Brief Curriculum Vitae: **Dr Keith Richard Lassey** **08 January 2013**

Present position: Director
Lassey Research & Education Ltd

Present work address: 4 Witako St
Lower Hutt 5011
New Zealand

Contact email: keith@lasseyresearch.co.nz

Academic qualifications (with year awarded):

BSc, physics & mathematics (University of Auckland, NZ; 1966)
MSc (hons), physics (University of Auckland, NZ; 1968)
PhD, physics (McMaster University, Hamilton, Ont., Canada; 1972)

Years as a practising researcher: 42

Honours/distinctions/membership of societies, institutions, committees:

- Member of the Royal Society of New Zealand
- Member of the American Geophysical Union
- Member of the European Geophysical Union
- Member of the Editorial Board, IPCC Emissions Factor Database (based in Japan)
- Member of former Expert Team, WMO Commission for Agricultural Meteorology, on "Contribution of Agriculture to the State of Climate".
- Member of expert Agricultural Inventory Advisory Panel to advise NZ Ministry for Primary Industries on proposed changes to inventory estimation
- Co-recipient, 2007 Nobel Peace Prize awarded to IPCC

Professional positions held:

Oct 2002 to Oct 2012: Principal Scientist and Group Manager, NIWA
Jul 1992 to Sep 2002: Scientist or Senior Scientist, NIWA (incl. section manger, 1992-94)
Jan 1976 to Jun 1992: Scientist at DSIR Institute of Nuclear Sciences, NZ
Jul–Dec 1975: Post-doctoral Fellow, Flinders University of South Australia
Jul 1972 to Jun 1975: Post-doctoral Fellow, University of Melbourne, Australia

Present research/professional speciality:

- Biogeochemical cycling of methane in the environment
- Mathematical models of the carbon and methane cycles with particular reference to isotope information, and of other geophysical models relevant to climate change research
- Greenhouse gas emissions and emission inventories, especially methane
- Methane emission by ruminant livestock and its determinants with particular expertise in the 'SF_6 tracer technique' for estimating such emissions
- Policy implications of atmospheric greenhouse gases, including 'Global Warming Potentials'

Number of refereed publications: 76 (journals) + 24 (conf. proceedings, book chapters)

Major achievements relating to greenhouse gas science:

1. Major relevant publications (in the last five years)

Lassey, K.R. (2013). On the importance of background sampling in applications of the SF_6 tracer technique to determine ruminant methane emissions. *Animal Feed Science and Technology (in press)*, doi:10.1016/j.anifeedsci.2012.11.012.

Lassey, K.R.; Allan, W.; Mikaloff Fletcher, S.E. (2011). Seasonal inter-relationships in atmospheric methane and companion $\delta^{13}C$ values: effects of sinks and sources. *Tellus 63B*: 287–301, doi:10.1111/j.1600-0889.2011.00535.x.

Lassey, K.R.; Pinares-Patiño, C.S.; Martin, R.J.; Molano, G.; McMillan, A.M.S. (2011). Enteric methane emission rates determined by the SF_6 tracer technique: temporal patterns and averaging

periods. *Animal Feed Science and Technology 166–167*: 183–191, doi:10.1016/j.anifeedsci.2011.04.066.
Pinares-Patiño, C.S.; Lassey, K.R.; Martin, R.J.; Molano, G.; Fernandez, M.; MacLean, S.; Sandoval, E.; Luo, D.; Clark, H. (2011). Assessment of the sulphur hexafluoride (SF_6) tracer technique using respiration chambers for estimation of methane emissions from sheep. *Animal Feed Science and Technology 166–167:* 201–209, doi:10.1016/j.anifeedsci.2011.04.067.
Lassey, K.R.; Brailsford, G.W.; Bromley, A.M.; Martin, R.J.; Moss, R.C.; Gomez, A.J.; Sherlock, V.; Allan, W.; Nichol, S.E.; Schaefer, H.; Connor, B.J.; Robinson, J.; Smale, D. (2010). Recent changes in methane mixing ratio and its ^{13}C content observed in the southwest Pacific region. *Journal of Integrative Environmental Sciences 7(2):* 109–117, doi:10.1080/19438151003621441.
Lassey, K.R.; Ragnauth, S. (2010). Balancing the global methane budget: constraints imposed by isotopes and anthropogenic emission inventories. *Journal of Integrative Environmental Sciences 7(S1):* 97–107, doi:10.1080/19438151003680843.
Ramírez-Restrepo, C.A.; Barry, T.N.; Marriner, A.; López-Villalobos, N.; McWilliam, E.L.; Lassey, K.R.; Clark, H. (2010). Effects of grazing willow fodder blocks upon methane production and blood composition in young sheep. *Animal Feed Science and Technology 155:* 33–43, doi:10.1016/j.anifeedsci.2009.10.003.
Currie, K.I.; Brailsford, G.; Nichol, S.; Gomez, A.; Sparks, R.; Lassey, K.R.; Riedel, K. (2011). Tropospheric $^{14}CO_2$ at Wellington, New Zealand — the world's longest record. *Biogeochemistry 104:* 5–22, doi:10.1007/s10533-009-9352-6.
Etiope, G.; Lassey, K.R.; Klusman, R.W.; Boschi, E. (2008). Reappraisal of the fossil methane budget and related emission from geologic sources. *Geophysical Research Letters 35:* L09307, doi:10.1029/2008GL033623.
Pinares-Patiño, C.S.; Holmes, C.W.; Lassey, K.R.; Ulyatt, M.J. (2008). Measurement of methane emission from sheep by the sulphur hexafluoride tracer technique and by the calorimetric chamber: failure and success. *Animal 2:* 141–148, doi:10.1017/S17511731107000857.
Lassey, K.R. (2008). Livestock methane emission and its perspective in the global methane cycle. *Australian Journal of Experimental Agriculture 48:* 114–118, doi:10.1071/EA07220.
White, J.W.C.; Ferretti, D.F.; Miller, J.B.; Etheridge, D.M.; Lassey, K.R.; Lowe, D.C.; MacFarling, C.M.; Dreier, M.F.; Trudinger, C.M.; van Ommen, T.D. (2007). The global methane budget over the past 2000 years: $^{13}CH_4$ reveals hidden information. In: *Stable Isotopes as Indicators of Ecological Change,* Dawson, T.E.; Siegwolf, R.T.W. (eds). pp235–248. Academic Press, London.
Lassey, K.R.; Etheridge, D.M.; Lowe, D.C.; Smith, A.M.; Ferretti, D.F. (2007). Centennial evolution of the atmospheric methane budget: what do the carbon isotopes tell us? *Atmospheric Chemistry and Physics 7:* 2119–2139.
Lassey, K.R.; Lowe, D.C.; Smith, A.M. (2007). The atmospheric cycling of radiomethane and the "fossil fraction" of the methane source. *Atmospheric Chemistry and Physics 7:* 2141–2149.
Lassey, K.R. (2007). Livestock methane emission: from individual grazing animal through national inventories to the global methane cycle. *Agricultural and Forest Meteorology 142:* 120–132, doi:10.1016/j.agrformet.2006.03.028.
Ferretti, D.F.; Miller, J.B.; White, J.W.C.; Lassey, K.R.; Lowe, D.C.; Etheridge, D.M. (2007). Stable isotopes provide revised global limits of aerobic methane emissions from plants. *Atmospheric Chemistry and Physics 7:* 237–241.

2. Oral presentations at conferences and workshops (in the last five years)

Lassey, K.R. (2010). The SF_6 Tracer Technique: Performance of permeation tubes and breath sampling equipment. Convenor of workshop, Greenhouse Gases and Animal Agriculture Conference, Banff, Canada, 3–8 October 2010.
Lassey, K.; Brailsford, G.; Bromley, T.; Martin, R.; Moss, R.; Gomez, A.; Sherlock, V.; Allan, W.; Connor, B.; Smale, D. (2009). Recent changes in methane mixing ratio and its ^{13}C content observed in the southwest Pacific region. Fifth International Symposium on Non-CO_2 Greenhouse Gases, Wageningen, Netherlands, 30 June–3 July 2009.
Lassey, K.R.; Ragnauth, S.; Allan, W. (2009). Balancing the global methane budget: constraints imposed by isotopes and anthropogenic emission inventories. Fifth International Symposium on Non-CO_2 Greenhouse Gases, Wageningen, Netherlands, 30 June–3 July 2009.
Lassey, K.; Bromley, A.; Martin, R.; Brailsford, G.; Moss, R.; Currie, K.; Allan, W.; Lowe, D. (2008). Methane and other trace gases: NIWA measurements. Asia-Pacific Workshop on Carbon-Cycle Observations, Tsukuba, Japan, 17–19 March 2008.
Lassey, K.; Brailsford, G.; Martin, R.; Bromley, A.; Moss, R.; Lowe, D. (2008). Data on atmospheric sampling programmes by NIWA. Asia-Pacific Workshop on Carbon-Cycle Observations, Tsukuba, Japan, 17–19 March 2008.

Lassey, K.R.; Lowe, D.C. (2007). The role of radiomethane ($^{14}CH_4$) measurements in constraining the global methane source inventory. EGU General Assembly, Vienna, Austria, 15–20 April 2007.

Lassey, K.R. (2007). What do atmospheric $^{14}CH_4$ measurements tell us about the role of 'fossil methane' in the global methane budget? Invited seminar, Istituto Nazionale di Geofisica e Vulcanologia, Rome, 26 April 2007.

Lassey, K.R. (2007). New Zealand greenhouse gas emissions and pastoral agriculture. Invited presentation, Annual Meetings and Conference, Federated Farmers of New Zealand, Auckland Province Inc, Manurewa, Auckland, 18 May 2007.

Lassey, K.R. (2007). Atmospheric $^{14}CH_4$ and the role of 'fossil methane' in the global methane budget Seminar, NOAA/GMD, Boulder, CO, 25 October 2007.

Lassey, K. (2007). The use of tracers to determine enteric methane emission. Invited presentation, workshop Measurement of Enteric Methane in Grazing Animals Using Tracers, in Greenhouse Gases and Animal Agriculture Conference, Christchurch, New Zealand, 26–29 November 2007.

Lassey, K.R. (2007). Livestock methane and its perspective in the global methane cycle. Greenhouse Gases and Animal Agriculture Conference, Christchurch, New Zealand, 26–29 November 2007.

3. Other major achievements

- Lead Author on the Agriculture chapter of *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.
- Contributing Author on two chapters of the contribution by Working Group 1 to the IPCC Fourth Assessment Report on Climate Change (2007).
- Contributor to UNDP regional project (for East Europe, North Asia), *"Capacity Building for Improving National GHG Inventories"*, through participation in a *Workshop on Improvement of Agricultural Emissions and Implementation of Good Practice Elements in National Inventories*, held in Tashkent, Uzbekistan, Oct 2005.
- Author or co-author of numerous reports commissioned by NZ Ministry of Agriculture and Forestry (now Ministry for Primary Industries) and of numerous other client reports.