

MEMORANDUM FOR: Patricia Larkins  
Division of Technical Information  
and Document Control, ADM

FROM: Leon L. Beratan, Chief  
Earth Sciences Branch  
Division of Radiation Programs  
and Earth Sciences, RES

SUBJECT: TRANSMITTAL OF NUREG/CR-4502, "VIRGINIA REGIONAL SEISMIC  
NETWORK" FINAL REPORT (1977-1985)

Leon L. Beratan, Chief  
Earth Sciences Branch  
DRPES/RES

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PDR NUREG  
CR-4502 C PDR

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3. TITLE AND SUBTITLE (State in full as shown on document)		2. DISTRIBUTION CATEGORY NO. (If any)	Insert appropriate number from the NRC Distribution Category List (see NUREG 0550)						
<b>Virginia Regional Seismic Network: Final Report (1977-1985)</b>		<b>RA</b>	<b>RA</b>						
4. AUTHORS (If more than three, name first author followed by "and others")  <b>G. A. Bollinger and others</b>									
5. NAME OF CONTRACTOR  <b>Virginia Polytechnic Institute and State University</b>		MAILING ADDRESS (Number and street, city, state and zip code)  <b>Blacksburg, VA 24061</b>							
6. DATE MANUSCRIPT COMPLETED  <b>Dec. 1985</b>	7. NRC PROGRAM SPONSOR, TECHNICAL MONITOR  <b>Andrew J. Murphy</b>	TELEPHONE NO.  <b>(301) 427-4078</b>							
8. CONTRACT DATA a. CONTRACT OR FIN NUMBER (Do not list DOE contract numbers) <b>NRC-04-77-134/B6249</b> b. IF CONTRACTOR IS AUTHORIZED TO PRINT, PLEASE PROVIDE THE FOLLOWING INFORMATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-bottom: 1px solid black;">Number of Copies Printed</td> <td style="width: 33%; border-bottom: 1px solid black;">Estimated Composition Cost</td> <td style="width: 33%; border-bottom: 1px solid black;">Estimated Printing Cost</td> </tr> <tr> <td style="height: 20px;"></td> <td></td> <td></td> </tr> </table>				Number of Copies Printed	Estimated Composition Cost	Estimated Printing Cost			
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<b>50 copies to G. A. Bollinger 15 copies to A. J. Murphy</b>									
11. PATENT CLEARANCE (If applicable)  Forward completed, signed NRC Form 426A together with the related documents for review. TO: Appropriate Patent Counsel		12. SUBMITTED BY a. NAME OF AUTHORIZED CONTRACTOR OFFICIAL OR NRC MONITOR (Type or print)  <b>Leon L. Beratan</b>							
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d. PATENT COUNSEL'S SIGNATURE	DATE	SIGNATURE (Authorized contractor official or NRC Monitor)  <b>Leon L. Beratan</b>	DATE  <b>1-10-86</b>						

NRC FORM 335 (2-84) NRCM 1102 3201, 3202		U.S. NUCLEAR REGULATORY COMMISSION		1. REPORT NUMBER (Assigned by TIDC add Vol. No. if any)  CR-4502					
2. TITLE AND SUB-TITLE  Virginia Regional Seismic Network: Final Report (1977-1985)				3. LEAVE BLANK					
5. AUTHOR(S)  G. A. Bollinger, J. A. Snoke, M. S. Sibol & M. C. Chapman				4. DATE REPORT COMPLETED <table border="1"> <tr> <td>MONTH</td> <td>YEAR</td> </tr> <tr> <td>December</td> <td>1985</td> </tr> </table>		MONTH	YEAR	December	1985
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7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)  Seismological Observatory Virginia Polytechnic Institute & State University Blacksburg, VA 24061				6. DATE REPORT ISSUED <table border="1"> <tr> <td>MONTH</td> <td>YEAR</td> </tr> <tr> <td>February</td> <td>1986</td> </tr> </table>		MONTH	YEAR	February	1986
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10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)  Earth Sciences Branch DRPES/RES U.S. Nuclear Regulatory Commission Washington, D.C. 20555				8. PROJECT/TASK/WORK UNIT NUMBER  B6249					
12. SUPPLEMENTARY NOTES				9. FIN OR GRANT NUMBER  B6249					
13. ABSTRACT (200 words or less)  <p>Eight years of monitoring with a 20-station regional network has produced epicenters (<math>M &lt; 4</math>), focal depths and mechanisms of adequate number and quality to reveal considerable differences between the two seismically active portions of Virginia. Those two areas (southwestern (Giles County) and central parts of the state) are separated by only some 200 km. Despite their proximity, the two zones exhibit remarkable differences in geometrical/mechanical characteristics. In Giles County, seismic energy is released by predominately strike-slip faulting in a near vertical, tabular zone (~ 40 km long) that is below the Appalachian decollement. In central Virginia, the seismicity is derived from mixed dip-slip and strike-slip faulting in a large, coin shaped volume (~ 100 km diameter; ~ 10 km vertical thickness), above the major detachment faulting. Stress estimates, as derived from single- and composite-focal mechanism solutions P-axes, are NE to ENE in Giles County and NW to NE in central Virginia.</p> <p>The causes for the observed variability are unknown. The two zones are in different tectonostratigraphic (suspect) terranes and that difference could be relevant. The recently proposed Hydroseismicity model (Costain and Bollinger, 1985) ascribes the observed seismicity variations in Virginia and throughout the Southeast to different drainage basin hydrologic characteristics plus differences in upper crustal fracturing.</p>				11. TYPE OF REPORT  Final Technical 12. PERIOD COVERED (Inclusive dates)  1977-1985					
14. DOCUMENT ANALYSIS - a. KEYWORDS/DESCRIPTORS  Seismicity Giles County Earthquakes				15. AVAILABILITY STATEMENT					
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JAN 14 1986

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Transmitted herewith is the camera ready copy of the subject report for publication as a NUREG document. Also enclosed are completed NRC forms 335 and 426A. Please include the contract number, NRC-04-77-134, on the title page.

*Leon L. Beratan*

Leon L. Beratan, Chief  
Earth Sciences Branch  
DRPES/RES

Enclosures:  
3, as stated

Contact: A. Murphy  
42-74078

*PDR*

NRC FORM 335 (2-84) NRCM 1102, 3201, 3202 SEE INSTRUCTIONS ON THE REVERSE		U.S. NUCLEAR REGULATORY COMMISSION <b>BIBLIOGRAPHIC DATA SHEET</b>		1. REPORT NUMBER (Assigned by TIDC, add Vol. No., if any) CR-4502	
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NRC FORM 426A  
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TELEPHONE NO.

6. DATE MANUSCRIPT  
COMPLETED

Dec. 1985

7. NRC PROGRAM SPONSOR/TECHNICAL MONITOR

Andrew J. Murphy

TELEPHONE NO.

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427-4078

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a. NAME OF AUTHORIZED CONTRACTOR OFFICIAL OR NRC MONITOR (Type or print)

Leon L. Beratan

b. OFFICIAL'S ORGANIZATIONAL UNIT

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Leon L. Beratan

DATE

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