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10CFR50, Appendix E

February 13, 2002

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Limerick Generating Station, Units 1 & 2
             Facility Operating License Nos. NPF-39 and NPF-85
             NRC Docket Nos. 50-352 and 50-353

             ERP-316, Revision 1, "Operation of the Dose Assessment Computer"
             ERP-326, Revision 1, "Shift Dose Assessment Personnel (SDAP)"
             ERP-360, Revision 4, "Adjustment of Wide Range Gas Monitor Conversion Factors"

Dear Sir/Madam:

Enclosed are revised Emergency Response Procedures (ERPs) for Limerick Generating Station
(LGS), Units 1 and 2. These procedures are required to be submitted within thirty (30) days of
their revision in accordance with 10CFR50, Appendix E, and 10CFR50.4.

Also, enclosed is a copy of a computer generated report index identifying the latest revisions of the
LGS ERPs.

If you have any questions or require additional information, please do not hesitate to contact us.

Very truly yours,

M. P. Gallagher
Director - Licensing & Regulatory Affairs
Mid-Atlantic Regional Operating Group

Enclosures

cc: H. J. Miller, Administrator, Region I, USNRC (2 copies)
        A. L. Burritt, USNRC Senior Resident Inspector, LGS

A O45

ATTACHMENT 1

LIMERICK GENERATING STATION, UNITS 1 & 2

Docket Nos. 50-352
             50-353

License Nos. NPF-39
              NPF-85

EMERGENCY RESPONSE PROCEDURES

**ERP-316, "Operation of the Dose Assessment
Computer" - Revision 1**

**ERP-326, "Shift Dose Assessment Personnel (SDAP)"
Revision 1**

**ERP-360, "Adjustment of Wide Range Gas Monitor
Conversion Factors" - Revision 4**

EXELON NUCLEAR
LIMERICK UNITS 1 AND 2
EMERGENCY RESPONSE PROCEDURE

ERP-316 OPERATION OF THE DOSE ASSESSMENT COMPUTER **(CM-3)**

> ### WARNING
>
> **THIS PROCEDURE SHALL BE IMPLEMENTED UPON DECLARATION OF AN EMERGENCY OR AT THE DISCRETION OF THE SHIFT MANAGEMENT AT THE AFFECTED SITE.**

1.0 RESPONSIBILITIES

1.1 The Dose Assessment Coordinator (DAC) shall perform dose projections using this procedure when required.

2.0 INITIAL ACTIONS

2.1 Activate computers used for dose assessment.

   2.1.1 Turn on computer power.

   2.1.2 **IF** computer and printer do not activate
   THEN ensure individual switches are turned on.

   2.1.3 Verify paper is loaded in adequate supply.

   2.1.4 Log onto the Computer Dose Assessment System.

   2.1.4.1 Control Room
   a. Password = MCR
   b. User ID = 111111

   2.1.4.2 TSC
   a. Password = TSC
   b. User ID = 222222

2.2 **IF** equipment failure occurs in the MCR,
THEN using a D1512 key relocate to the Technical Support Center (TSC) Dose Assessment Room.

NOTE

THE PASSWORD AND USER ID FOR THE CONTROL ROOM DOSE ASSESSMENT
COMPUTER WILL ALLOW ACCESS TO FAST MODE A, AUTO MODE A, OR
LIQUID DOSE CALCULATIONS.

THE PASSWORD AND USER ID FOR THE TSC DOSE ASSESSMENT COMPUTER
WILL ALLOW ACCESS TO FAST MODE A, MODE A, AUTO MODE A, LIQUID
DOSE CALCULATIONS, OR BACK CALCULATION SOURCE TERM.

2.3 Collect appropriate data for section(s) of attachment 1 and 6,
IF actual values are not available
THEN use default values as stated in Mesorem. **CM-1**

3.0 CONTINUING ACTIONS

3.1 **IF** performing dose projections in the Limerick Control Room,
THEN select either, Fast Mode A or Auto Mode A.

3.1.1 For Auto Mode A, see attachment 2 titled, "Auto Mode
A".

3.1.2 For Fast Mode A, see attachment 3 titled, "Fast Mode
A".

3.1.3 For Liquid Dose Calculations, see attachment 5
titled, "Liquid Release".

3.2 **IF** performing dose projections in the Limerick TSC,
THEN select F2, Execute Dispersion Model from the command
menu.

3.2.1 For Auto Mode A, see attachment 2 titled, "Auto Mode
A".

3.2.2 For Fast Mode A, see attachment 3 titled, "Fast Mode
A".

3.2.3 For Mode A, see attachment 4 titled, "Mode A".

3.2.4 For Liquid Dose Calculations, see attachment 5
titled, "Liquid Release".

3.2.5 For unmonitored releases, evaluate source term based
on field survey data.

3.2.5.1 Select F5, Back Calculate Source Term from
the command menu
AND enter data from attachment 1 titled,
"Input Parameters" Part 4, in response to
system prompts.

3.3 Verify all data inputs on printout match data sheet.

3.4 Advise the Emergency Director and/or Shift Management of results of dose projection.

3.5 Repeat dose projections as new information becomes available or until relieved by the PBAPS DAC or EOF Dose Assessment Team.

4.0 FINAL CONDITIONS

4.1 Terminate use of the procedure when:

4.1.1 The Emergency Director determines that the dose assessment function is not longer required.

4.1.2 The potential for and/or actual airborne release has been alleviated.

4.1.3 The Peach Bottom DAC or EOF Dose Assessment Team has taken over the dose assessment function.

4.2 Records generated are compiled for review and submitted to the Nuclear Records Management System (NRMS).

5.0 ATTACHMENTS AND APPENDICES

5.1 Attachment 1 - "Input Parameters"

5.2 Attachment 2 - "Auto Mode A"

5.3 Attachment 3 - "Fast Mode A"

5.4 Attachment 4 - "Mode A"

5.5 Attachment 5 - "Liquid Release"

5.6 Attachment 6 - "Meteorological Parameter Resources"

6.0 SUPPORTING INFORMATION

6.1 PURPOSE

To provide directions for using the Dose Assessment Computer System.

6.2 CRITERIA FOR USE

This procedure shall be implemented when an Alert or higher level emergency has been declared in accordance with ERP-101, Classification of Emergencies, or at the discretion of the affected site Emergency Director.

6.3 SPECIAL EQUIPMENT

6.3.1 Mesorem Jr.

6.4   REFERENCES

      6.4.1   Nuclear Emergency Plan

      6.4.2   ERP-301, "Dose Assessment Coordinator (DAC)"

      6.4.3   ERP-300, " Dose Assessment Coordinator" (LGS)

      6.4.4   ERP-315, "Operation of the Dose Assessment Computer" (PBAPS)

      6.4.5   ERP-325, "Shift Dose Assessment Personnel" (PBAPS)

      6.4.6   ERP-326, "Shift Dose Assessment Personnel" (LGS)

      6.4.7   Offsite Dose Calculation Manual (ODCM)

      6.4.8   MESOREM, Jr., System Atmospheric Dispersion and Dose Assessment Program (Version 8.3)

      6.4.9   EPA-400, "Manual for Protective Action Guides and Protective Actions for Nuclear Incidents"

6.5   COMMITMENT ANNOTATION

      6.5.1   CM-1, NRC Inspection 93-03/03, T02541 (section 2.3)

      6.5.2   CM-2, Letter to NRC, 08/15/86, T01949 (attachment 5)

      6.5.3   CM-3, Letter to NRC, 12/30/83, T03167 (refers to entire procedure)

ATTACHMENT 1
INPUT PARAMETERS
(Page 1 of 3)

I. EVENT INFORMATION

Unit _____

Accident Type ☐ LOCA. ☐ Minor damage, ☐ MCA Data (Default = LOCA)

Time of Release in Military Format _____:_____ (HH:MM)

Date of Release in Standard Format _____/_____/_____ (MM/DD/YY)

Night or Day? _____ (N or D)

Adverse Weather or Normal Weather? _____ (A or N)

Estimated Release Duration: _____:_____ (HH:MM) (Default Value 4:00)

Has the Release been in Progress? _____ (Y or N)

- If Yes: Time Release has been in Progress _____:_____ (HH:MM)

- If No: Time Until Release Begins: _____:_____ (HH:MM)

Has the Reactor reached 0% Power? _____ (Y or N)

Time of Reactor reaching 0% Power _____:_____ (HH:MM)

Account for Wet Deposition? _____ (Y or N)

Release Points (check one or more)

☐ Main Stack   ☐ Unmonitored Release

Is release from ☐ Drywell ☐ Suppression Pool ☐ Other

Drywell sprays ☐ ON   ☐ OFF

Is Suppressions Chamber ☐ Saturated   ☐ Supercooled ☐ Unknown

Simultaneous Release? _____ (Y or N)

Verify Standby Gas Treatment Efficiency. Utilize 95.0% default value until
the current efficiency can be verified by Peach Bottom Shift Management
and/or System Engineer or by the most recent surveillance test.

ATTACHMENT 1
INPUT PARAMETERS
(Page 2 of 3)

PART 2. Information required only if Auto Mode A is unavailable.

I. METEOROLOGICAL PARAMETERS

(For backup or alternate source inputs, refer to the attachment 6 titled, "Meteorological Parameter Resources")

IA. For Main Stack Release

Wind Speed _____ mph from Tower 2, 320 ft.

Wind Direction _____ from Tower 2, 320 ft.

Delta Temperature _____ °F from Tower 2, 316' - 33'

Ambient Temperature _____ °F for Tower 2, 33 ft.

Precipitation _____ (60 minute total from MET screen or 'N' = not available)

IB. For Unmonitored Release

Wind Speed _____ mph from River Tower

Wind Direction _____ from River Tower

Delta Temperature _____ °F from Tower 2, 316' - 33'

Ambient Temperature _____ °F for Tower 2, 33 ft.

Precipitation _____ (60 minute total from MET screen or 'N' = not available)

ATTACHMENT 1
INPUT PARAMETERS
(Page 3 of 3)

II.   EFFLUENT PARAMETERS

IIA.   For Main Stack Release

Count Rate _____ µCi/cc

(Check which parameter used)

_____   Low Range (red), panel 00C014
_____   Mid Range (blue), panel 00C014
_____   High Range (green), panel 00C014

Flow Rate _____ kcfm (FRS-0470, panel 30C010)

PART 3. Information required for known isotopic projections.

I.   Isotopic Breakdown

If known, enter sample results.

Kr 83m _____		Xe 131m _____
Kr 85m _____		Xe 133m _____
Kr 85 _____		Xe 135m _____
Kr 87 _____		Xe 135 _____
Kr 88 _____		Xe 137 _____
Kr 89 _____		Xe 138 _____

Total Noble Gas Concentration _____ µCi/ccµCi/cc

I-131 _____   I-133 _____   I-135 _____

I-132 _____   I-134 _____

Total Iodine Concentration _____ µCi/cc

PART 4. Unknown Isotopic Breakdown for Unmonitored Release

Field Survey Whole Body Dose Rate _____ mR/hr

Field Survey Thyroid Dose Rate _____ mR/hr

Distance from the plant to where the field survey readings were
obtained _____ miles.

Angle between the field reading location and 0 degrees North _____

**Angle is positive in the clockwise direction and must be 180 degrees
from the wind direction already inputted.**

ATTACHMENT 2
AUTO MODE A
(Page 1 of 4)

1.   From Mode A or Auto A Menu Choose;

     a. F3 -- Auto Mode A - Initiate automatic data collection

2.   Choose DBA from Accident Menu

3.   Answer the following prompts:

     a. Enter the time of the release in military format
         (Current system time = <ENTER> = 07:42)

     b. Enter the date of the release in standard format
         (Current system time = <ENTER> = 09/23/93):

     c. Night or Day?
         (N or D, <ENTER> = D):

     d. Adverse Weather or Normal Weather?

         (A or N, <ENTER> = N):

     e. Enter estimated release duration.
         (00:01 to 999:00, <ENTER> = 4: 0):

     ┌───┐
     │   NOTE: │
     │   │
     │   TO USE AUTO MODE A THE FOLLOWING PROMPT MUST BE ANSWERED   │
     │   "Y", OTHERWISE, YOU WILL BE PROMPTED TO SWITCH TO FAST MODE │
     │   A.   (AUTO DATA COLLECTION CANNOT HAPPEN FOR A RELEASE THAT │
     │   HAS NOT YET OCCURRED).   │
     │   │
     └───┘

     f. Has the release been in progress?
         (Y or N, <ENTER> = N):   Y

     g. Time the release has been in progress.
         (Format is (HH:MM), <ENTER> = 0: 0):

     h. When did the reactor reach 0% power?

         1. Date = <ENTER> = 09/23/93:
         2. Time in 24 hour format = <ENTER> = (00:00)
             Time since reactor shutdown will be displayed

     i. Do you wish the model to account for wet disposition?
         (Y or N, <ENTER> = N):

Select appropriate tower/sensor data from this table.

ATTACHMENT 2
AUTO MODE A
(Page 2 of 4)

NOTE:

METEOROLOGICAL AND RADIOLOGICAL DATA FOR THE TIME IN QUESTION
WILL BE DISPLAYED. ANY OF THIS DATA CAN BE EDITED BY THE
USER. ANY DATA MARKED WITH A CHECK MARK TO THE LEFT IS BAD
DATA AND WILL NOT BE USED BY THE SYSTEM. THE BAD DATA MARK
CAN BE REMOVED BY PRESSING ALT-B WITH THE CURSOR ON THAT
DATA. THIS WILL CAUSE THE PROGRAM TO USE THAT DATA AS GOOD
DATA. DATA MARKED WITH AN "R" IS DATA THAT IS OUT OF RANGE.
THIS DATA CANNOT BE USED BY THE PROGRAM AND MUST BE
CORRECTED.

The Auto Mode A Screen is then displayed:

j. View data and press F10 to continue.

1. If any of the data points are out of range, a warning will be
    displayed at the bottom of the screen and the cursor will go
    to the bad data point. This situation must be corrected
    before continuing.

2. If any meteorological data points are displayed as "bad data",
    the backup sensor will be used by the program. If
    radiological data for the release point in question is bad, or
    if all of a particular met quantity is bad, Auto Mode A will
    cease and the operator will be forced to use Fast Mode A or
    Mode A.

k. Choose release point from release point menu.

1. Met Data that will be used will be displayed.

l. Enter whether isotopic breakdown is known or unknown at breakdown
    menu.

1. If unknown isotopic breakdown.

    For PBAPS Main Stack, (For other release points, no SGTS
    prompt)

    Enter the current stand-by-gas-treatment efficiency.
    Range is [.0000 to 99.99] -
    [<ENTER> = 95.0]

    Use the default value unless instructed otherwise.

ATTACHMENT 2
AUTO MODE A
(Page 3 of 4)

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│                               NOTE:                                   │
│                                                                       │
│ DEPENDING ON RELEASE POINT AND ANSWERS TO THESE PROMPTS, SEVERAL      │
│ PROMPTS WILL APPEAR CONCERNING  THE RELEASE PATH.   THESE ARE USED    │
│ TO DETERMINE THE NOBEL GAS TO IODINE RATIO AND ALL HAVE "UNKNOWN"     │
│ AS AN OPTION.   THIS PROMPT IS AN EXAMPLE:                            │
│                                                                       │
│     IS THIS RELEASE FROM DRYWELL ATMOSPHERE, SUPPRESSION CHAMBER      │
│     ATMOSPHERE, OR OTHER?                                             │
│     (D, S, O, UNKNOWN = O <ENTER> = 0):                              │
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2. If known isotopic breakdown,

    a. Then choose from isotope mix menu:

       Isotopic Mix in Percentages   (%)
       Isotopic Mix in Concentration   (μCi/cc)
       Isotopic Mix in Release Rate   (μCi/sec)

    b. How long after scram was the sample taken?
       (Enter 00:00 if the sample was taken before the scram)
       (Make sure a colon ":" separates the hours and minutes)
       (Format is (HH:MM), <ENTER> = 0: 0):

    c. Enter each noble gas and iodine isotope: (in units chose
       at menu)

    d. Enter total iodine concentration (μCi/cc).
       Range is (.0000 to 1.0000E+08)
       (<ENTER> = .0000):

    e. Do you wish to enter additional isotopes?
       (Y or N, <ENTER> = N): Y

    f. If answered "Y", additional isotopes may be entered.

ATTACHMENT 2
AUTO MODE A
(Page 4 of 4)

> NOTE:
>
> ADDITIONAL NUCLIDES MAY BE ENTERED BY SYMBOL, MASS NUMBER, AND
> RELEASE RATE IN µCi/cc. A MAXIMUM OF UP TO 33 NUCLIDES MAY BE
> ENTERED. ENTER THE SYMBOL UP TO 2 LETTERS AT THE FIRST
> PROMPT, THE ATOMIC WEIGHT UP TO 3 DIGITS AT THE SECOND PROMPT
> ALONG WITH THE CHARACTER "M" IF THE NUCLIDE IS IN THE
> METASTABLE STATE.
>
> (I.E Xe <-- AT THE FIRST PROMPT
> 133M <-- AT THE SECOND PROMPT)

     g. Enter the nuclide symbol. (<ENTER> = No other
          radionuclides):

     h. Enter nuclide mass number, including M for metastable:

     i. Enter the amount of release in µCi/cc.
        Range is (.0000 to 1.0000E+20)
        (<ENTER> = .0000):

     j. View isotopic breakdown.

3. Would you like an automatic dump to the printer?
   (Y or N, <ENTER> = Y):
   Output will be produced designated location.

4. Will this be a simultaneous release?
   (Y or N, <ENTER> = N):

5. Receptor Display Menu will appear.

> NOTE:
>
> THESE OPTIONS ARE SELF EXPLANATORY EXCEPT FOR F7 RECEPTOR
> INFORMATION. THIS OPTION GIVES THE OPPORTUNITY TO DISPLAY
> ALL INFORMATION FOR A PARTICULAR RECEPTOR.
>
> TPARD = TOTAL PROTECTIVE ACTION RECOMMENDED DOSE =
> EXTERNAL DOSE + ADULT CEDE + 4 DAY.
>
> 4DAY = SHINE DOSE FROM 4 DAYS' EXPOSURE TO GROUND
> DEPOSITION FROM RELEASE.
>
> PAT   = PLUME ARRIVAL TIME
>
> DOSE RATIO = RATION OF EXTERNAL DOSE + CEDE (TEDE) TO EXTERNAL
> DOSE. THIS RATION GIVES A METHOD TO ESTIMATE TEDE FROM EXTERNAL
> DOSE (DRD READING). USED PRIMARY FOR FIELD TEAM DOSE
> ESTIMATION.

ATTACHMENT 3
FAST MODE A

1.   Select F1, Fast Mode A, from the Command Menu.

2.   **IF** isotopic breakdown unknown
      THEN select F1, Loss of Coolant Accident;
      IF isotopic breakdown is known
      THEN select F10, MCA Data

3.   Enter data recorded on attachment titled
      "Input Parameters" in response to system
      prompts and menus.

4.   Ensure appropriate device is selected for printer output.

5.   Make appropriate printout selection.

6.   **IF** a release is in progress from more than one
      release point
      THEN enter a "Y" after the prompt, "Will this be a
      simultaneous release?"
      AND repeat until data for all
      release points has been entered.

7.   **IF** specific receptor data is desired,
      THEN select the appropriate receptor from
      the Receptor Display Menu
      OR select Q to leave the menu.

8.   **IF** another dose projection is desired,
      THEN respond "Y" to the prompt
      OR respond "N" to leave the system.

ATTACHMENT 4
MODE A

1. Select F1, update data, from the command menu.

2. Select files to be updated from File Menu.

3. Enter data recorded on attachment titled, "Input Parameters", in response to system prompts and menus.

4. Once all files have been updated, select "Q" to return to the Command Menu.

5. Select F2, Execute Dispersion Model, from the Command Menu.

6. Select F2, Mode A, from Mode A Menu.

7. Make appropriate printout selection.

8. Respond to prompts to calculate a simultaneous release, view specific receptor data, run another dose projection, or exit the system, as desired.

ATTACHMENT 5
LIQUID RELEASE
(Page 1 of 2)

NOTE:

THIS ATTACHMENT APPLIES TO LIQUID RELEASES THRU THE
DISCHARGE CANAL TO THE RIVER OR LIQUID RELEASES EXITING THE
SITE BY MEANS OTHER THAN THE DISCHARGE CANAL. **CM-2**

1. From Mode A or Auto Mode A Menu, select F4, Liquid Dose Calculations
    and enter data from this attachment.

2. Source of sample:

NOTE:

BEFORE: DILUTION CORRECTION APPLIED
AFTER: DILUTION CORRECTION NOT APPLIED

_____ Before (Liquid release is to the discharge canal and the sample
        was obtained prior to dilution in the discharge canal.)

_____ After (Liquid release is to the discharge canal and the sample
        has been obtained from the discharge canal after dilution by
        circulation water pump flow OR liquid release is exiting the
        site by means other than the discharge canal.)

3. Estimated duration of the liquid release: _____ hours

4. Number of circ water pumps in operation = _____

5. Estimated volume of the liquid release: _____ gallons

6. Isotopic concentrations from analysis of release sample:

Zn-65 _____ µCi/ml   Cs-134 _____ µCi/ml

Co-60 _____ µCi/ml   Cs-137 _____ µCi/ml

I-131 _____ µCi/ml

ATTACHMENT 5
LIQUID RELEASE
(Page 2 of 2)

7.   Make appropriate printout selection.

> NOTE:
>
> LIQUID EFFLUENT RELEASE LIMIT PER THE OFFSITE DOSE
> CALCULATION MANUAL (ODCM).   ODCMS 3.8.B.2
>
> A) DURING ANY CALENDAR QUARTER, $\leq$ 3.0 MREM TO THE TOTAL
>   BODY AND $\leq$ 10.0 MREM TO ANY ORGAN.
>
> B) DURING ANY CALENDAR YEAR, $\leq$ 6.0 MREM TO THE TOTAL BODY
>   AND $\leq$ 20.0 MREM TO ANY ORGAN.

8.   **IF** results exceed ODCM limits,
     THEN the Peach Bottom Emergency Director should ensure notification
     of the Department of Environmental Resources and downstream domestic
     water users from the Emergency Response Telephone Directory.

ATTACHMENT 6
METEOROLOGICAL PARAMETER RESOURCES
(Listed in order of preference)

1.   Main Control Room Instrument Panels (Control Room Only)

2.   Plant Monitoring System (PMS)   (Primary for TSC)

Select appropriate tower/sensor data from this table

Release Point	Primary	PMS Screen	Backup	PMS Screen
MAIN STACK				
Wind Speed (mph)	Twr 2-320'	MET	Twr 2-75'	MET
Wind Direction (Deg Azm)	Twr 2-320'	MET	Twr 2-75	MET
Delta Temperature (Deg F)	Twr 2-316'-33	MET	Twr 2-150'-33'	MET
Sigma Theta (Deg. Azm)	Twr 2-75'	MET	None	MET
Ambient Temperature (Deg F)	Twr 2-33'	MET	None	MET
Precipitation (in/hr)	Twr 2	MET	TwrA	MET
VENT STACK				
Wind Speed (mph)	Twr 2-75'	MET	Twr 2-320'	MET
Wind Direction (Deg Azm)	Twr 2-75'	MET	Twr 2-320'	MET
Delta Temperature (Deg F)	Twr 2-316'-33'	MET	Twr 2-150'-33'	MET
Sigma Theta (Deg. Azm)	Twr 2-75'	MET	None	MET
Ambient Temperature (Deg F)	Twr 2-33'	MET	None	MET
Precipitation (in/hr)	Twr 2	MET	Twr A	MET
UNMONITORED RELEASE				
Wind Speed (mph)	River Twr 33'	MET	Twr 2-75'	MET
Wind Direction (Deg Azm)	River Twr 33'	MET	Twr 2-75'	MET
Delta Temperature (Deg F)	Twr 2-316'-33'	MET	Twr 2-150'-33'	MET
Sigma Theta (Deg. Azm)	Twr 2-75'	MET	None	MET
Ambient Temperature (Deg F)	Twr 2-33'	MET	None	MET
Precipitation (in/hr)	Twr 2	MET	Twr A	MET

3.   National Weather Service

A.   PENN State NWS: 9-1-814-237-1152 or 9-1-800-697-0010
B.   Mount Holly NWS: 9-1-609-261-6604

Obtain the following meteorological parameters:

Wind Direction (WD30)   _____   deg. az.
Wind Speed (WD30)   _____   knots
Cloud Cover (CLCVR)   _____   tenths
Cloud Ceiling (CLCEG)   _____   ft
Ambient Temperature   _____   deg. F
Precipitation   _____   in/hr

Forecast:

_____

_____

_____

_____

NWS Contact: _____ Time _____

EXELON NUCLEAR
LIMERICK UNITS 1 AND 2
EMERGENCY RESPONSE PROCEDURE

ERP-326   <u>SHIFT DOSE ASSESSMENT PERSONNEL (SDAP)</u>

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│                        WARNING                            │
│                                                           │
│  THIS PROCEDURE SHALL BE IMPLEMENTED UPON DECLARATION OF  │
│  AN EMERGENCY AT PEACH BOTTOM OR LIMERICK AT THE          │
│  DISCRETION OF THE AFFECTED SITE SHIFT MANAGEMENT.        │
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1.0   RESPONSIBILITIES

1.1   Reports to the shift management at the affected site.

1.2   Capable of reporting to the Control Room within 15 minutes when requested to perform dose projections.

1.3   Provides off-site dose projections and applicable protective action recommendations due to radiological releases or projected radiological releases within 30 minutes of the initiating event (accident, transient).

1.4   Responsible for dose assessment functions until Technical Support Center (TSC) Dose Assessment Coordinator (DAC) or the Emergency Operations Facility (EOF) Dose Assessment Team (DAT) is assembled and turn-over is completed.   **CM-1**

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│                         NOTE                              │
│                                                           │
│  SDAP ACTIVELY PERFORMING DOSE PROJECTIONS SHALL HAVE NO  │
│  OTHER RESPONSIBILITIES DURING EMERGENCIES THAT DETRACT   │
│  FROM DOSE ASSESSMENT CALCULATIONS.                       │
│                                                  CM-2     │
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2.0   INITIAL ACTIONS:

2.1   **WHEN** an alert or higher level emergency is declared **OR WHEN** requested by shift management at either site, **THEN** report to the Control Room.

2.2   **IF** performing a dose projection for PBAPS **THEN** upon reporting to LGS Control Room, obtain a copy of PBAPS ERP-200-6 that was Faxed to 802:2092.

2.3 **IF** no FAX arrived,
THEN contact PBAPS Shift Management (807:4687 or 81-231)
AND request ERP-200-6 be Faxed.

2.4 **IF** performing a dose projection for LGS,
THEN request a completed copy of LGS ERP-200-2 from LGS
Shift Management.

2.5 **IF** immediate dose projections are not necessary
THEN become familiar with plant radiological conditions,
effluent radiation monitors and release rates.

2.6 **IF** a probable offsite radiological release exists
OR
IF there is an unexpected or unexplained increase in the
effluent radiation monitors,
THEN perform a dose projection.

2.7 Activate computers used for dose assessment.

    2.7.1 Turn on computer power.

    2.7.2 **IF** computer and printer do not activate,
            THEN ensure individual switches are turned on.

    2.7.3 Verify paper is loaded in adequate supply.

    2.7.4 At desk top, choose icon for appropriate site that
            a dose projection will be performed for.

    2.7.5 Log onto the Computer Dose Assessment System. Use
            tab key to relocate cursor to next field.

            2.7.5.1 Control Room
                    a. Password = MCR
                    b. User ID = 111111

    2.7.6 **IF** equipment failure occurs
            THEN using key C-24 (D1512), relocate to the TSC
            Dose Assessment Room.

            2.7.6.1 TSC
                    a. Password = TSC
                    b. User ID = 222222

    2.7.7 After log on, choose F1 or F2 for the appropriate
            site that a dose projection will be performed for
            (same site as specified in step 2.7.4).

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│                              NOTE                                 │
│                                                                   │
│  THE PASSWORD AND USER ID FOR THE CONTROL ROOM DOSE ASSESSMENT    │
│  COMPUTER WILL ALLOW ACCESS TO FAST MODE A, AUTO MODE A, OR       │
│  LIQUID DOSE CALCULATIONS.                                        │
│                                                                   │
│  THE PASSWORD AND USER ID FOR THE TSC DOSE ASSESSMENT COMPUTER    │
│  WILL ALLOW ACCESS TO FAST MODE A, MODE A, AUTO MODE A, LIQUID    │
│  DOSE CALCULATIONS, OR BACK CALCULATION SOURCE TERM.              │
└─────────────────────────────────────────────────────────────────┘
```

2.8   **IF** performing dose projections in the Control Room,
      THEN select F3. Use Auto Mode A (Initiate Automatic Data
      Collection) and input parameters given by affected site shift
      Management.

    2.8.1   Verify all data inputs on printout match data
                sheet.

    2.8.2   Advise Shift Management and/or DAC/DAT of results
                of dose projection.

    2.8.3   Repeat dose projections as new information becomes
                available until relieved by the Dose Assessment
                Coordinator or EOF Dose Assessment Team.

2.9   **IF** performing dose projections in the Limerick TSC,
      THEN select F2, Execute Dispersion Model, from the command
      menu, then select F3, Auto Mode A, and input data from
      Attachment 1.

    2.9.1   **IF** Auto Mode fails,
                THEN request additional information from affected
                site's Shift Management
                AND use F1, Fast Mode A. Initiate model from
                sequential screens.

2.10 For unmonitored releases, contact affected site's Shift
      Management to dispatch Radiation Protection Technician to
      perform site boundary survey.

2.11 **IF** the dose projection indicates that an emergency action
      level has been reached,
      THEN immediately advise shift management.

2.12 Submit any dose projections and protective action
      recommendations to affected site's shift management for
      evaluation. For PBAPS, fax to 807:4793.

3.0   **CONTINUING ACTIONS**

3.1   Monitor plant radiological parameters and possible
      radiological release pathways.

3.2   Inform affected site Shift Management if any radiological parameters change significantly.

3.3   **WHEN** the affected site Dose Assessment Coordinator (DAC) arrives at the TSC,
      THEN:

    3.3.1   Provide the DAC with current information, including any protective action recommendations, and any previous dose projections.

    3.3.2   Discuss whether to remain in the Control Room or terminate the SDAP position.

3.4   **WHEN** the EOF dose assessment team is activated,
      THEN perform turnover using attachment 4 titled, "Dose Assessment Turnover Sheet".

4.0   FINAL CONDITIONS

4.1   Exit this procedure when either:

    4.1.1   Turnover to the Dose Assessment team is completed and no other assistance is requested by Shift Management at the affected site or

    4.1.2   The Emergency Plan has been exited and no other assistance has been requested by Shift Management at the affected site.

5.0   ATTACHMENTS AND APPENDICES

5.1   Attachment 1, "Auto Mode A"

5.2   Attachment 2, "Fast Mode A"

5.3   Attachment 3, "Meteorological Parameter Resources"

5.4   Attachment 4, "Dose Assessment Turnover Sheet"

6.0   SUPPORTING INFORMATION

6.1   PURPOSE

To provide guidance and direction for Shift Dose Assessment Personnel performing dose assessment.

6.2   CRITERIA FOR USE

This procedure is to be implemented upon declaration of an emergency at PBAPS, LGS, or at the discretion of Shift Management at the affected site.

6.3   SPECIAL EQUIPMENT

   6.3.1   None

6.4   REFERENCES

   6.4.1   ERP-200, "Emergency Director" (PBAPS)

   6.4.2   ERP-200, "Emergency Director" (LGS)

   6.4.3   ERP-301, "Dose Assessment Coordinator" (PBAPS)

   6.4.4   ERP-300, "Dose Assessment Coordinator" (LGS)

   6.4.5   ERP-315, "Operation of the Dose Assessment
              Computer" (PBAPS)

   6.4.6   ERP-316, "Operation of the Dose Assessment
              Computer" (LGS)

   6.4.7   ERP-325, "Shift Dose Assessment Personnel" (PBAPS)

   6.4.8   ERP-C-1300, "Dose Assessment Team"

6.5   COMMITMENT ANNOTATIONS

   6.5.1   CM-1, Letter to NRC, 02/11/86, T01935 (section
              1.4)

   6.5.2   CM-2, Letter to NRC dated 8/8/86, in response to
              NRC PB Insp. Rpt. 86-06106, T03210 (section 1.0)

ATTACHMENT 1
AUTO MODE A
(Page 1 of 3)

1.   From Mode A or Auto A Menu Choose;

     a. F3 -- Auto Mode A - Initiate automatic data collection

2.   Choose DBA from Accident Menu

3.   Answer the following prompts:

     a. Enter the time of the release in military format
         (Current system time = <ENTER> = 07:42)

     b. Enter the date of the release in standard format
         (Current system time = <ENTER> = 09/23/93):

     c. Night or Day?
         (N or D, <ENTER> = D):

     d. Adverse Weather or Normal Weather?

         (A or N, <ENTER> = N):

     e. Enter estimated release duration. If unknown released duration,
         use default value (default is 4 hours).
         (00:01 to 999:00, <ENTER> = 4: 0):

     ┌───┐
     │   NOTE: │
     │   │
     │ TO USE AUTO MODE A THE FOLLOWING PROMPT MUST BE ANSWERED "Y",   │
     │ OTHERWISE, YOU WILL BE PROMPTED TO SWITCH TO FAST MODE A. (AUTO   │
     │ DATA COLLECTION CANNOT HAPPEN FOR A RELEASE THAT HAS NOT YET   │
     │ OCCURRED).   │
     └───┘

     f. Has the release been in progress?
         (Y or N, <ENTER> = N):   Y

     g. Time the release has been in progress.
         (Format is (HH:MM), <ENTER> = 0: 0):

     h. Has the reactor been scrammed?
         (Y or N, <ENTER> = N):   Y

     i. When did the reactor reach 0% power?

         1. Date = <ENTER> = 09/23/93:
         2. Time in 24 hour format = <ENTER> = (00:00)
             Time since reactor shutdown will be displayed

     j. Do you wish the model to account for wet disposition?
         (Y or N, <ENTER> = N):

Select appropriate tower/sensor data from this table.

ATTACHMENT 1
AUTO MODE A
(Page 2 of 3)

```
┌─────────────────────────────────────────────────────────────────────┐
│                               NOTE:                                   │
│                                                                       │
│  METEOROLOGICAL AND RADIOLOGICAL DATA FOR THE TIME IN QUESTION        │
│  WILL BE DISPLAYED.  ANY OF THIS DATA CAN BE EDITED BY THE            │
│  USER.  ANY DATA MARKED WITH A CHECK MARK TO THE LEFT IS BAD          │
│  DATA AND WILL NOT BE USED BY THE SYSTEM.  THE BAD DATA MARK          │
│  CAN BE REMOVED BY PRESSING ALT-B WITH THE CURSOR ON THAT             │
│  DATA.  THIS WILL CAUSE THE PROGRAM TO USE THAT DATA AS GOOD          │
│  DATA.  DATA MARKED WITH AN "R" IS DATA THAT IS OUT OF RANGE.         │
│  THIS DATA CANNOT BE USED BY THE PROGRAM AND MUST BE                  │
│  CORRECTED.                                                           │
└─────────────────────────────────────────────────────────────────────┘
```

The Auto Mode A Screen is then displayed:

j. View data and press F10 to continue.

    1. If any of the data points are out of range, a warning will be displayed at the bottom of the screen and the cursor will go to the bad data point. This situation must be corrected before continuing.

    2. If any meteorological data points are displayed as "bad data", the backup sensor will be used by the program. If radiological data for the release point in question is bad, or if all of a particular met quantity is bad, Auto Mode A will cease and the operator will be forced to use Fast Mode A or Mode A.

k. Choose release point from release point menu.

    1. Met Data that will be used will be displayed.

l. At breakdown menu, select F1 "Isotopic Breakdown Unknown".

m. When projecting dose assessment for LGS, you will be prompted for Iodine Concentration calculations from iodine/noble gas ratio. Enter 'Y' (default value).

n. When projecting dose assessment for LGS, you will be prompted if release is processed through SGTS.
    IF yes,
    THEN provide efficiency and supply information for RERS filters.

o. IF no for SGTS,
    THEN you will be prompted to answer "Is this release from drywell atmosphere, suppression chamber atmosphere, or other?".
    (D, S, O, UNKNOWN = O <ENTER> = O):

ATTACHMENT 1
AUTO MODE A
(Page 3 of 3)

> **NOTE:**
>
> DEPENDING ON RELEASE POINT AND ANSWERS TO THESE PROMPTS, SEVERAL PROMPTS WILL APPEAR CONCERNING THE RELEASE PATH. THESE ARE USED TO DETERMINE THE NOBEL GAS TO IODINE RATIO AND ALL HAVE "UNKNOWN" AS AN OPTION. THIS PROMPT IS AN EXAMPLE:
>
> IS THIS RELEASE FROM DRYWELL ATMOSPHERE, SUPPRESSION CHAMBER ATMOSPHERE, OR OTHER?
> (D, S, O, UNKNOWN = O <ENTER> = O):

1. Would you like an automatic dump to the printer?
   (Y or N, <ENTER> = Y):
   Output will be produced designated location.

2. Will this be a simultaneous release?
   (Y or N, <ENTER> = N):

ATTACHMENT 2
FAST MODE A

1.   Select F1, Fast Mode A, from the Command Menu.

2.   Ensure appropriate device is selected for printer output.

3.   Make appropriate printout selection.

4.   **IF** a release is in progress from more than one release point,
     THEN enter a "Y" after the prompt, "Will this be a simultaneous release?"
     AND repeat until data for all release points has been entered.

5.   **IF** specific receptor data is desired,
     THEN select the appropriate receptor from the Receptor Display Menu
     OR select Q to leave the menu.

6.   **IF** another dose projection is desired,
     THEN respond "Y" to the prompt
     OR respond "N" to leave the system.

ATTACHMENT 3
METEOROLOGICAL PARAMETER RESOURCES
(Listed in order of preference)

1.   Main Control Room Instrument Panels (Control Room Only)

2.   National Weather Service

    A. PENN State NWS: 9-1-814-237-1152 or 9-1-800-697-0010
    B. Mount Holly NWS: 9-1-609-261-6604

Obtain the following meteorological parameters:

    Wind Direction (WD30)   _____ deg. az.
    Wind Speed (WD30)   _____ knots
    Cloud Cover (CLCVR)   _____ tenths
    Cloud Ceiling (CLCEG)   _____ ft
    Ambient Temperature   _____ deg. F
    Precipitation   _____ in/hr

Forecast:

_____

_____

_____

_____

_____

NWS Contact: _____ Time_____

ATTACHMENT 4

DOSE ASSESSMENT TURNOVER SHEET

Turnover of dose assessment responsibility from one Dose Assessment team/location to another Dose Assessment team/location should include the transmittal of any available information listed below:

1. Affected Station _____ Unit _____

2. Contact person:

   a) Dose Assessment Coordinator (DAC)   PBAPS Phone:
                                     (81:280),807:4644,4645
    _____   LGS Phone:
    Name   _____

   b) Dose Assessment Team Leader (DATL)

                                       (257), 803:3843
    _____   Phone
    Name

3. Time of reactor trip/scram   _____

4. Plant Status _____

5. Release Point   _____

6. Start time of release   _____

7. Estimated duration of release   _____

8. Method(s) used to calculate doses ☐ Auto-A ☐ Fast-A ☐ Mode A

9. Design Basis Accident _____

10. Site evacuation assembly area _____

11. Results of dose calculations, based on dose projection, Protective Action Recommendation.

_____

_____

_____

_____

_____   _____
Completed By   Date/Time

Effective Date: 2/15/02

EXELON NUCLEAR
LIMERICK GENERATING STATION
EMERGENCY RESPONSE PROCEDURE

ERP-360   ADJUSTMENT OF WIDE RANGE GAS MONITOR CONVERSION FACTORS

1.0 RESPONSIBILITIES

1.1   The TSC Dose Assessment Coordinator (DAC) shall coordinate the changing, if necessary, of the Wide Range Gas Monitor (WRGM) conversion factors.

1.2   The EOF Dose Assessment Team Leader (DATL) shall direct the TSC Dose Assessment Team to change if necessary, the WRGM conversion factors.

1.3   The Emergency Director (ED) shall be apprised of any changes to the WRGM conversion factor and any impact the changes may have on Emergency Action Levels (EALs) or Protective Action Recommendations.

1.4   The Emergency Response Manager (ERM) shall be apprised of any changes to the WRGM conversion factor and any impact the changes may have on EALs or Protective Action Recommendations.

2.0 INITIAL ACTIONS

2.1 The TSC DAC while activated, shall:

2.1.1   Determine a new WRGM conversion factor approximately 3 hours, 7 hours, 12 hours, 24 hours, 2 days, and 4 days following reactor shutdown or until termination of the release.

2.1.1.1   **IF** the suspected source term is a LOCA, (Major Fuel Damage-D/W Rad monitor ≥100 R/mr) **THEN** refer to ERP-360-1 to calculate **AND** document the new WRGM conversion factors.

2.1.1.2   **IF** the suspected source term is not a
LOCA, (Minor Fuel Damage-D/W Rad monitor
<100 R/mr)
THEN obtain an isotopic analysis
AND refer to ERP-360-2 to calculate and
document the new WRGM conversion
factors.

2.1.2   Inform the ED of the need to change the WRGM
conversion factors and any impact the changes may
have on EALs or Protective Action Recommendations.

2.1.3   Upon concurrence from the ED, request that a
Communicator notify the Shift Supervisor in the
Control Room of the planned action.

2.1.4   Direct I&C to apply the new calibration factors to
the mid and high-range channels as follows:

NOTE

The Supervisory Key Switch for the WRGM RM-23 Indicating
Controller RIX-026-076 is located to the right of the
RM-23.

2.1.4.1   Obtain the key for the supervisory key
switch for RIX-026-076, located on panel
00-C691.

2.1.4.2   Select the Supervisory Position of the
key switch for the WRGM, RY-026-076.

2.1.4.3   At RIX-026-076, press CH2.

2.1.4.4   At RIX-026-076, press 011,
THEN press ITEM.

2.1.4.5   At RIX-026-076, enter the new mid-range
value of the conversion factor.

2.1.4.6   At RIX-026-076, press ENTER.

2.1.4.7   At RIX-026-076, press CH2.

2.1.4.8   At RIX-026-076, press CH3.

2.1.4.9   At RIX-026-076, enter 011,
THEN press ITEM.

2.1.4.10   At RIX-026-076, enter the new high-range
value of the conversion factor.

2.1.4.11   At RIX-026-076, press ENTER.

2.1.4.12   At RIX-026-076, press CH3.

2.1.4.13   Place key switch on Panel 00-C691 to the NORMAL position and remove key.

2.1.4.14   Return the key.

2.2   The EOF DATL shall upon turnover from the TSC:

2.2.1   Determine a new WRGM conversion factor approximately 3 hours, 7 hours, 12 hours, 24 hours, 2 days, and 4 days following reactor shutdown or until termination of the release.

2.2.1.1   **IF** the suspected source term is a LOCA, (Major Fuel Damage-D/W Rad monitor ≥ 100 R/mr) **THEN** refer to Appendix 1 to calculate and document the new WRGM conversion factors.

2.2.1.2   **IF** the suspected source term is not a LOCA, (Minor Fuel Damage-D/W Rad monitor <100 R/mr) **THEN** obtain an isotopic analysis and refer to ERP-360-2 to calculate and document the new WRGM conversion factors.

2.2.2   Inform the ERM of the need to change the WRGM calibration factors and any impact the changes may have on EALs or PAG Recommendations.

2.2.3   Upon concurrence from ERM, request the a Communicator notify the Shift Supervisor in the Control Room of the planned action.

3.0   CONTINUING ACTIONS

3.1   The EOF DATL shall:

3.1.1   Upon termination of the release, evaluate the applicability of the current conversion factors.

4.0   FINAL CONDITIONS

4.1   Upon termination of the emergency, I&C shall return WRGM conversion factors to normal setting.

5.0 ATTACHMENTS AND APPENDICES

5.1 ERP-360-1, Mid and High-Range Conversion Factor Adjustment Worksheet for a Suspected LOCA

5.2 ERP-360-2, Mid and High-Range Conversion Factor Adjustment Worksheet for Non-LOCA Source Terms

6.0 SUPPORTING INFORMATION

6.1 Purpose

6.1.1 The purpose of this procedure is to provide instructions in the determination and the application of WRGM conversion factors during an emergency as a function of time after reactor shutdown.

6.2 Criteria For Use

6.2.1 A release of significant magnitude has occurred resulting in the activation of the mid or high-range channel of the WRGM.

6.3 Special Equipment

None

6.4 References

6.4.1 G. A. Technologies, INC, Calibration Report RD-72 Wide Range Gas Monitor High and Mid-Range Detectors, E-255-961 (Rev. 2)

6.4.2 LGS RD-72 Transfer Calibration Procedure (0366-9010)

6.4.3 Memo, L. G. Pyrih to R. H. Logue, Limerick Generating Station Units 1 and 2, Subject: Wide Range Accident Monitor Calibration Factors, dated Aug. 27, 1984.

6.5 Commitment Annotation

None

MID AND HIGH-RANGE CONVERSION FACTOR ADJUSTMENT WORKSHEET
FOR A SUSPECTED LOCA

Date: _____

Time: _____   Time after reactor shutdown (hrs) _____

Mid-range calibration factor
(Determine from Figure 1): _____ $\dfrac{cpm}{\mu Ci/cc}$

Mid-range conversion factor = $\dfrac{1}{\text{Mid-range calibration factor}}$

A.

New Mid-range conversion factor = _____ $\dfrac{\mu Ci/cc}{cpm}$
for channel RE26076-1

High-range calibration factor: _____ $\dfrac{cpm}{\mu Ci/cc}$
(Determine from Figure 2)

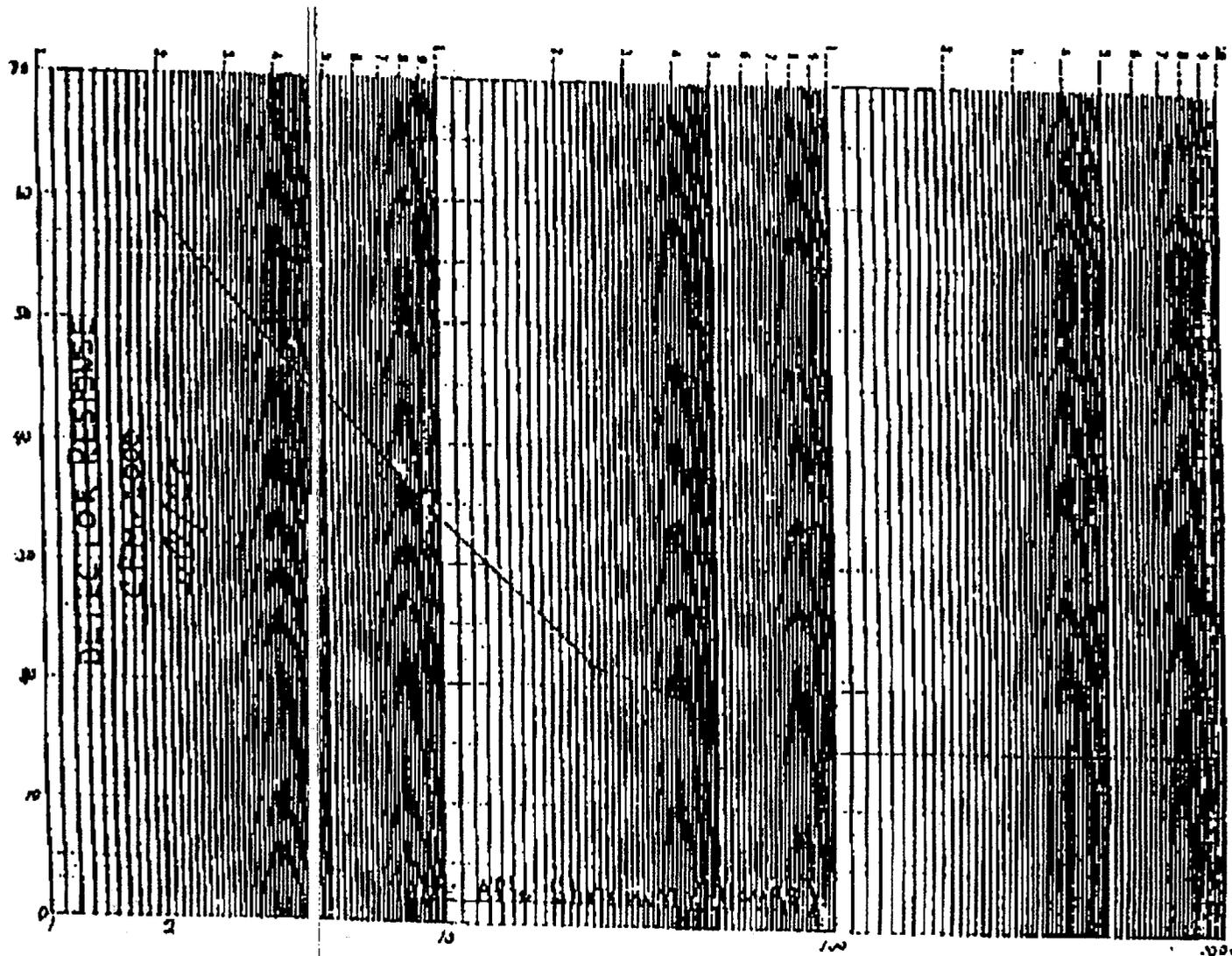High-range conversion factor = $\dfrac{1}{\text{High-range calibration factor}}$
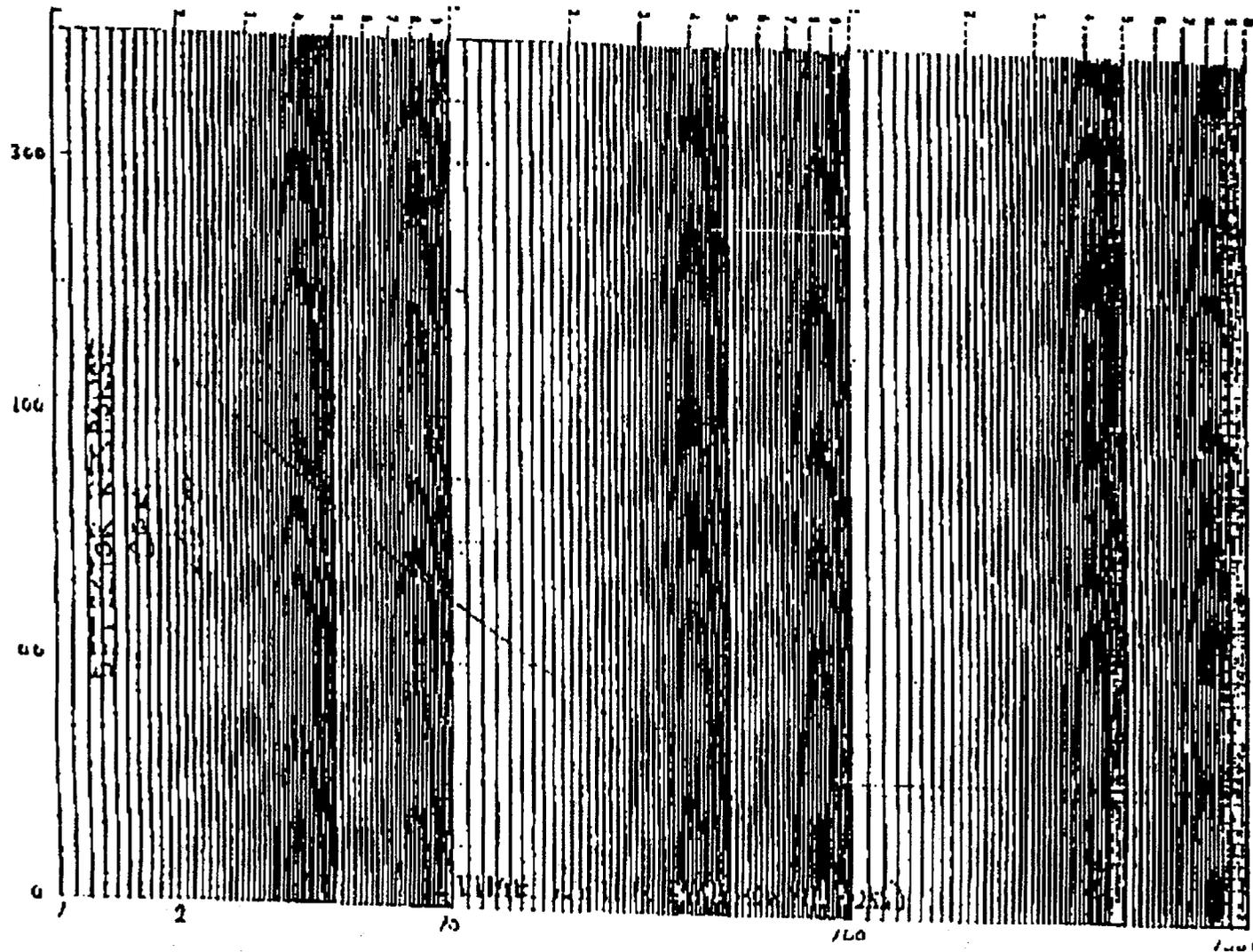
B.

New Mid-range conversion = _____ $\dfrac{\mu Ci/cc}{cpm}$
for channel RE26076-3

Apply Value A to channel item 11 of RE26076-1
Apply Value B to channel item 11 of RE26076-3

Appendix ERP-360-1
FIGURE 1
Mid-Range Detector Response Vs. Time

Appendix ERP-360-1
FIGURE 2
Mid-Range Detector   Response   Vs.   Time

APPENDIX ERP-360-2

Mid and High-Range Conversion Factor Adjustment Worksheet for Non-LOCA
Source Terms

INSTRUCTIONS

Do one worksheet each for the mid-range and high-range channels.
Complete the worksheets as follows:

1.   Fill in the appropriate information at the top of the worksheet.

2.   List the suspected or actual isotopic makeup of the release in
      the first column.

3.   Provide the concentration or curie amount in the second column.

4.   Determine the fractional abundance of each isotope in the source
      term. The sum of all isotopic abundances should approximately
      equal 1.

5.   Obtain the values for B, C, and D from the Table of Isotopes,
      Radiological Health Handbook or any acceptable reference
      document.

6.   Obtain the value for E from Figure 3 and Figure 4 for the mid-
      range and high-range channel respectively. Use the gamma curve
      for each gamma emitted and the beta curve for each beta emitted.

7.   Determine the isotopic conversion factor for each emission (F) by
      multiplying column D times E.

8.   Calculate the expected yield for each emission (G) by multiplying
      columns A times F times Cf.

NOTE

CF VALUES ARE DETECTOR CORRECTION FACTIONS OBTAINED FROM TRANSFER
CALIBRATION PROCEDURE (0366-9010). THE VALUE IS 1.29 FOR BETA AND
1.07 FOR GAMMA.

---

9.   Calculate the Total Expected Yield for the Source Term
      (CPM/uCi/cc) by adding all expected yields for each emission in
      column G.

10.   Calculate the new conversion factor for each channel by taking
      the reciprocal of the Total Expected Yield.

11.   Apply the new conversion factor determined in step 9 to channel
      item 11 for the channel of interest.

APPENDIX ERP-360-2

DATE: _____ **Mid and High-Range Calibration Factor Adjustment Worksheet**
TIME: _____ **for Non-LOCA Source Terms**
Time after reactor   (See notes on following page)
Shutdown: _____

MID-RANGE

HIGH-RANGE

Source Term		Intensity	Radiations Produced			$\frac{cpm}{uCi/cc}$ from Graph	$\frac{cpm}{uCi/cc}$ D x E	Expected Yield cf-beta = 1.29 A x F x CF cf-gamma = 1.07
Isotope	Concentration or Activity		E(MeV)	B or	No. per Dis			
		A	B	C	D	E	F	G
								ENTER THE RECIPROCAL OF THE TOTAL EXPECTED YIELD IN CHANNEL ITEM 11: $\frac{1}{TOTAL}$ EXP. YIELD = $\frac{uCi/cc}{CPM}$
=	= 1							

APPENDIX ERP-360-2

NOTES

A   =   Fractional abundance of each isotope in source term. The sum of all isotopes should approximately equal 1.

B,C,D   =   Obtain these values from the Table of the Isotopes or the Radiological Health Handbook.

E   =   Obtain these values as a function of beta or gamma energy from Figure 1 (Mid-range detector) and Figure 2 (High-range detector) of this Appendix.

F   =   D times E

G   =   A times F times Cf

Cf   =   These values are actual values obtained from the transfer calibration procedure (0366-9010) and are 1.29 for betas and 1.07 for gammas.
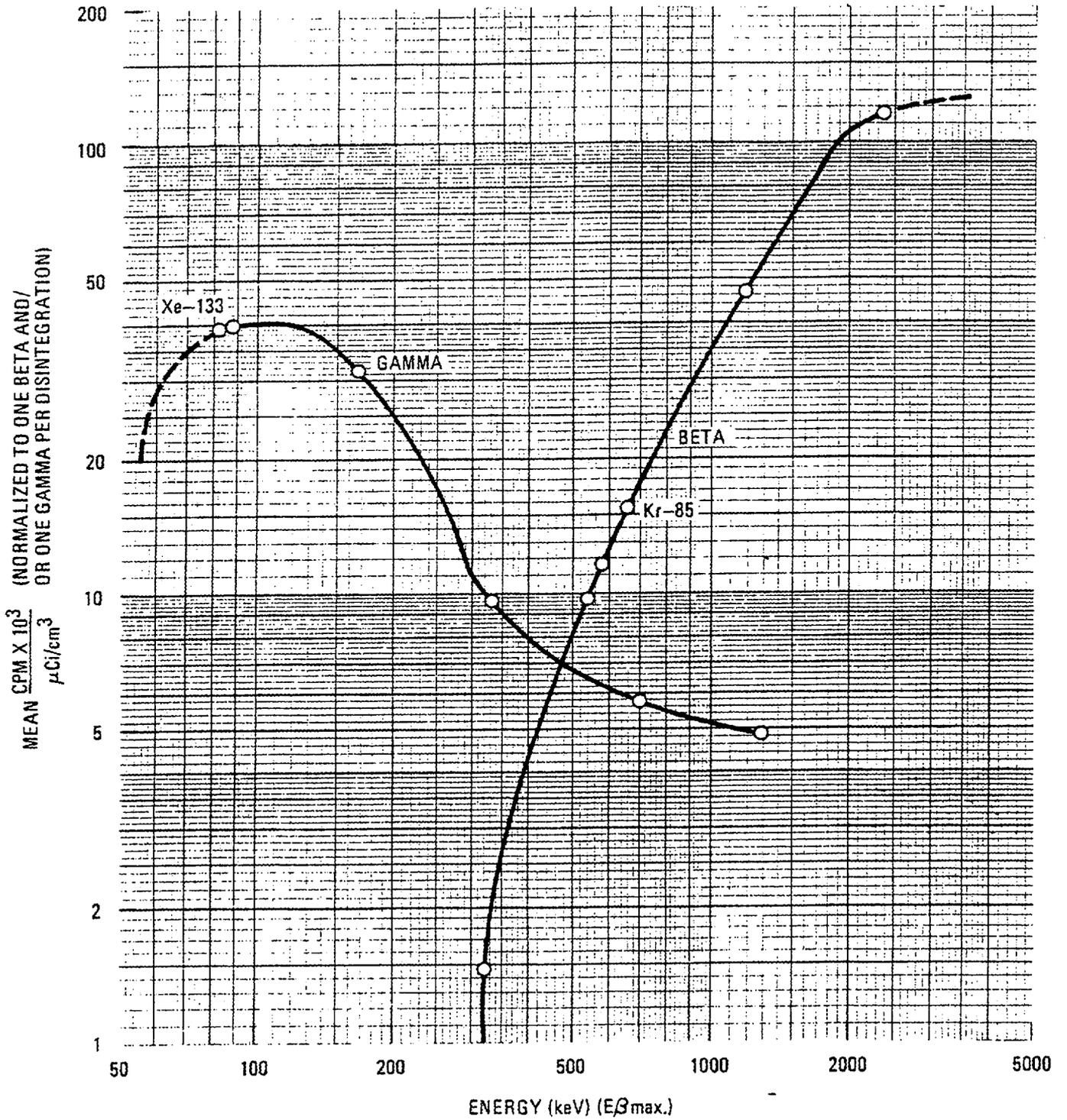
APPENDIX ERP-360-2

FIGURE 3

Fig. 3. Mid-range detector energy response curve

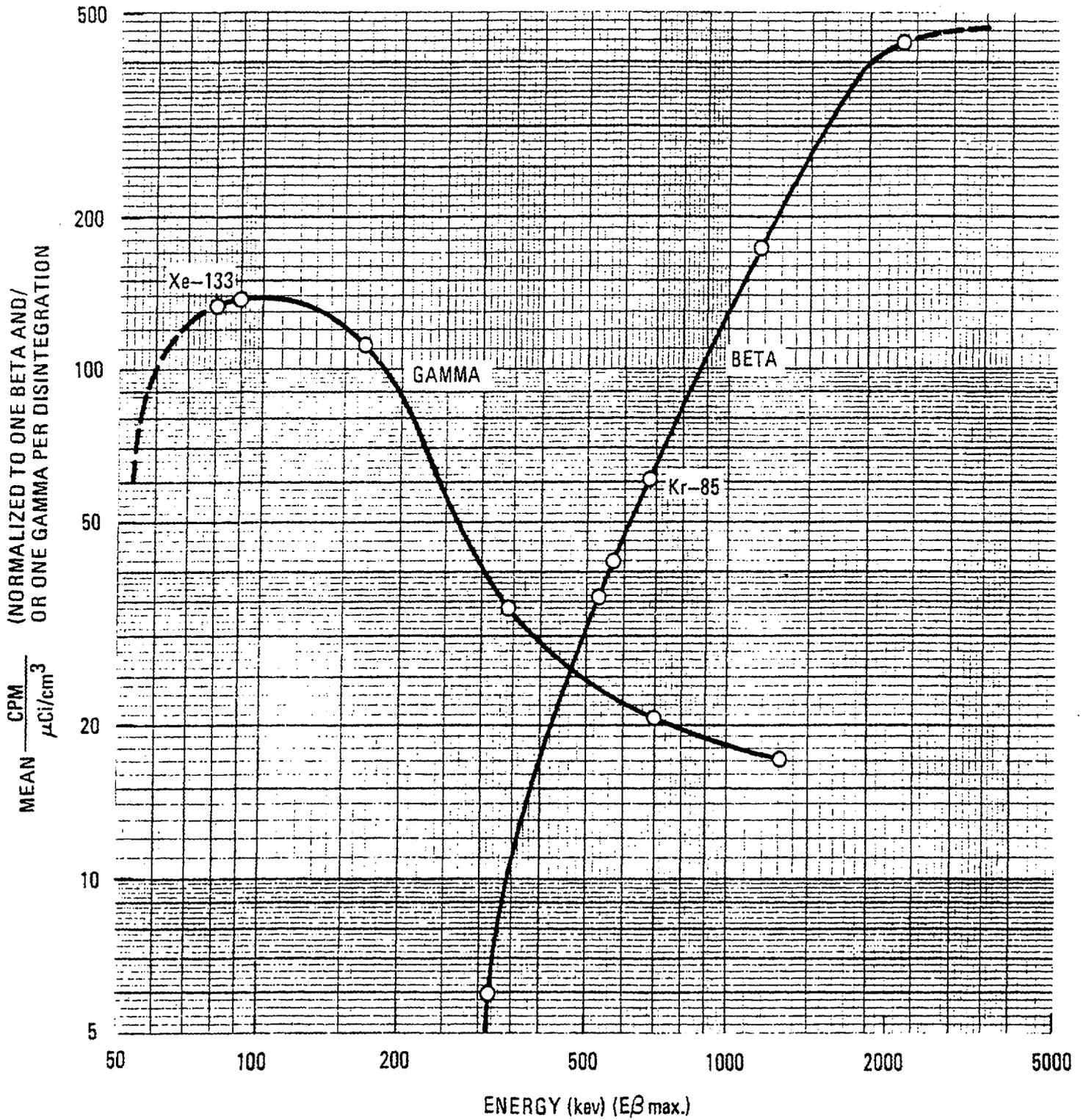APPENDIX ERP-360-2

FIGURE 4

Fig. 4. High-range detector energy response curve

ATTACHMENT 2

LIMERICK GENERATING STATION, UNITS 1 & 2

Docket Nos.   50-352
                     50-353

License Nos. NPF-39
                     NPF-85

EMERGENCY RESPONSE PROCEDURES

REPORT INDEX

```
             DOC   PROC                          CURR
                                                 REV                                                        EFFECTIVE  RESP   SYSTEM
       FAC  TYPE  TYPE   PROCEDURE NUMBER         NBR                         TITLE                            DATE     GROUP   NBR

       LG   PROC  ERP   ERP-C-1000              0006 EMERGENCY OPERATIONS FACILITY (EOF) ACTIVATION/DEACTIVATION   06/25/01
       LG   PROC  ERP   ERP-C-1000-1            0004 EOF ACTIVATION CHECKLIST                                 06/25/01
       LG   PROC  ERP   ERP-C-1000-2            0003 EOF DEACTIVATION CHECKLIST                               04/21/99
       LG   PROC  ERP   ERP-C-1000-3            0000 EOF BUSINESS HOURS FIRST RESPONDER CHECKLIST             04/21/99
       LG   PROC  ERP   ERP-C-1000-4            0000 EOF AFTER HOURS FIRST RESPONDER CHECKLIST                04/21/99
       LG   PROC  ERP   ERP-C-1000-5            0000 MIMIMUM STAFFING POSITIONS NECESSARY TO ACTIVATE THE EOF 06/25/01
       LG   PROC  ERP   ERP-C-1100              0003 EOF STAFF AUGMENTATION                                   09/14/94
                                                     INCORPORATED INTO ERP-C-1250
       LG   PROC  ERP   ERP-C-1200              0011 EMERGENCY REPSONSE MANAGER                               06/25/01   LWE
       LG   PROC  ERP   ERP-C-1200-1            0000 EMERGENCY RESPONSE MANAGER TURNOVER/BRIEFING FORM        09/14/94
       LG   PROC  ERP   ERP-C-1200-2            0000 PROTECTIVE ACTION RECOMMENDATION  WORKSHEET              10/24/95
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1200-3            0000 ERM PAR DELIVERY CHECKLIST                               04/03/00
       LG   PROC  ERP   ERP-C-1200-4            0000 MINIMUM STAFFING POSITIONS NECESSARY TO ACTIVATE THE EOF 03/30/01
       LG   PROC  ERP   ERP-C-1210              0002 ASSISTANT EMERGENCY RESPONSE MANAGER (AERM)             10/24/95
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1250              0004 EMERGENCY PREPAREDNESS COORDINATOR/EOF                   06/25/01
       LG   PROC  ERP   ERP-C-1250-1            0000 EMERGENCY POWER INSTRUCTIONS                             09/14/94
       LG   PROC  ERP   ERP-C-1250-2            0002 EMERGENCY PREPAREDNESS COORDINATOR INSTRUCTIONS FOR ASPEN 05/11/01
                                                     BACKUP NOTIFICATION SYSTEM
       LG   PROC  ERP   ERP-C-1250-3            0000 EMERGENCY PREPAREDNESS COORDINATOR INSTRUCTIONS TO STOP  09/14/94
                                                     STAFFING
       LG   PROC  ERP   ERP-C-1250-4            0000 ENERGENCY PREPAREDNESS COORDINATOR INSTRUCTIONS FOR SYSTEM 09/14/94
                                                     RESET
       LG   PROC  ERP   ERP-C-1300              0010 EMERGENCY OPERATIONS FACILITY (EOF) DOSE ASSESSMENT TEAM LEADER 08/29/00
       LG   PROC  ERP   ERP-C-1300-1            0004 DOSE ASSESSMENT TEAM LEADER (DATL) INITIAL ACTIONS       06/25/01
       LG   PROC  ERP   ERP-C-1300-2            0000 DOSE ASSESSMENT TURNOVER LIST                            09/23/94
       LG   PROC  ERP   ERP-C-1300-3            0004 PROTECTIVE ACTION RECOMMENDATION WORKSHEET               03/30/01
       LG   PROC  ERP   ERP-C-1300-4            0000 OFFSITE SAMPLE ANALYSIS REQUESTS                         09/23/94
       LG   PROC  ERP   ERP-C-1300-5            0001 DETERMINATION OF PROTECTIVE ACTION                       11/02/98
                                                     RECOMMENDATIONS (PARS)
       LG   PROC  ERP   ERP-C-1300-6            0002 DOSE ASSESSMENT GROUP MEMBER (DAGM) INITIAL ACTIONS      06/25/01
       LG   PROC  ERP   ERP-C-1300-7            0000 OBTAINING EPDS MET/RAD DATA                              03/26/97
       LG   PROC  ERP   ERP-C-1300-8            0000 USE OF MODE A/MODE B CDM                                 03/26/97
       LG   PROC  ERP   ERP-C-1300-9            0001 OBTAINING MET DATA FROM NATIONAL WEATHER SERVICE         09/12/97
       LG   PROC  ERP   ERP-C-1310              0003 EMERGENCY OPERATIONS FACILITY (EOF) DOSE ASSESSMENT GROUP 03/26/97
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1310-1            0000 DOSE ASSESSMENT GROUP LEADER INITIAL ACTIONS             03/26/97
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1310-2            0000 OBTAINING MET DATA FROM NATIONAL WEATHER SERVICE         03/26/97
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1310-3            0000 OBTAINING EPDS MET/RAD DATA                              03/26/97
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1310-4            0000 USE OF MODE A / MODE B OF CDM                            03/26/97
                                                     CANCELLED
       LG   PROC  ERP   ERP-C-1320              0007 EMERGENCY OPERATIONS FACILITY (EOF) FIELD SURVEY GROUP LEADER 08/29/00
       LG   PROC  ERP   ERP-C-1320-1            0002 FIELD SURVEY GROUP LEADER INITIAL ACTIONS                04/10/98
       LG   PROC  ERP   ERP-C-1320-2            0001 FIELD SURVEY GROUP LEADER TURNOVER SHEET                 03/26/97
       LG   PROC  ERP   ERP-C-1320-3            0002 FIELD SURVEY GROUP LEADER DATA SHEET                     08/29/00
       LG   PROC  ERP   ERP-C-1400              0005 ENGINEERING SUPPORT TEAM                                 06/25/01
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FAC	DOC TYPE	PROC TYPE	PROCEDURE NUMBER	CURR REV NBR	TITLE	EFFECTIVE DATE	RESP GROUP	SYSTEM NBR
LG	PROC	ERP	ERP-C-1400-1	0002	ENGINEERING SUPPORT TEAM CHECKLIST	11/02/98		
LG	PROC	ERP	ERP-C-1410	0002	CORE DAMAGE ASSESSMENT	09/09/98		
LG	PROC	ERP	ERP-C-1410-1	0000	RADIOLOGICAL DATA	09/14/94		
LG	PROC	ERP	ERP-C-1410-2	0001	HYDROGEN CONCENTRATION DATA	09/09/98		
LG	PROC	ERP	ERP-C-1410-3	0001	CONTAINMENT RADIATION MONITOR DATA	09/09/98		
LG	PROC	ERP	ERP-C-1410-4	0000	METAL WATER REACTION CANCELLED	09/09/98		
LG	PROC	ERP	ERP-C-1410-5	0002	PERCENT OF FUEL INVENTORY AIRBORNE IN THE CONTAINMENT VS. APPROXIMATE SOURCE AND DAMAGE ESTIMATE	06/01/01		
LG	PROC	ERP	ERP-C-1410-6	0002	PROCEDURES FOR ESTIMATING FUEL DAMAGE BASED ON MEASURED I-131 AND XE-133 CONCENTRATIONS	06/25/01		
LG	PROC	ERP	ERP-C-1500	0006	LOGISTIC SUPPORT TEAM	04/14/00		
LG	PROC	ERP	ERP-C-1500-1	0001	MESSAGE AND INFORMATION INSTRUCTIONS	10/24/95		
LG	PROC	ERP	ERP-C-1500-2	0001	HELICOPTER LANDING INFORMATION	10/24/95		
LG	PROC	ERP	ERP-C-1900	0004	RECOVERY PHASE IMPLEMENTATION	11/02/98		
LG	PROC	ERP	ERP-C-1900-1	0000	RECOVERY PHASE IMPLEMENTATION FLOW CHART	06/28/93		
LG	PROC	ERP	ERP-C-1900-2	0002	PEACH BOTTOM ATOMIC POWER STATION RECOVERY ACCEPTANCE CHECKLIST	04/02/98		
LG	PROC	ERP	ERP-C-1900-3	0002	LIMERICK GENERATING STATION RECOVERY ACCEPTANCE CHECKLIST	04/02/98		
LG	PROC	ERP	ERP-C-1900-4	0002	RECOVERY PLAN OUTLINE	04/02/98		
LG	PROC	ERP	ERP-C-1900-5	0002	ASSESSMENT CONSIDERATIONS	12/28/99		
LG	PROC	ERP	ERP-101	0012	CLASSIFICATION OF EMERGENCIES	02/08/02	LWE	
LG	PROC	ERP	ERP-101 BASES	0003	LGS EAL TECHNICAL BASIS MANUAL	02/08/02		
LG	PROC	ERP	ERP-106	0003	WRITTEN SUMMARY NOTIFICATION	11/22/95	LWE	
LG	PROC	ERP	ERP-110	0033	EMERGENCY NOTIFICATION	06/12/01	LWE	
LG	PROC	ERP	ERP-120	0007	STATION EVACUATIONS	12/07/01	LWE	
LG	PROC	ERP	ERP-140	0010	STAFFING AUGMENTATION	12/07/01	LWE	
LG	PROC	ERP	ERP-200	0015	EMERGENCY DIRECTOR (ED) RESPONSE	12/07/01	LWE	
LG	PROC	ERP	ERP-200-1 APP	0012	EMERGENCY DIRECTOR FORMS	12/07/01	LWE	
LG	PROC	ERP	ERP-200-2 APP	0000	DOSE ASSESSMENT DATA SHEET	06/20/00		
LG	PROC	ERP	ERP-230	0014	OPERATIONS SUPPORT CENTER (OSC) DIRECTOR	04/14/00	LWE	
LG	PROC	ERP	ERP-230 APPENDIX 1	0000	OSC - EMERGENCY COMMUNICATIONS EQUIPMENT CHECK LIST	04/14/00		
LG	PROC	ERP	ERP-230 APPENDIX 2	0000	OSC DIRECTOR ACTIVATION CHECK-OFF LIST	04/14/00		
LG	PROC	ERP	ERP-230 APPENDIX 3	0000	OPERATIONS SUPPORT CENTER FACILITY ACCOUNTABILITY LOG	04/14/00		
LG	PROC	ERP	ERP-230 APPENDIX 4	0000	OSC DIRECTOR ACTIVATION	04/14/00		
LG	PROC	ERP	ERP-300	0023	DOSE ASSESSMENT COORDINATOR	01/31/02	LWE	
LG	PROC	ERP	ERP-300 APPENDIX 1	0000	DOSE ASSESSMENT TEAM ACTIVATION	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 2	0000	DOSE ASSESSMENT TEAM CHECK-OFF LIST	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 3	0001	TURNOVER OF DOSE ASSESSMENT RESPONSIBILITIES	06/19/00		
LG	PROC	ERP	ERP-300 APPENDIX 4	0000	DOSE ASSESSMEMT DATA SHEET	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 5	0000	USE OF MESOREM, JR, AUTO MODE A	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 6	0000	OBTAINING RADIOLOGICAL DATA	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 7	0000	OBTAINING MET DATA FROM PLANT MONITORING SYSTEM (PMS)	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 8	0000	OBTAINING METEROLOGICAL DATA FROM NATIONAL WEATHER SERVICE	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 9	0001	PROTECTIVE ACTION WORKSHEET	06/19/00		
LG	PROC	ERP	ERP-300 APPENDIX 10	0000	USE OF NORTH STACK DOSE RATE TO ESTIMATE RELEASE SOURCE TERM	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 11	0000	OPERATION OF IBM PS/2 MODEL L40SX	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 12	0000	LIMERICK LIQUID RELEASE DOSE CALCULATIONS	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 13	0000	DOSE ASSESSMENT SELF-CHECK	04/03/00		
LG	PROC	ERP	ERP-300 APPENDIX 14	0000	STABILTIY CLASS DETERMINATION	04/03/00		
LG	PROC	ERP	ERP-316	0001	OPERATION OF THE DOSE ASSESSMENT COMPUTER (CM-3)	02/15/02		

FAC	DOC TYPE	PROC TYPE	PROCEDURE NUMBER	CURR REV NBR	TITLE	EFFECTIVE DATE	RESP GROUP	SYSTEM NBR
LG	PROC	ERP	ERP-326	0001	SHIFT DOSE ASSESSMENT PERSONNEL (SDAP)	02/15/02		
LG	PROC	ERP	ERP-330	0000	USE OF NORTH STACK-DOSE RATE TO ESTIMATE RELEASE SOURCE TERM CANCELLED INCORPORATED INTOERP-300 APP.10	11/14/94	LWE	
LG	PROC	ERP	ERP-340	0009	FIELD SURVEY GROUP	01/31/02	LWE	
LG	PROC	ERP	ERP-350	0003	RADIOACTIVE LIQUID RELEASE CANCELLED	11/10/94	LWE	
LG	PROC	ERP	ERP-360	0004	ADJUSTMENT OF WIDE RANGE GAS MONITOR CONVERSION FACTORS	02/15/02	LWE	
LG	PROC	ERP	ERP-370	0001	USE OF RMMS FOR DOSE ASSESSMENT CANCELLED	11/10/94	LWE	
LG	PROC	ERP	ERP-400	0013	CHEMISTRY SAMPLING AND ANALYSIS TEAM	07/24/01	LWE	
LG	PROC	ERP	ERP-410	0002	SAMPLE PREPARATION AND HANDLING OF HIGHLY RADIOACTIVE LIQUID SAMPLES	09/28/98	LWE	
LG	PROC	ERP	ERP-420	0002	SAMPLE PREPARATION AND HANDLING OF HIGHLY RADIOACTIVE PARTICULATE FILTERS AND IODINE CARTRIDGES	09/28/98	LWE	
LG	PROC	ERP	ERP-430	0002	SAMPLE PREPARATION AND HANDLING OF HIGHLY RADIOACTIVE GAS SAMPLES	09/28/98	LWE	
LG	PROC	ERP	ERP-440	0002	OFF-SITE ANALYSIS OF HIGH ACTIVITY SAMPLES	03/29/95	LWE	
LG	PROC	ERP	ERP-500	0016	SECURITY TEAM	04/14/00	LWE	
LG	PROC	ERP	ERP-500 APPENDIX 1	0000	SECURITY TEAM ACTIVATION	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 2	0000	SECURITY TEAM STAFFING GUIDELINES	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 3	0000	STAFFING FOR SITE EVACUATION	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 4	0000	SECURITY EVACUATION GUIDANCE	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 5	0000	SECURITY TEAM LEADER CHECK-OFF LIST	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 6	0000	EMERGENCY ASSEMBLY AREAS	04/14/00		
LG	PROC	ERP	ERP-500 APPENDIX 7	0000	FACILITY ACCOUNTABILITY LOG TECHNICAL SUPPORT CENTER	04/14/00		
LG	PROC	ERP	ERP-600	0013	HEALTH PHYSICS TEAM	01/31/02	LWE	
LG	PROC	ERP	ERP-620	0002	PLANT SURVEY GROUP CANCELLED - NO REPLACEMENT	05/02/95	LWE	
LG	PROC	ERP	ERP-630	0004	VEHICLE AND EVACUEE CONTROL GROUP	01/31/02	LWE	
LG	PROC	ERP	ERP-640	0008	EMERGENCY RESPONSE FACILITY HABITABILITY	04/17/99	LWE	
LG	PROC	ERP	ERP-650	0011	ENTRY FOR EMERGENCY REPAIR AND OPERATIONS	01/31/02	LWE	
LG	PROC	ERP	ERP-660	0007	DISTRIBUTION OF THYROID BLOCKING TABLETS	01/31/02	LWE	
LG	PROC	ERP	ERP-700	0016	TECHNICAL SUPPORT TEAM	02/15/01	LWE	
LG	PROC	ERP	ERP-800	0020	MAINTENANCE TEAM	12/15/00	LWE	
LG	PROC	ERP	ERP-800 APPENDIX 1	0000	TASK BRIEFING/DEBRIEFING SHEET	04/14/00		
LG	PROC	ERP	ERP-800 APPENDIX 2	0001	MAINTENANCE TEAM ACTIVATION	07/24/01		
LG	PROC	ERP	ERP-800 APPENDIX 3	0001	TECHNICAL SUPPORT CENTER ACTIVATION	12/15/00		
LG	PROC	ERP	ERP-800 APPENDIX 4	0001	OFFSITE SIRENS ACTIVATION (REF. 6.5.1)	12/15/00		

** END OF REPORT **