILL HAPPEN IN AN EMERGENCY?

If you live, work or happen to be visiting in the area shown on the map, this message may be helpful to you.

If there is ever a problem at the Zimmer Nuclear Power Station, state and local officials will decide, first, how serious it is. Most problems will not place you in danger. If they decide there is an emergency, however, you may need to do something to protect yourself.

●HOW WILL YOU KNOW IF YOU HAVE TO DO SOMETHING?

If you live in the area marked on the map, you will be informed in the following ways.
-By special sirens
-By special radios placed in homes
-By special announcements on radio & TV
-By emergency cars or trucks

●WHAT SHOULD YOU DO FIRST?

-Turn on your radio or TV for advice.
-Follow all advice carefully.
•**DO NOT** leave the area unless told to do so.
•**DO NOT** use your telephone unless absolutely needed.
•**DO NOT** call police or fire department for information.
•**DO NOT** call your child's school or go there.
Special care will be taken of school children.
-Put in your window the "I have been notified sign" from your "Circle of Safety" handbook. If you don't have the sign, tie a large towell or other cloth on the front door or mailbox.

●WHAT SHOULD YOU DO IF TOLD TO TAKE SHELTER?

-Go inside your home or nearby building.
Stay inside.
-Close all windows and doors.
-Turn off the heating and cooling sysems.
-Wash your hands and face as soon as possible.
-Cover up your food or put it in the refrigerator.
-If you have a basement, take a radio and go there.
-If you have no basement, stay away from doors and windows.
-If you must go outside, go back inside as soon as you can.

●WHAT SHOULD YOU DO IF TOLD TO LEAVE THE AREA?

-Gather your family together. If you have children in school, they will be taken to the relocation center shown on the map. Meet them there.
-Pack only needed items (personal items, medical supplies, children and infant supplies).
-Lock your house.

●WHAT ABOUT OTHER THINGS?

DO NOT take pets to the relocation center. Leave them at home.
-Take only things you must have.
-Remember that police will patrol the area on the map to protect what you have left behind.

●HOW SHOULD YOU TRAVEL?

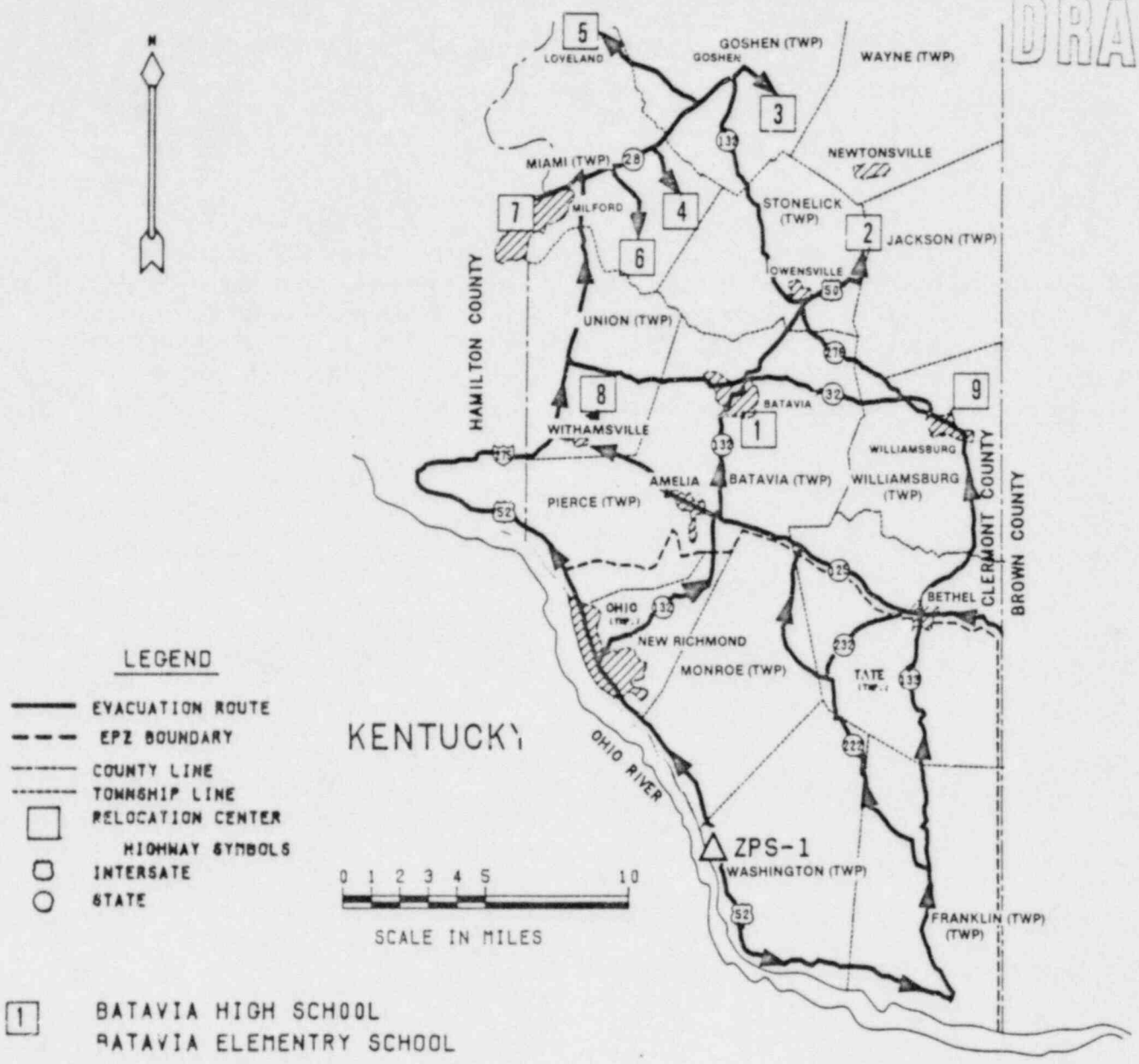
-Use your family car and take neighbors if you have room. Turn on your car radio.
-If you have no ride, do not put out the sign from the handbook. A ride will then be provided. Wait inside until it comes.
-Use the closest route shown on the map to get to the relocation center. Register there and ask for the next steps to take.

-DO NOT RUSH - Obey traffic signals and follow the directions of police officers.

For more information you should read the "Circle of Safety" handbook you were given or write:
The Cincinnati Gas & Electric Company
EMERGENCY PLANNING - Room 360A
P.O. Box 960
Cincinnati, Ohio 45201

RELOCATION CENTERS

DRAFT



1 BATAVIA HIGH SCHOOL
BATAVIA ELEMENTRY SCHOOL

2 CLERMONT NORTHEASTERN HIGH SCHOOL
CLERMONT NORTHEASTERN JR. HIGH SCHOOL
CLERMONT NORTHEASTERN MIDDLE SCHOOL

3 GOSHEN HIGH SCHOOL
GOSHEN JR. SCHOOL

4 LIVE OAKS CAREER DEVELOPMENT CAMPUS

5 LOVELAND HIGH SCHOOL
LOVELAND-MIAMI JUNIOR HIGH SCHOOL
LOVELAND MIDDLE SCHOOL

6 MILFORD HIGH SCHOOL
MILFORD JR. HIGH SCHOOL

7 MILFORD MAIN MIDDLE SCHOOL

8 GLEN ESTE HIGH SCHOOL
GLEN ESTE JR. HIGH SCHOOL
CAREER CENTER

9 WILLIAMSBURG HIGH SCHOOL
WILLIAMSBURG ELEMENTARY SCHOOL

CLERMONT COUNTY, OHIO
EVACUATION ROUTE MAP