NATIONAL RESEARCH COUNCIL
COMMISSION ON ENGINEERING AND TECHNICAL SYSTEMS
GEOTECHNICAL BOARD
U.S. NATIONAL COMMITTEE FOR ROCK MECHANICS

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2 February, 1994

Dr Jose Delgado Rodrigues
Secretary-General, ISRM
Laboratorio Nacional de Engenharia Civil
101 Av. do Brasil
P-1799 Lisboa Codex
PORTUGAL

Dear Dr Rodrigues:

Nomination of Dr Neville G.W. Cook for the Muller Award

By this letter, the U.S. National Committee for Rock Mechanics nominates Dr Neville G.W. Cook for the 1995 Muller Award. As required under By-Law No. 8 of the ISRM, we support this nomination with a 1000-word description of Dr Cook's achievements and contributions to Rock Mechanics and Rock Engineering and a list of Dr Cook's publications.

Dr Cook's address is:

Dr N.G.W. Cook
Professor of Mining Engineering
Department of Materials Science and Mineral Engineering
University of California
Hearst Mining Building
Berkeley, CA 94720
U.S.A.

The address of the nominating group is provided at the head of this letter.

Yours sincerely,

B. H. Brady.

B H Brady
Chairman

c. P Smeallie/D Mani, GeoBoard

Neville G. W. Cook is the first holder of the Distinguished Donald McLaughlin Chair in Mineral Engineering in the University of California at Berkeley, as well as being Professor of Civil Engineering. He has also been Chairman of the Faculty of the College of Engineering and is a Faculty Senior Scientist in the Earth Sciences Division of the Lawrence Berkeley Laboratory of the University of California.

Neville Cook began his career in rock mechanics and rock engineering by pioneering the development and use of full-waveform, continuous -recording, multi-channel, three dimensional seismic networks to study the phenomenon of rockbursts in deep-level mines in South Africa. This seminal work led to the concept of energy release rates to analyse the stability of deep mine excavations. Professor Alexander M. Linkov of the Institute for Engineering Economics in St Petersburg, Russia, stated "The drastic step was due to N.G.W.Cook. He was the first to use results of rock *post-failure* tests to get a *quantitative* relation that described a rockburst as the loss of stability. His magnificent paper of 1965 was thus titled: "A note on rockbursts considered as a problem of stability ." To-day, thirty years later the concept of energy-release-rates is still the basis of the state-of- the- art in the design of deep-level mines.

In 1962/63 Dr Cook worked at the Australian National University in Canberra with the late Professor J.C. Jaeger. This led to the writing of the classic textbook *Fundamentals of Rock Mechanics* originally published in 1969, now in its Third Edition which has also been translated into Chinese and Japanese. Professor Jaeger and Dr Cook were the second recipients of the American Institute of Mining Engineers Rock Mechanics Award in 1969.

Professor Charles Fairhurst invited Dr Cook to spend 1963/64 as a Visiting Assistant Professor at the University of Minnesota. It was here that Professor Cook began his study of complete stress-strain curves for rocks using a stiffened testing machine to measure strain-softening deformation. His 1965 paper on "The Failure of Rock" was the first to analyse the influence of cracks on both the effective moduli as well as the strength of rock and led to the use of the a Griffith locus to describe strain-softening in rocks.

In 1964 Dr. Cook was appointed the first Director of the Mining Research Laboratory (MRL) of the Chamber of Mines of South Africa, as position he held for twelve years. During this period the MRL became recognized as one of the world leaders in mining research, particularly in rock mechanics and rock engineering . Among the many significant contributions to rock mechanics and rock engineering were the development of computer methods (initially analogue and subsequently digital) to design mine layouts, making use of energy release rates, and the development of rapid-yielding hydraulic props for stope support against rockbursts. Over the decades these developments saved the lives and limbs of thousands of miners. For this work in 1971 Dr Cook and Dr M.D.G.

Salamon shared the Gold Medal of the Associated Scientific and Technical Societies of South Africa, that country's premier national award for outstanding contributions to science and technology.

Professor Cook has served as Chair of the U.SNational Committee for Rock Mechanics. In 1988 Professor John Kemeny and he received the Basic Research Award of that Committee for their paper on "Effective Moduli, Non-Linear Deformation and Strength of a Cracked Elastic Solid", and in 1991 Professor Laura Pyrak-Nolte, Dr Larry R. Myer and Professor Cook again shared the Basic Research Award for their paper on "Transmission of Seismic Waves Across Single Natural Fractures". Two of Professor Cook's students have won the PhD Thesis Award of the U.S. National Committee for Rock Mechanics. In 1991 Dr Russell T. Ewy received this Doctoral Award for his thesis entitled "Deformation and Fracture Around Cylindrical Openings in Rock" and in 1993 Dr. Kurt Nihei received the same Award for his thesis on the "Micromechanics of Seismic Wave Propagation in Granular Rocks". Professor Cok was a member of the Commission on Rock Joints of the International Society for Rock Mechanics and a Member of the Organizing Committee for the Rock Joints Meeting in Loen, Norway and Lake Tahoe, California.

Professor Cook's many contirbutions to rock mechanics and rock engineering flow from two sources. First, unselfish co-operation with his collegues particularly the late Professor John Jaeger, Professor Charles Fairhurst, Professor Miklos Salamon, Professor Richard Goodman, Dr Larry Myer, Professor John Kemeny, and Professor Laura Pyrak-Nolte , among many other collegues and students. Second, emphasis on fundamental understanding of the physical and chemical process that determine the behavior and properties of rock as the basis for sound, economic solutions to problems in rock engineering.

Many seminal contributions both in the fields of fundamental rock mechanics and applied rock engineering have been made, and continue to be made by Professor Cook and his collegues and students. These contributions include experimental, analytical and numerical studies of the basic micromechanics of deformation and failure in rocks; the application of seismic methods to rock mechanics involving both field problems as well as fundamental studies of seismic wave propagation in rock and across discontinuities in rocks; fluid flow in porous rocks and, particularly, fluid flow through rock fractures; rock failure and the stability of excavations and boreholes; the support of underground excavations, and the design of deep mines and nuclear waste repositories.

The Jaeger Memorial Dedication Lecture was given by Professor Cook during the 29th U.S. Rock Mechanics Symposium at the University of Minnesota on "Natural Joints in Rock: Mechanical, Hydraulic and Seismic Behavior and Properties under Normal

Stress". This important lecture introduced new paradigms in understanding fluid flow through fractures and the effects of fractures on seismic wave propagation.

In 1988 Professor Cook was elected a Member of the U.S. National Academy of Engineering "*For pioneering work on rockbursts, major contributions to rock mechanics, design of deep mines, and undergound nuclear waste repositories*". He has twice served as Chair of the Petroleum, Mining and Geological Engineering Section of the National Academy of Engineering.

Resumé

Neville G. W. Cook

Department of Materials Science and Mineral Engineering
and
Earth Sciences Division, Lawrence Berkeley Laboratory
University of California, Berkeley

Fields

Rock Mechanics, Waste Disposal, Fracture Mechanics, Geophysics, Petroleum Engineering, Mining Engineering

Born

January 29, 1938; U. S. Citizen, September 18, 1984

Education

B.Sc. Engineering, University of Witwatersrand (1959)

Ph.D. Geophysics, University of Witwatersrand (1962)

Professional Experience

1959-1962	Research Assistant, Bernard Price Institute of Geophysical Research, University of Witwatersrand, Johannesburg.
1962-1963	Research Fellow, Department of Geophysics and Geochemistry, Australian National University, Canberra.
1963-1964	Visiting Assistant Professor, School of Mineral and Metallurgical Engineering, University of Minnesota, Minneapolis.
1964-1974	First Director of the Mining Research Laboratory of the Chamber of Mines of South Africa.
1968-present	Adjunct Professor, Department of Civil and Mineral Engineering, University of Minnesota.
1974-1976	Research and Development Consultant to the Chamber of Mines of South Africa.
1976-present	Professor, Department of Materials Science and Mineral Engineering, University of California at Berkeley.
1976-present	Faculty Senior Scientist, Earth Sciences Division, Lawrence Berkeley Laboratory, University of California at Berkeley.
1988-	Donald H. McLaughlin Professor of Mineral Engineering, Department of Materials Science and Mineral Engineering, University of California at Berkeley.

1988-1990	Chairman of the Faculty of the College of Engineering, University of California at Berkeley.
1990-	Vice Chair, Department of Materials Science and Mineral Engineering, University of California at Berkeley.
1989-1991	Chair, Committee on Research, Berkeley Division of the Academic Senate.
1987-1989	Member, Committee on Research, Berkeley Division of the Academic Senate.
1989-1993	Member, Divisional Council, Berkeley Division of the Academic Senate.
1988-1990	Director, Berkeley Engineering Fund.
1988-1990	Director, Berkeley Engineering Alumni Society.

Professional Society and Related Activities

Member, National Academy of Engineering.

Chair, Petroleum, Mining and Geological Engineering Peer Committee, National Academy of Engineering, 1991-92

Vice Chair, Committee on Membership, National Academy of Engineering, 1993

Member, Membership Policy Committee, National Academy of Engineering, 1993

Distinguished Member, American Institute of Mining, Metallurgical and Petroleum Engineers.

Member, Society of Petroleum Engineers.

Member, American Geophysical Union.

Member, International Society of Rock Mechanics.

Member, Materials Research Society.

Member, Seismological Society of America.

Member, American Association for the Advancement of Science.

Editorial Advisor, International Journal Rock Mechanics Mining Sciences and Geomechanics Abstracts, 1963-present.

Associate Editor, Journal of Geophysical Research, 1978-80.

Member, Editorial Board, International Journal of Geotechnical and Geological Engineering, 1983-present.

Member, Advisory Editorial Board, International Journal of Mining and Geological Sciences, 1990-present.

Member, Panel on the Implementation Requirements of Environmental Standards (PIRES) Committee on Radioactive Waste Management, National Research Council, National Academy of Sciences. (1977-78)

Chairman, National Materials Advisory Board (NMAB) Committee on Measurement and Control of Respirable Dust in Mines, National Research Council, National Academy of Sciences (1979-1980).

Member, Panel on the Waste Isolation Pilot Plant (WIPP) of the Committee on Radioactive Waste Management, National Research Council, National Academy of Sciences. (1979-84)

Member, U. S. National Committee for Rock Mechanics Panel for Defining Critical Rock Mechanics Research Requirements, Subpanel on Rock Fragmentation and Drilling, National Research Council, National Academy of Sciences. (1979-80)

Chairman, U. S. National Committee for Rock Mechanics Panel on Domestic and International Activities, National Research Council, National Academy of Sciences. (1979-80)

Chairman, U.S. National Committee for Rock Mechanics, National Research

Council, National Academy of Sciences. (1980-81)

Member, Society of Civil Engineers, Underground Technology Research Council, Technical Committee on Rock Strata Control. (1979-84)

Member, Policy Board University of California, Davis-NASA/AMES-NSF

Centrifuge Facility for Research in Geotechnical Engineering. (1978-1982)

Member, Office of Nuclear Waste Isolation Earth Sciences Review Group, Battelle, Columbus, Ohio (1979-83)

Member, Geosciences Advisory Panel. Los Alamos Scientific Laboratory, Los Alamos, New Mexico. (1980-1984)

Member, Office of Nuclear Waste Isolation, Engineering Review Group. (1983-87)

Chairman, Workshop on The Containment of Underground Nuclear Explosions, Office of Technology Assessment, Congress of the United States, 1988.

Member, Geomechanics Committee of the American Society of Mechanical Engineers.

Member, Methodology Development Team, Electric Power Research Institute, 1990-present.

Member, Commission on Rock Joints, International Society for Rock Mechanics, 1989-1992.

Member, Board on Earth Sciences and Resources, NAS/NRC, 1992-present.

Awards

The Central Mining - Rand Mines Award of the South African Institution of Mechanical Engineers (with J. P. M. Hojem) 1966.

Research Medal of the South African Institution of Mechanical Engineers (with J. P. M. Hojem) 1968.

American Institute of Mining and Metallurgical Engineers Rock Mechanics Award (with Professor J. C. Jaeger) 1969.

Gold Medal of the Associated Scientific and Technical Societies of South Africa (with Dr. M. D. G. Salamon). This is South Africa's Premier award for outstanding contributions to science and technology, 1971.

Research Medal of the South African Institution of Mechanical Engineers (with J. P. M. Hojem and C. Heins) 1975.

The Rand Mines Award of the Institution of Mechanical Engineers, 1975.

Distinguished Member, Society of Mining Engineers of the American Institute of Mining Metallurgical and Petroleum Engineers.

Elected to National Academy of Engineering, 1988.

Basic Research Award, U. S. National Committee for Rock Mechanics, (with J. Kemeny) 1988.

Jaeger Memorial Dedication Lecture, 29th U. S. Symposium on Rock Mechanics, University of Minnesota, June 1988.

Basic Research Award, U. S. National Committee for Rock Mechanics (NAS/NRC) (with L. J. Pyrak-Nolte and L. R. Myer) 1991.

Selected Publications - N. G. W. Cook

Books

Fundamentals of Rock Mechanics, J. C. Jaeger and N. G. W. Cook, First Ed., 1969, Methuen and Co., Ltd., London, Second Ed., 1976, Chapman and Hall, London, John Wiley and Sons, New York, Third Ed., 1979, Chapman and Hall, London, 593 pp.

Refereed Journals and Proceedings

1. J. C. Jaeger and N. G. W. Cook, "Pinching off and disking of rock," *J. Geophys. Res.*, Vol. 68, pp. 1759-65 (1963).

2. N. G. W. Cook, "The seismic location of rockbursts," Proceedings of the Fifth Rock Mechanics Symposium, Oxford, Pergamon Press, pp. 493-516 (1963).

3. N. G. W. Cook, "The basic mechanics of rockbursts," *J. S. Afr. Inst. Min. Metall.*, Vol. 64, No. 3, pp. 71-81 (1963).

4. J. C. Jaeger and N. G. W. Cook, "Theory and application of curved jacks for measurement of stresses," in *State of Stress in the Earth's Crust*, William R. Judd, ed., New York, Elsevier, pp. 381-395 (1964).

5. N. G. W. Cook, "The application of seismic techniques to problems in rock mechanics," Int. J. Rock Mech. Min. Sci., Vol. 1, pp. 169-179 (1964).

6. W. D. Ortlepp and N. G. W. Cook, "The measurement and analysis of the deformation around deep, hard-rock excavations," Proceedings Fourth International Conference on Strata Control and Rock Mechanics, Henry Krumb School of Mines, Columbia University, New York, pp. 140-152 (1964).

7. N. G. W. Cook, "A note on rockbursts considered as a problem of stability," *J. S. Afr. Inst. Min. Metall.*, Vol. 65, pp. 437-446 (1965).

8. N. G. W. Cook and K. Hodgson, "Some detailed stress-strain curves for rocks," *J. Geophys. Res.*, Vol. 70, No. 12, pp. 2883-2888 (1965).

9. N. G. W. Cook, "The failure of rock," *Int. J. Rock Mech. Min. Sci.*, Vol. 2, pp. 389-403 (1965).

10. N. G. W. Cook, E. Hoek, J. P. G. Pretorius, W. D. Ortlepp, and M. D. G. Salamon, "Rock mechanics applied to the study of rockbursts," *J. S. Afr. Inst. Min. Metall.*, Vol. 66, pp. 435-528 (1966).

11. G. A. Wiebols and N. G. W. Cook, "An elementary analysis of the displacements generated in rock by a linear explosive charge," *J. S. Afr. Inst. Min. Metall.*, Vol. 66, pp. 97-108 (1965).

12. C. Fairhurst and N. G. W. Cook, "The phenomenon of rock splitting parallel to the direction of maximum compression in the neighborhood of a surface," Proceedings First Congress of the International Society of Rock Mechanics,

Lisbon, pp. 687-692 (1966).

13. N. G. W. Cook and J. P. M. Hojem, "A rigid 50-ton compression and testing machine," *S. Afr. Mech. Eng.*, Vol. 16, pp. 89-92 (1966).

14. N. G. W. Cook, "The design of underground excavations," Proceedings Eighth Symposium on Rock Mechanics, University of Minnesota, in Failure and Breakage of Rock, ed. C. Fairhurst, pp. 167-193 (1967).

15. N. G. W. Cook, H. G. Denkhaus, W. S. Rapson, "Deep-level mining research in South Africa," *Fifth International Mining Congress*, Moscow (1967).

16. G. A. Wiebols and N. G. W. Cook, "An energy criterion for the strength of rock in polyaxial compression," *Int. J. Rock Mech. and Min. Sci.*, Vol. 5, pp. 529-549 (1968).

17. N. G. W. Cook, "The impact of modern advances in technology on mining and ventilation techniques: The basis of new mining systems," *J. Mine Vent. Soc. S. Afr.*, Vol. 21, pp. 149-153 (1968).

18. J. P. M. Hojem and N. G. W. Cook, "The design and construction of a triaxial and a polyaxial cell for testing rock specimens," S. Afr. Mech. Eng., Vol. 18, pp. 57-61 (1968).

19. G. A. Wiebols, J. C. Jaeger, N. G. W. Cook, "Rock property tests in a stiff testing machine," Proceedings Tenth Rock Mechanics Symposium, University of Texas, Austin, pp. 297-329 (1968).

20. N. G. W. Cook, N. C. Joughin, G. A. Wiebols, "Rockcutting and its potentialities as a new method of mining," *J. S. Afr. Inst. Min. Metall.*, Vol. 68, pp. 435-454 (1968), Vol. 69, pp. 266-271 (1969).

21. N. G. W. Cook, D. A. Immelman, M. Mrost, "Economic factors affecting planning research and development for large South African gold mines," Proceedings Ninth Commonwealth Mining and Metallurgical Congress (1969), *Inst. of Min. and Metall.*, Vol. 1, pp. 235-258 (1970).

22. N. G. W. Cook, "Analysis of hard-rock cuttability for machines," Proceedings Conference on Tunnelling and Shaft Sinking, University of Minnesota, Minneapolis (1968), in *Rapid Excavation - Problems and Progress*, ed. D. H. Hardley, American Institute of Mining Engineers, pp. 39-54 (1970).

23. N. G. W. Cook and N. C. Joughin, "Rock fragmentation by mechanical, chemical and thermal methods," Proceedings Sixth International Mining Congress, Madrid (1970).

24. K. Hodgson and N. G. W. Cook, "The mechanism, energy content and radiation efficiency of seismic waves generated by rock bursts in deep-level mining," Proceedings of a Conference organized by the Society for Earthquake and Civil Engineering Dynamics held at University College, Swansea, *Dynamic Waves in Civil Engineering*, Wiley-Interscience, a division of John Wiley and Sons, Ltd. pp. 121-136 (1971).

25. N. G. W. Cook, "Continuous hard rock breakage and its potential effect on deep-level mining in South Africa," *Trans. Soc. Min. Engrs.*, AIME, Vol. 247 (1970).

26. N. G. W. Cook and M. D. G. Salamon, "Design and layouts for mining tabular deposits," *Sixth World Mining Congress*, Madrid (1970).

27. K. Hodgson and N. G. W. Cook, "The effects of size and stress gradient on the strength of rock," Proceedings Second Congress of the International Society of Rock Mechanics, Belgrade, Vol. 1, pp. 25-28 (1970).

28. G. F. Pallister, N. C. Gay and N. G. W. Cook, "Measurements of the virgin state of stress in rock at depth," Proceedings Second Congress of the International Society of Rock Mechanics, Belgrade, Vol. 1, pp. 25-28 (1970).

29. N. G. W. Cook, "An experiment proving that dilatancy is a pervasive volumetric property of brittle rock loaded to failure," *Rock mechanics*, Vol. 2, pp. 181-188 (1970).

30. J. C. Jaeger and N. G. W. Cook, "Friction in granular materials," *Structure Solid Mechanics and Engineering Design Proceedings of the Southampton Engineering Materials Conference* (1969), Wiley-Interscience, Vol. 1, pp. 257-266 (1971).

31. N. G. W. Cook, E. Hodgson, J. P. M. Hojem, "A 100 MN jacking system for testing coal pillars underground," *J. S. Afr. Inst. Min. Metall.*, Vol. 71, pp. 215-224 (1971).

32. N. G. W. Cook, E. Hodgson, S. C. Muller, A. J. A. White, "Rapid yielding hydraulic props as stope support in deep gold mines," Association of Mine Managers, A. M. M. Circular No. 2/72.

33. N. G. W. Cook, Contribution to "Rockbursts: The nature of the problem and management counter-measures on E.R.P.M. Limited," *Association of Mine Managers*, A. M. M. Circular No. 2/72.

34. K. Hodgson and N. G. W. Cook, "Rock Mechanics: The design of mine layouts," Application of Computer Methods in the Mineral Industry, .R Proceedings Tenth International Symposium, ed. M. D. G. Salamon and F. H. Lancaster, Johannesburg, pp. 10-14 (1972), *S. Afr. Inst. in Metall.*, pp. 255-258 (1973).

35. N. G. W. Cook, "The siting of mine tunnel sand other factors affecting their layout and design," Association of Mine Managers, A. M. M. Circular 4/73.

36 N. G. W. Cook and N. C. Joughin, "The role of rockcutting in strata control," *Association of Mine Managers*, A. M. M. Circular 4/73.

37. D. K. Hallbauer, H. Wagner, N. G. W. Cook, "Some observations concerning the microscopic mechanical behaviour of quartzite specimens in stiff, triaxial compression tests," *Int. J. Rock Mech. Min. Sci. and Geomech.*, Abstr., Pergamon Press, Vol. 10, pp. 713-726 (1973).

38. D. R. Cloete, P. A. G. Collett, N. G. W. Cook, A. J. Jaeger, A. J. A. White, "The nature of the fracture zone in gold mines as revealed by diamond core drilling," *Association of Mine Managers*, A. M. M. Circular No. 1/74.

39. N. G. W. Cook and V. R. Harvey, "An appraisal of rock excavation by mechanical, hydraulic, thermal and electromagnetic means," Proceedings Third Congress of the International Society for Rock Mechanics, Denver, in *Advances in Rock Mechanics,* Vol. 1, Part B, pp. 1599-1615, National Academy of Sciences, Washington, D. C. (1974).

40. A. J. A. White, N. G. Joughin and N. G. W. Cook, "Improvements in stope drilling and blasting for deep bold mines," *J. S. Afr. Inst. Min. Metall.*, Vol. 6, pp. 139-150 (1975).

41. N. G. W. Cook, "Seismicity associated with mining," A review paper prepared for the First International Symposium on Induced Seismicity, Banff, Canada, (1975); *Engineering Geology*, Vol. 10, pp. 99-122 (1976).

42. J. P. M. Hojem, N. G. W. Cook and C. Heins, "A stiff, two meganewton testing machine for measuring the properties of brittle, work-softening materials," *S. Afr. Mech. Eng.*, Vol. 25, pp. 250-270 (1975).

43. N. G. W. Cook, "Methods of acquiring and utilizing geotechnical data for the design and construction of workings in rock," Proceedings Symposium on Exploration for Rock Engineering, South African National Group on Rock Mechanics and the South African Institution of Civil Engineers, Johannesburg, ed., Z. T. Bieniawski, Balkema Press for Associated Scientific and Technical Societies of South Africa (1976).

44. P. A. Witherspoon, J. E. Gale and N. G. W. Cook, "Radioactive waste storage in argillaceous and crystalline rock masses," Proceedings Storage in Excavated Rock Caverns, *Rockstore 77*, September 5-8, 1977, Stockholm, Sweden (1977).

45. N. G. W. Cook, "Ventilation techniques developed in South Africa," Mining Congress Journal, Vol. 63, pp. 40-44 (1977).

46. M. Hood and N. G. W. Cook, "The stability of underground coal mine workings," Proceedings of the First International Symposium on Stability in Coal Mining, Vancouver, B. C. Canada, pp. 135-147 (1978).

47. N. G. W. Cook, "Rock Fracture: Observations and interpretations," Proceedings Tewksbury Symposium on Fracture, University of Melbourne, Parkville, Victoria, Australia, February 12-14th (1979).

48. N. G. W. Cook and P. A. Witherspoon, "In -situ heating experiments in hard rock: Their objectives and design," Proceedings Ludvika-Stripa Seminar on In-Situ Heating Experiments in Geological Formations, Organization for Economic Co-operation and Development, September 13-15 (1978).

49. N. G. W. Cook and M. Hood, "Full-scale and time-scale heating experiments at Stripa: Preliminary results," Proceedings Ludvika-Stripa Seminar on *In-Situ* Heating Experiments in Geological Formations, Organization for Economic Co-operation and Development, September 13-15 (1978).

50. D. J. Jamison and N. G. W. Cook, "An analysis of measured values for the state of stress in the earth's crust," *J. of Geophys. Res.*, Vol. 85, No. B4, pp. 1833-1838, April (1980).

51. J. S. Y. Wang, C. F. Tsang, N. G. W. Cook and P. A. Witherspoon, "A study of regional temperature and thermohydrological effects of an underground repository for nuclear wastes in hard rock," *J. of Geophys. Res.*, Vol. 86, No. B5, pp. 3759-70, May (1981).

52. P. A. Witherspoon and N. G. W. Cook, "Thermomechanical experiments in granite at Stripa, Sweden," Proceedings of the First Annual ONWI Information Meeting, Columbus, Ohio, October 30-November 1 (1979).

52. P. A. Witherspoon, N. G. W. Cook and J. E. Gale, "Geologic storage of radioactive waste: Field studies in Sweden," *Science*, Vol. 211, pp. 894-900, February 27 (1981).

53. N. G. W. Cook, "Stiff testing machines, stick-slip sliding and the stability of rock deformation," in *Mechanical Behavior of Crustal Rocks - The Handin Volume*, Geophysical Monograph 24, American Geophysical Union, pp. 93-102 (1981).

54. N. G. W. Cook, "Groundwater problems in open pit and underground mines," in *Recent Trends in Hydrogeology*, Geological Society of America, Special Paper 189, pp. 397-405 (1981).

55. J. A. Apps and N. G. W. Cook, "Backfill barriers: The use of engineered barriers based on geologic materials to assure isolation of radioactive wastes in a repository," Proceedings of the Materials Research Society Symposium, Scientific Basis for Nuclear Waste Management, Boston, Mass. November 16-20 (1981).

56. M. Hood and N. G. W. Cook, "Application of research results to the development of an improved system for rock excavation," Proceedings 22nd U. S. Symposium on Rock Mechanics, *Rock Mechanics from Research to Application*, Massachusetts Institute of Technology, Cambridge, Mass., June 29-July 1 (1981).

57. N. G. W. Cook and H. C. Heard, "National Science Foundation - University of California at Berkeley Workshop on Large Scale Laboratory Testing in Geomechanics - Executive Summary," *Geophysical Research Letters*, Vol. 8, No. 7, pp. 645-646, July (1981).

58. N. G. W. Cook and L. R. Myer, "Thermochemical studies in granite at Stripa, Sweden," *Advances in the Science and Technology of the Management of High Level Nuclear Waste*, Battelle, Ohio, ed. by P. L. Hofmann and J. Breslin, Office of Nuclear Waste Isolation (1981).

59. N. G. W. Cook, "Laboratory testing in geomechanics," *Nature*, Vol 294, No. 5838, pp. 213-214 (1981).

60. N. G. W. Cook, "Wear on drag bits in hard rock," Proceedings Canadian Symposium on Rock Mechanics, Vancouver, B. C., May 13-14, (1982).

61. N. G. W. Cook, "Questions in experimental rock mechanics," Proceedings U.S. Symposium on Rock Mechanics, University of California, Berkeley, California, August 25-27 (1982).

62. N. G. W. Cook, "Effects of joints on thermally induced displacements and stresses," Proceedings 24th U. S. Symposium on Rock Mechanics, Texas A&M University, Texas (1984).

63. N. G. W. Cook, M. Hood and F. Tsai, "Observations of crack growth in hard rock loaded by an indentor," *Int. J. Rock Mech. Min. Sci. and Geomech.*, Abstr., Vol. 21, No. 2, pp. 77-107 (1984).

64. N. G. W. Cook, "Origin of rockbursts," Proceedings Symposium on Rockbursts: Origin and Prediction, Inst. Min. Metall., London, October (1983).

65. B. N. P. Paulsson, T. V. McEvilly and N. G. W. Cook, "Elastic wave velocities and attenuation in an underground granite repository for nuclear waste," *Geophysics*, Vol. 50, No. 4, pp. 551-571, April (1985).

66. J. Kemeny and N. G. W. Cook, "Formation and stability of steeply dipping joint sets," Proceedings 26th U. S. Symposium on Rock Mechanics, Rapid City, South Dakota, pp. 471-478 (1985).

67. L. R. Myer, D. L. Hopkins and N. G. W. Cook, "Effects of contact area of an interface on acoustic wave transmission characteristics," Proceedings 26th U.S. Symposium on Rock Mechanics, Rapid City, South Dakota, pp. 565-572 (1985).

68. J. Kemeny and N. G. W. Cook, "Effective moduli, non-linear deformation, and strength of a cracked elastic solid," *Int. J. Rock. Mech. Min. Sci. and Geomech.* Abstr., Vol. 23, No. 2, pp. 107-118 (1986).

69. J. Kemeny and N. G. W. Cook, "Frictional stability of heterogeneous surfaces in contact," Proceedings 27th U. S. Symposium on Rock Mechanics, Tuscaloosa, Alabama, pp. 41-48 (1986).

70. N. G. W. Cook, "Coupled processes in geomechanics," Proceedings of the International Symposium on Coupled Processes Associated with Nuclear Waste Repositories, Berkeley, California, Academic Press, London, pp. 39-66 (1987).

71. J. M. Kemeny and N. G. W. Cook, "Crack models for the failure of rocks in compression," *Constitutive Laws for Engineering Materials: Theory and Applications*, C. S. Desai et al., ed., Elsevier Science Publishing Co., Inc.(1987).

72. R. T. Ewy, J. M. Kemeny, Z. Zheng and N. G. W. Cook, "Generation and analysis of stable excavation shapes under high rock stresses', Proceedings Sixth International Congress on Rock Mechanics, G. Herget and S. Vongpaisal, ed., A. A. Balkema, Rotterdam, pp. 875-881 (1987).

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