



ARKANSAS POWER & LIGHT COMPANY  
POST OFFICE BOX 551 LITTLE ROCK, ARKANSAS 72203 (501) 371-4000

June 22, 1979

1-069-14  
2-069-9

Director of Nuclear Reactor Regulation  
ATTN: Mr. R. W. Reid, Chief  
Operating Reactors Branch #4  
Mr. J. F. Stolz, Chief  
Light Water Reactors Branch #1  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Arkansas Nuclear One - Units 1 & 2  
Docket Nos. 50-313 & 50-368  
License Nos. DPR-51 & NPF-6  
Gaseous Effluent Monitoring Systems  
(File: 1510, 2-1510)

Gentlemen:

In response to the questions telecopied to us June 15, 1979 concerning the Gaseous Effluent Monitoring Systems at Arkansas Nuclear One - Units 1 & 2 the following is provided.

ANO-1

Item 1) Location of the effluent monitor, monitoring system:

The following five (5) Process Radiation Monitoring Systems exist at ANO-1 to monitor gaseous effluent releases.

- 1) Stack Gas - Monitors effluents released during containment purging, and during normal ventilating of the Fuel Handling and Radwaste Area.
- 2) Waste Gas - In line from the waste gas surge tank and waste gas decay tanks to plant vent.
- 3) Main Condenser Air Discharge
- 4) Hydrogen Purge
- 5) Reactor Building Penetration Room Ventilation

2352 239

~~2328 356~~

Item 2) What detector is being used:

Gamma Scintillation detectors are utilized in the first three (3) systems listed in Item 1. Beta scintillation detectors are used in the Hydrogen Purge and Reactor Building Penetration Room Ventilation monitoring systems.

Item 3) All scintillation detectors installed in the systems listed in Item 1 have a range from 0-10<sup>8</sup> cpm.

Item 4) Maximum release rate that can be detected on-scale by the detector:

The maximum release rate that can be detected on-scale by the effluent monitoring systems depends upon the flow rate of the gas being monitored.

The Stack Gas Monitoring System can detect on-scale release rates in excess of 3000 curies per second under minimum flow conditions (Spent Fuel Area exhaust fan running). Under maximum flow conditions the detector can monitor release rates in excess of 10,000 curies per second.

The Waste Gas Monitoring System can detect on-scale releases with concentrations greater than 88 microcuries per cubic centimeter. The maximum release rate detectable is dependent on the flow rate. Any release from the Waste Gas system is also monitored by the Stack Gas Monitoring System.

The Main Condenser Air Discharge Monitoring System can detect on-scale releases with concentrations greater than 350 microcuries per cubic centimeter. The maximum release rate detectable is dependent on the flow rate.

The Hydrogen Purge Monitoring System can detect on-scale a release rate in excess of 4 curies per second at the design flow rate of 50 cubic feet per minute.

The Reactor Building Penetration Room Ventilation Monitoring System can detect on-scale a release rate in excess of 0.08 curies per second at the design flow rate of 2000 cubic feet per minute.

Item 5) Calibration Factor for system:

Calibration curves for the Gamma Scintillation detectors used in the Stack Gas, Waste Gas, and Main Condenser Air Discharge monitoring systems are attached. The Beta Scintillators were calibrated by the vendor.

Item 6) Reference radionuclide used to calibrate system:

Krypton-85 is used to perform all calibrations of Gaseous Effluent Monitoring Systems in Unit 1.

Item 7) Alarm setpoint for system:

The alarm setpoint on Stack Gas is dependent upon the combination of exhaust fans operating. The minimum setpoint is  $1.4 \times 10^4$  cpm. This setpoint is used when the Containment Purge, Fuel Handling area, and Radwaste area exhaust fans are used simultaneously. The maximum setpoint used is  $5.0 \times 10^4$  cpm. This setpoint is used when either the Radwaste area or Fuel Handling area exhaust fan is being used.

The alarm setpoint used for the Waste Gas Monitoring System is variable depending on the particular release. The setpoint is set at 1.1 times the calculated value for the release.

The Main<sub>3</sub> Condenser Air Discharge Monitoring System setpoint is  $7.0 \times 10^3$  cpm.

The Hydrogen Purge monitoring system setpoint is  $5.0 \times 10^4$  cpm.

The Reactor Building Penetration Room Ventilation monitoring system setpoint is  $5.0 \times 10^4$  cpm.

Item 8) Alarm function of system:

The Stack Gas monitoring system alarms in the control room if radiation levels exceed the setpoint.

The Waste Gas monitoring system alarms in the control room if radiation levels exceed the setpoint. The waste gas surge tank and decay tanks will also be isolated.

The Main Condenser Air Discharge, Hydrogen Purge, and Reactor Building Penetration Room Ventilation monitoring systems alarm in the control room if radiation levels exceed the setpoint.

ANO-2

Item 1) Location of the effluent monitor, monitoring system:

The applicable systems are underlined in the attached Table 11.4-1.

Item 2) What detector is being used:

Detector type is shown in Table 11.4.1

~~2328 358~~

2352 241

Item 3) Readout range of detector:

All detectors installed in the systems referenced in Item 1 have a range from 0 -  $10^6$  cpm.

Item 4) Maximum release rate that can be detected on-scale by the detector:

The maximum release rate that can be detected on-scale by the effluent monitoring systems depends upon the flow rate of the gas being monitored. All of the subject monitoring systems can detect on-scale releases with activities of approximately 0.04 microcurie per cubic centimeter.

The Penetration Rooms monitoring system can detect a release rate in excess of 0.03 curies per second on-scale.

The Hydrogen Purge monitoring system can detect on-scale a maximum release rate of approximately  $1.0 \times 10^{-3}$  curies per second.

The Fuel Handling Area effluent monitoring system can detect on-scale a maximum release rate of greater than 0.67 curies per second.

The Fuel Handling Area effluent monitoring system can detect on-scale a maximum release rate of greater than 0.67 curies per second.

The Radwaste Area effluent monitoring system can detect on-scale a maximum release rate of greater than 0.83 curies per second.

The Containment Purge effluent monitoring system can detect on-scale a maximum release rate of greater than 0.67 curies per second.

Item 5) Calibration Factor for system:

The calibration curve for the applicable detectors is attached.

Item 6) Reference radionuclide used to calibrate system:

Krypton-85 is used to perform all calibrations of Gaseous Effluent Monitoring systems in Unit 2.

Item 7) Alarm setpoint for system:

Alarm setpoints are shown in the attached Table 11.4-1.

~~2328 359~~

2352 242

Messrs. R. W. Reid  
J. F. Stolz

-5-

June 22, 1979

Item 8) Alarm function of system:

Alarm functions are shown in the attached Table 11.4-1.

Very truly yours,

*David C. Trimble*

David C. Trimble  
Manager, Licensing

DCT/MOW/vb

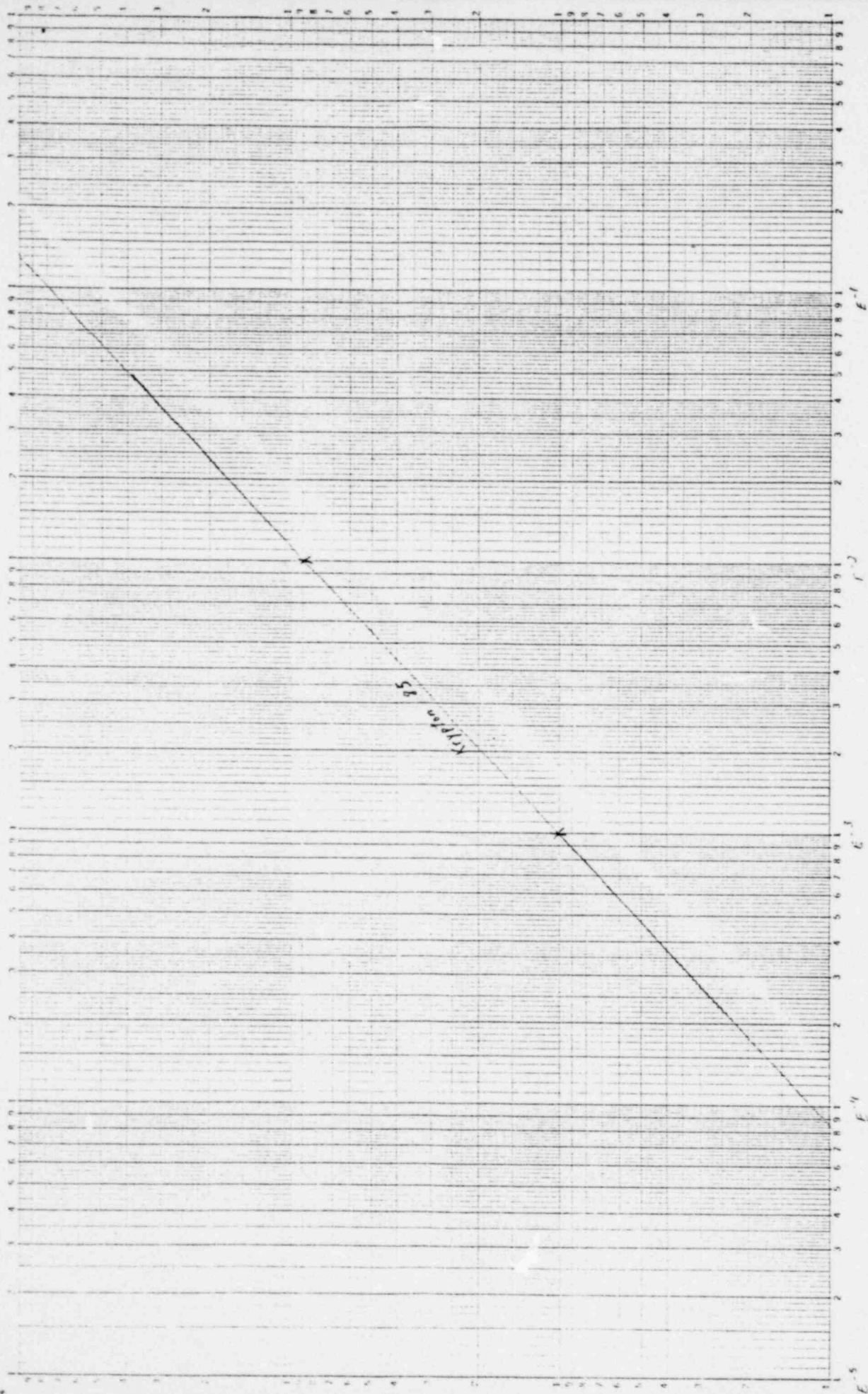
Attachment

2352 243

~~2328 360~~

STACK GAS

AT 2700



2352 244

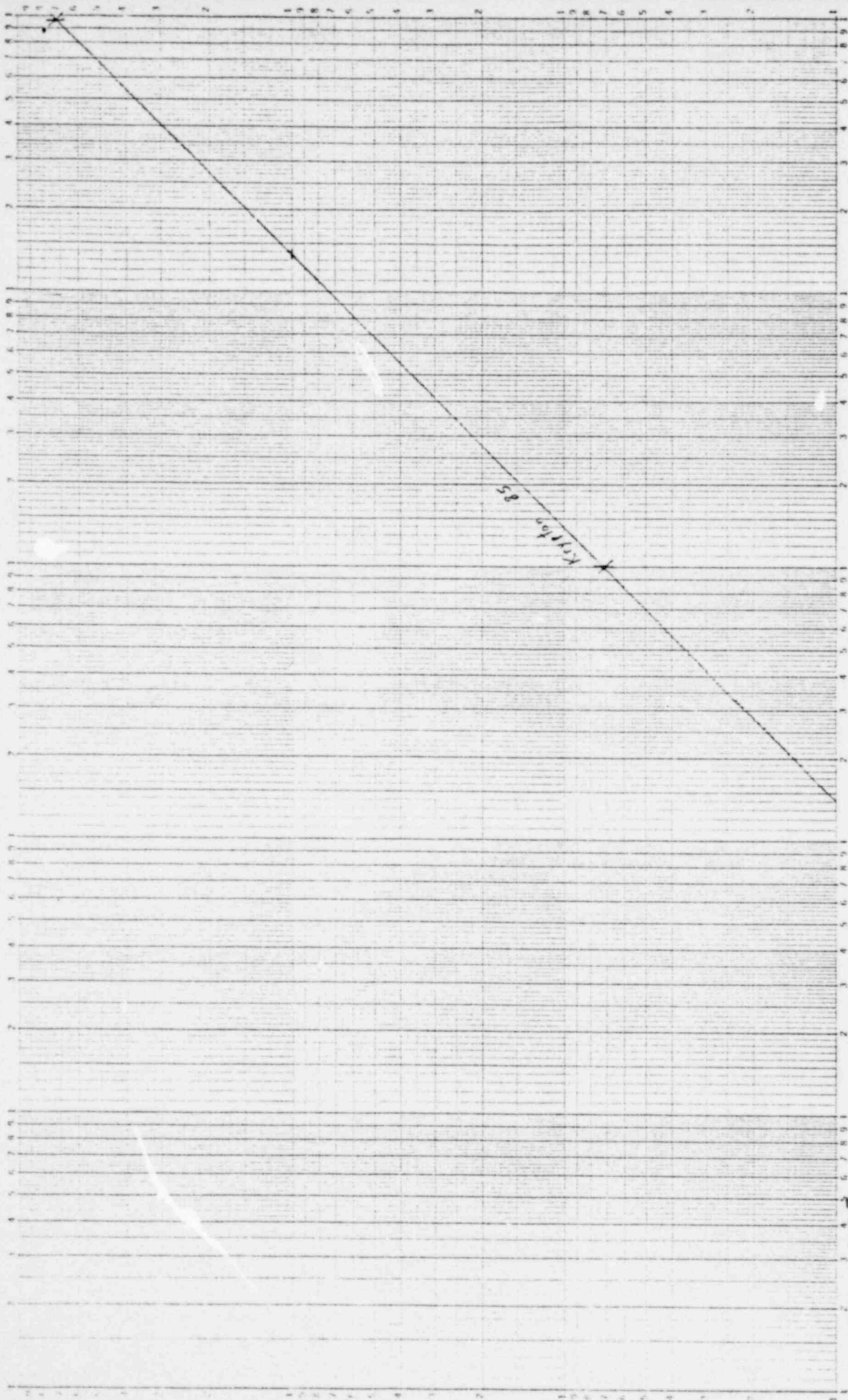
Counts vs. gpc

POOR ORIGINAL

K-M LOGGING  
AT 7020  
SHELTON, WISCONSIN

WASTE GAS

K 4830



2352 245

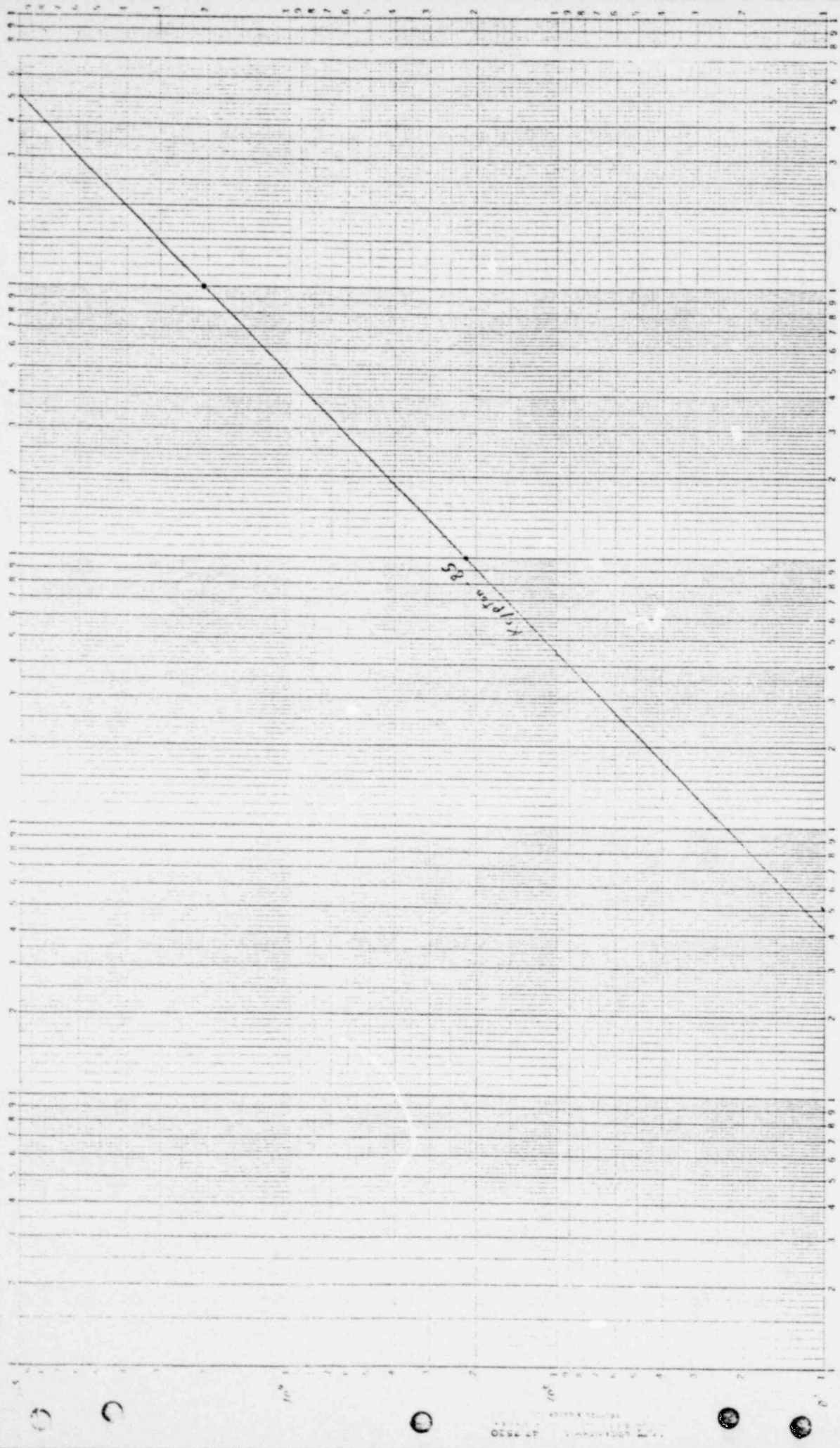
Count 16 4 1/2

POOR ORIGINAL

DO NOT WRITE IN THESE SPACES  
104  
105

MAIN CONDENSER AIR DISCHARGE

RL - 16.32



2352 246

Counts vs q/c/c

POOP ORIGINAL



TABLE 11.4-1 (Contd.)

Channel	Monitor	Type-Detector	Readout	MHL*	Set-point	Alarm & Control
<u>2RE-0645</u> <u>2RE-0646</u>	<u>Main condenser</u> <u>air discharge</u> <u>monitors</u>	Beta-Gamma sensitive GM tube	Log count ratemeters	1(-5) uCi/cc of Xe-133 in 2.5 mr/hr background	1(-4) uCi/cc	Alarm on high radiation and circuit failure
<u>2RE-2429</u>	<u>Waste gas moni-</u> <u>toring system</u>	"	log count ratemeter	1(-5) uCi/cc of Xe-133 in 2.5 mr/hr background	Variable set- point estab- lished after isotopic analy- sis	Alarm on high radiation and circuit failure terminates dis- charge
<u>2RE-8845</u> <u>2RE-8846</u>	<u>Penetration</u> <u>rooms monitoring</u> <u>system</u>	"	Log count ratemeter	1(-5) uCi/cc of Xe-133 in 2.5 mr/hr background	1(-4) uCi/cc	Alarm on high radiation and circuit failure
<u>2RE-8271-2</u> <u>2RE-8231-1</u>	<u>Hydrogen purge/</u> <u>containment</u> <u>atmosphere mon-</u> <u>itor</u>	Particulate: Gamma scintillation crystal, Gas: Beta-Gamma sensitive GM tube	Log count ratemeters	Particulate: 1.5(-10) uCi/cc of Cs-137, Gas: 1(-5) uCi/cc of Xe-133 in 2.5 mr/hr background	Variable set slightly above equilibrium background level	Alarm on high radiation and circuit failure
VENT MONITORING SYSTEM						
<u>2RE-8540</u>	<u>Fuel handling</u> <u>area ventila-</u> <u>tion monitor</u>	Beta-Gamma sensitive GM tube	Log count ratemeter	1(-5) uCi/cc of Xe-133 2.5 mr/hr background	1st alarm 1(-4) uCi/cc 2nd alarm 1(-3) uCi/cc	Alarm on high radiation and circuit failure

POOR ORIGINAL

2352 247

11.4-14

Amendment No. 38  
Date 30 1974

TABLE 11.4-1 (Contd.)

Channel	Monitor	Type-Detector	Readout	MDL*	Set-point	Alarm & Control	
<u>2RE-8542</u>	<u>Radwaste area ventilation monitor</u>	"	"	"	"	"	38
<u>2RE-8255</u>	<u>Containment purge monitor</u>	"	Log count ratemeter	1(-5) uCi/cc of Xe-133 in 2.5 mr/hr background	Variable dependent on meteorological conditions and Containment activity	Alarm on high radiation and circuit failure terminates containment purge	
<u>2RE-7828</u>	<u>Aux Bldg. extension ventilation monitor</u>	"	"	"	1(-4)uCi/cc	Alarm on high radiation and circuit failure	38
2RE-8750-1	Control room inlet air monitor	"	"	1 (-5) uCi/cc of Cs-137 with no lead shield.	Variable set slightly above equilibrium background level.	Alarm on high radiation and Circuit failure High alarm isolates control room.	25

\*MDL = Minimum Detectable Level

2352 248

POOR ORIGINAL

UNIT 2 G-M TUBES

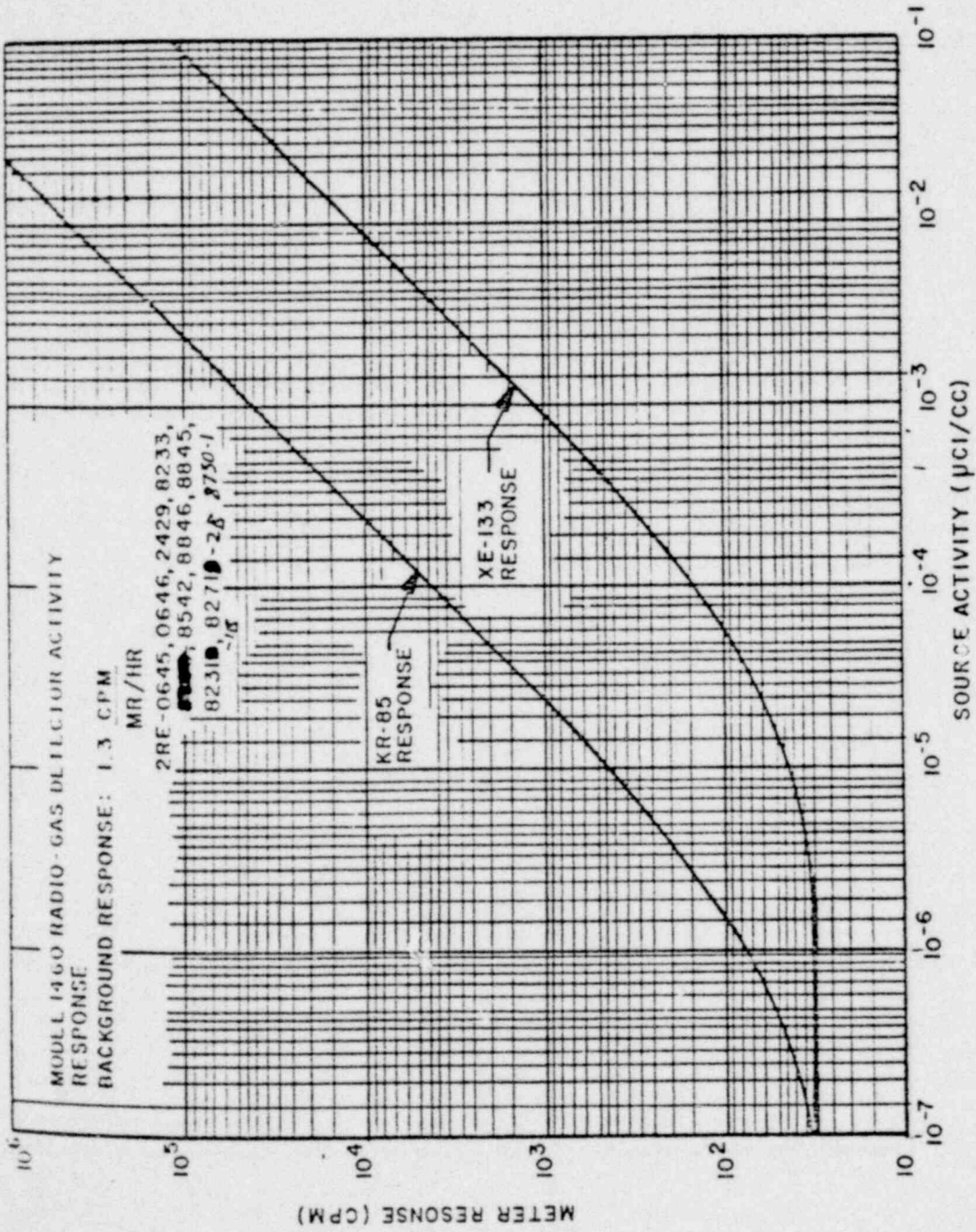


Figure 5-12. Kr-85 and Xe-133 Sensitivity Curves (Radio Gas Monitors)

2304.27 5-5-79 P. Nelson

POOR ORIGINAL

2352 249