

APPLICATION FOR LICENSE TO EXPORT NUCLEAR
MATERIAL AND EQUIPMENT (See Instructions on Reverse)

1. APPLICANT'S USE		a. DATE OF APPLICATION 6-18-79		b. APPLICANT'S REFERENCE QE-7926		2. NRC USE		a. LICENSE NO. XSNM01526		b. DOCKET NO. 11000685			
3. APPLICANT'S NAME AND ADDRESS						4. SUPPLIER'S NAME AND ADDRESS (Complete if applicant is not supplier of material)							
a. NAME Reuter-Stokes, Inc.						b. NAME							
b. STREET ADDRESS 18530 South Miles Parkway						b. STREET ADDRESS							
c. CITY Cleveland				STATE Ohio		ZIP CODE 44128		b. STREET ADDRESS					
d. TELEPHONE NUMBER (Area Code - Number - Extension) 216-475-3434						c. CITY		STATE		ZIP CODE			
5. FIRST SHIPMENT SCHEDULED		6. FINAL SHIPMENT SCHEDULED		7. APPLICANT'S CONTRACTUAL DELIVERY DATE		8. PROPOSED LICENSE EXPIRATION DATE		9. U.S. DEPARTMENT OF ENERGY CONTRACT NO. (If Known)					
10-11-79		10-11-79		10-11-79		12-11-79							
10. ULTIMATE CONSIGNEE						11. ULTIMATE END USE (Include plant or facility name).							
a. NAME Swedish State Power Board						In-core flux monitoring at Ringhals 1 Reactor							
b. STREET ADDRESS Ringhals Site						11a. EST. DATE OF FIRST USE April 1980							
c. CITY - STATE - COUNTRY Sweden						13. INTERMEDIATE END USE							
12. INTERMEDIATE CONSIGNEE						13a. EST. DATE OF FIRST USE							
a. NAME						15. INTERMEDIATE END USE							
b. STREET ADDRESS						15a. EST. DATE OF FIRST USE							
c. CITY - STATE - COUNTRY													
14. INTERMEDIATE CONSIGNEE						15. INTERMEDIATE END USE							
a. NAME													
b. STREET ADDRESS													
c. CITY - STATE - COUNTRY													
16. NRC USE		17. DESCRIPTION (Include chemical and physical form of nuclear material; give dollar value of nuclear equipment and components)				18. MAX. ELEMENT WEIGHT		19. MAX. WT. %		20. MAX. ISOTOPE WT.		21. UNIT	
		Reuter-Stokes LPRM Assembly as described on data sheet 9.12 Regenerative type U-234/U-235 mixture sensitive material. NRC amounts in blocks 18, 19, and 20 are for 5 LPRM assemblies.				27.5 mg		20% U-235 80% U-234		5.5 mg U-235 21.9 mg U-234		5 assemblies	
22. COUNTRY OF ORIGIN - SOURCE MATERIAL UNITED STATES						23. COUNTRY OF ORIGIN - SOURCE MATERIAL WHERE ENRICHED OR PRODUCED UNITED STATES							
24. COUNTRIES WHICH ATTACH SAFEGUARDS (If Known)													
25. ADDITIONAL INFORMATION (Use separate sheet if necessary)						7907230162X							
26. The applicant certifies that this application is prepared in conformity with Title 10, Code of Federal Regulations, and that all information in this application is correct to the best of his/her knowledge.						511-152							
27. AUTHORIZED OFFICIAL				a. SIGNATURE Joseph D. Skarupa				b. TITLE Joseph D. Skarupa, Sales Manager					

RS-C6-1100 Local Power Range Monitor (LPRM) Assembly

For
use in your
General Electric Company
Design BWR

The RS-C6-1100 is Reuter-Stokes' proven LPRM assembly which is electrically and mechanically interchangeable with the General Electric Company design for BWR core instrumentation.

The assembly including fission chambers, calibration tube, plunger, seal plug and gland is to the exact dimensions required for direct replacement in the core support structure of all BWR reactors using standard removal and replacement procedures.

Reuter-Stokes has extensive experience in the design and manufacture of miniature fission chambers of the type used in the LPRM assembly. Features incorporated into the design are based on our experience as well as the need to provide an interchangeable unit. In addition the design has been thoroughly tested in BWR operation.

State of the art welding and ceramic to metal bonding is used throughout the detector manufacture. Particular care has been taken in the design and manufacture of the seal between detector and detector lead cable.

Design of the Reuter-Stokes' LPRM conforms to the ASME Boiler and Pressure Vessel Code. Manufacture and testing is to meet the requirements of Class 1E Safety Related Nuclear Instrumentation. The company is listed as a qualified supplier in the U.S. register of the Coordinating Agency for Supplier Evaluation (CASE) and the USNRC report on License Contractor and Vendor Inspection Status.

The LPRM assembly adds another member to our family of products for in-core instrumentation for CANDU, PWR and BWR Reactors.

The products include many designs of self-powered detectors, travelling in-core fission chambers and LPRM assemblies.

Our 20 years of experience with the diverse approaches to in-core neutron and gamma measurement have given us a great depth of applications knowledge, manufacturing capability and performance experience. Our goal is to have the name Reuter-Stokes synonymous with in-core radiation measurement.

Specifications

MECHANICAL

See sketch (on front side) for a brief overall outline of mechanical configuration. Detailed drawings are supplied with each offer and with each shipment.

MATERIAL

All materials are in conformance with required codes for in-core safety related equipment. Following are specifications on certain key materials:

Assembly housing	304 Stainless steel
Detector: Outer shell	304L Stainless steel
Inner electrode	Titanium
Detector coaxial cable:	
Outer sheath	304L Stainless steel
Center wire	304L Stainless steel
Insulation: Of detector	High purity Aluminum Oxide
Of detector cable	High purity Aluminum Oxide
Of connector	Rexolite
Neutron sensitive material	Uranium >90% enriched in ²³⁵ U

TYPICAL OPERATING CHARACTERISTICS

(Each of four detectors in the assembly).

Thermal neutron sensitivity:

In BWR Spectrum 1×10^{-17} amp/nv $\pm 20\%$

(To 1.5×10^{-17} amp/nv on request)

Thermal neutron flux range 1.4×10^{12} to 1.4×10^{14} nv

Gamma sensitivity 2×10^{-14} amp/R/hr $\pm 20\%$

Deviation of neutron signal from

linearity at nominal voltage $\pm 1\%$

Operating voltage: Range < 200V

Nominal 100V

Burn-up life 2.5 years @ 6.7×10^{13} n/cm² sec⁻¹
in a BWR spectrum

This value corresponds to a sensitivity reduction to 5:1 of neutron to gamma signal.

Impedance:

Resistance @ 25° C $> 1 \times 10^{12}$ ohms (w/o connector)

Resistance @ 400° C $> 1 \times 10^7$ ohms (w/o connector)

Capacitance: Cable ~ 300 pf/meter

MAXIMUM RATINGS

Voltage 200V

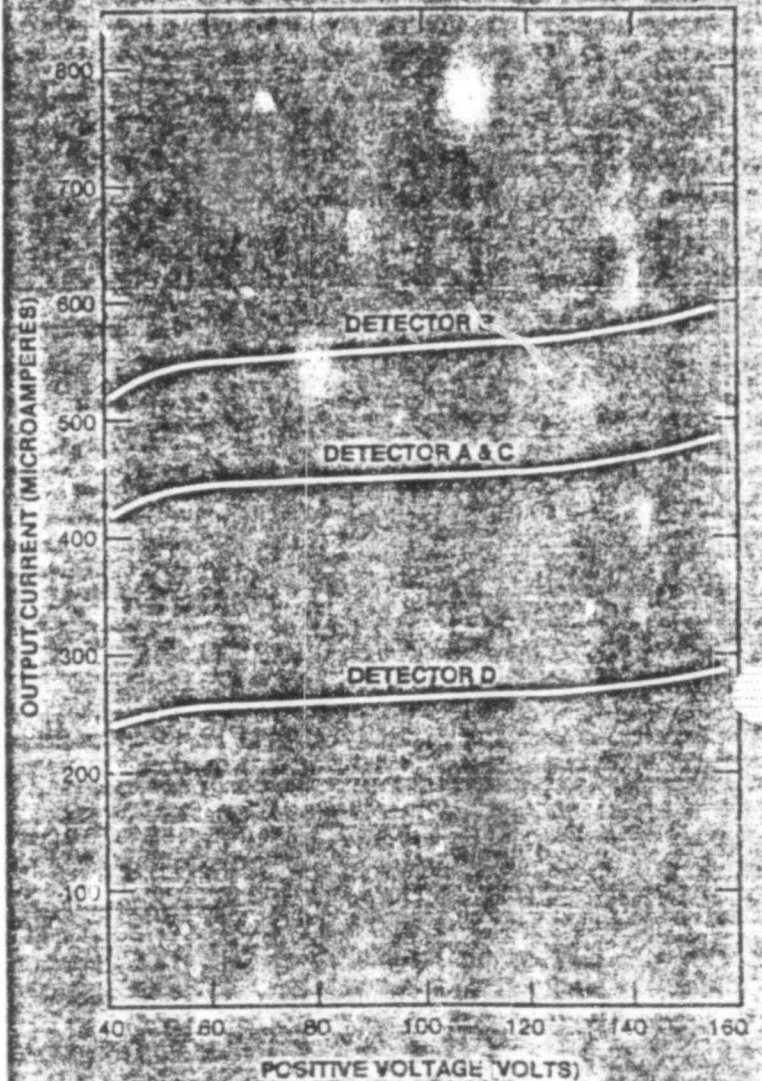
Design Temperature: (Continuous) 600°F

Design pressure: (External) 250 psig (nominal)

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TYPICAL SATURATION CHARACTERISTICS
(REACTOR AT 100% POWER)



reuter **RS** stokes

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