

**MODERNIZATION  
OF  
VVER - 1000  
RADIATION MONITORING  
SYSTEMS**

**KOZLODUY 20<sup>TH</sup> ANNIVERSARY**

**OCTOBER 26<sup>TH</sup>, 1994**



***Sorrento Electronics***  
*A Subsidiary of General Atomics*



**Westinghouse Energy**  
Systems Europe S.A.

# INTRODUCTION

## PURPOSE

- COMPLY WITH INTERNATIONAL STANDARDS
- INTEGRATE INTO PLANT INFORMATION NETWORK
- REDUCE OPERATION & MAINTENANCE COST
- DELETE OBSOLETE COMPONENTS
- DECREASE NUMBER OF DETECTOR CHANNELS

## IMPLEMENTATION

- VVER - 1000 DESIGN
- STANDARDS
- SYSTEM ARCHITECTURE
- DISTRIBUTED PROCESSING UNIT (DPU)
- CENTRAL RADIATION PROCESSOR (CRP)
- LOCAL RADIATION PROCESSOR (LRP)
- VVER - 1000 SPECIFIC RADIATION MONITORING SYSTEMS



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# VVER - 1000 DESIGN

## SYSTEMS

- ACCIDENT LOCALIZATION (CONTAINMENT)
- BALANCE OF PLANT

## DETECTOR CHANNELS

Type	U.S.PWR <sup>1</sup>	Soviet PWR1
Gas	12	16
Iodine	1	4
Noble Gas	16	3
Particulate & Iodine	2	6
Liquid	16	17
Wide Range Gas	4	3
Area	138	237

NOTE<sup>1</sup> Typical Pressurized Water Reactors



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# STANDARDS

## INTERNATIONAL

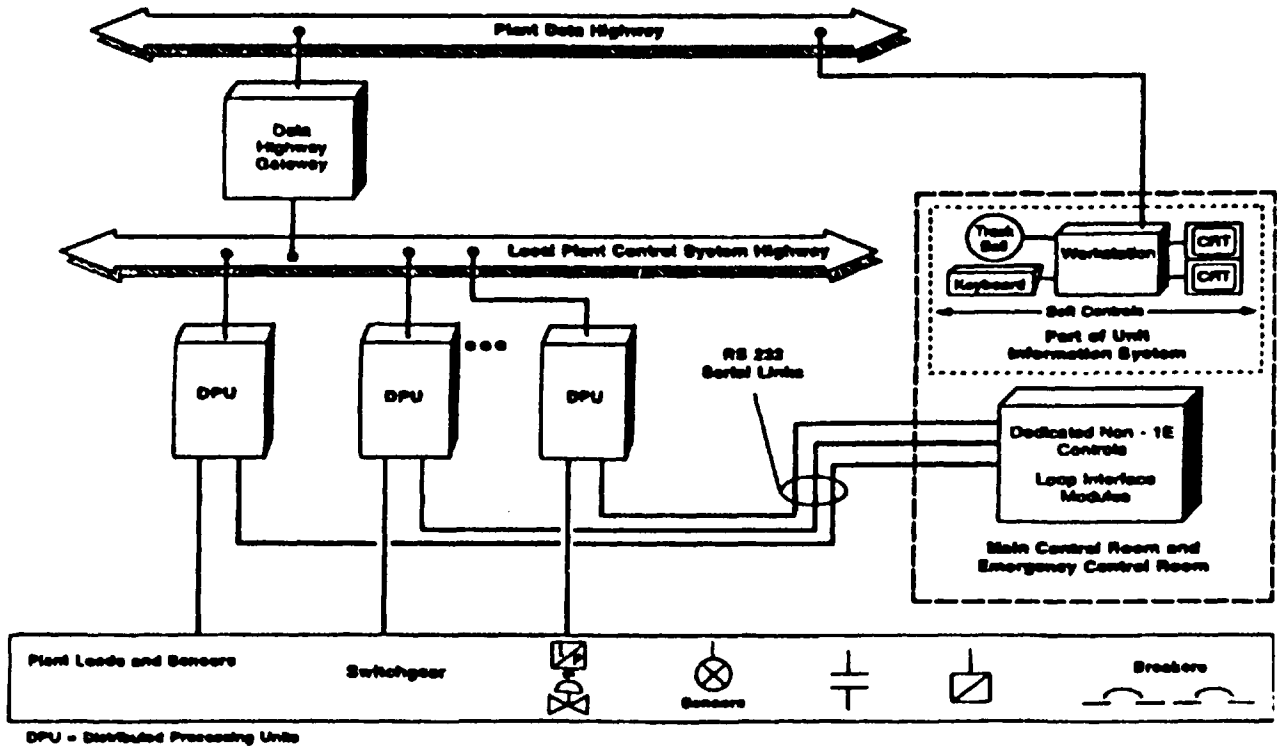
- INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
- INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
- UNITED STATES NUCLEAR REGULATORY COMMISSION (USNRC)

## NATIONAL

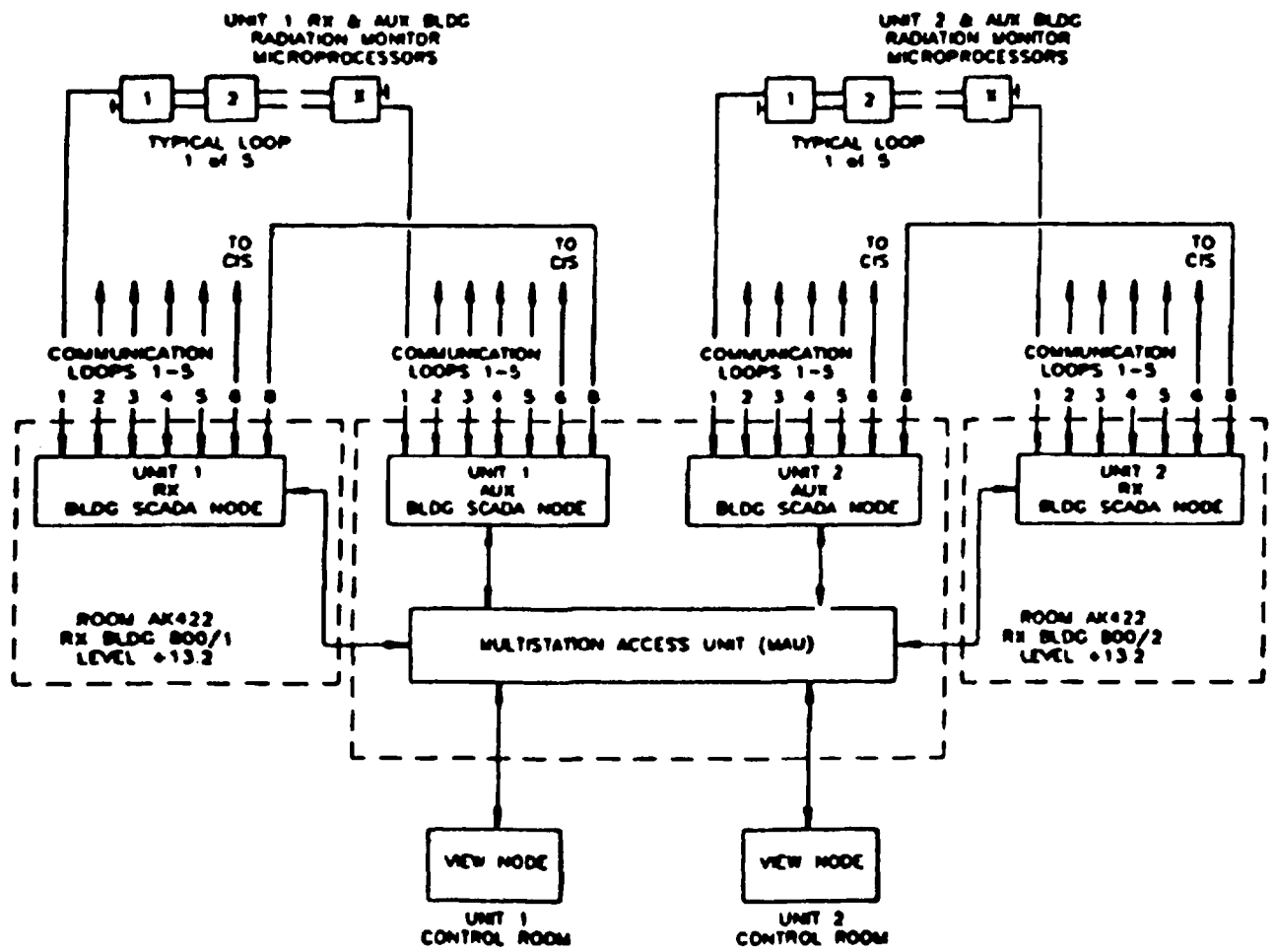
- NATIONAL REGULATORY AUTHORITY

## EQUIPMENT SPECIFICATION

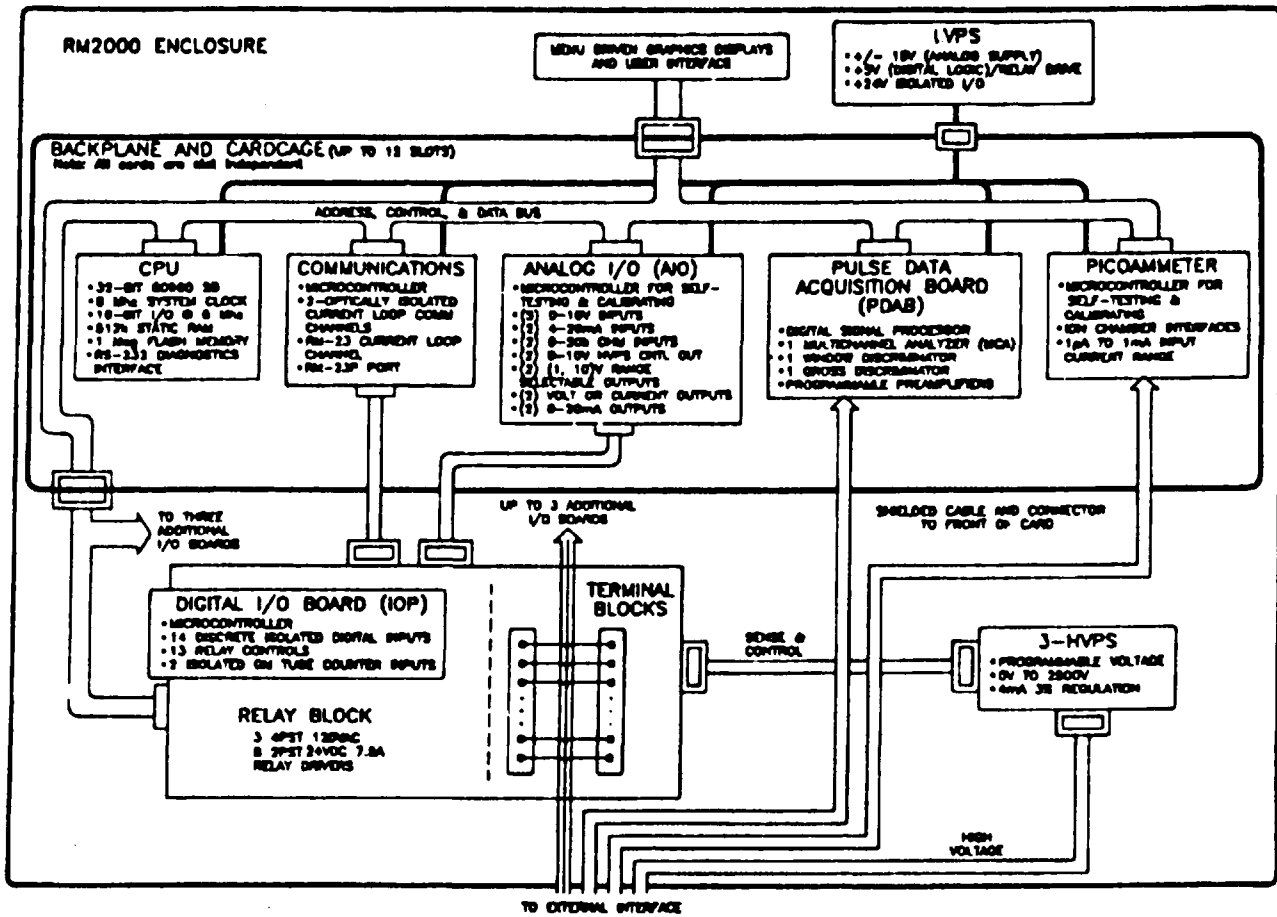
# I&C SYSTEM ARCHITECTURE



# DRAMS ARCHITECTURE



# LRP BLOCK DIAGRAM



# VVER - 1000 SPECIFIC DESIGN

- REACTOR BUILDING STACK
- HERMETIC ZONE
- WASTE WATER BASIN
- DISTRICT HEATING

## CONCLUSION

A DIGITAL RADIATION MONITORING SYSTEM (DRMS) WHICH MEETS INTERNATIONAL AND LOCAL REGULATIONS MAY BEINTEGRATED INTO A VVER - 1000 I&C MODERNIZATION PROGRAM. IF PLANNED AND IMPLEMENTED PROPERLY, THE I&C AND DRMS MODERNIZATION PROGRAM CAN PROVIDE COST SAVINGS BY REDUCING TIME REQUIRED TO ACCESS AND DISPLAY DATA AND REDUCE MAINTENANCE COST BY DELETING OBSOLETE PARTS AND DECREASING THE NUMBER OF DETECTOR CHANNELS.



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