

Mai i te rangi, ki te nuku o te whenua, ka puta te ira tangata i te po, i te whaiao, i te ao mārama. Ko Te Pū Ao mātou.

From the sky and the land, came people from the night, to the old world, to the world of light. We are GNS Science.

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Front Cover: National Geohazards Monitoring Centre Te Puna Mōrearea i te Rū - in room named "The Bridge"

Photo Credit: Margaret Low

Back Cover: Sea Ice

Photo Credit: Gavin Dunbar



Directors' Report

The Board of GNS Science are pleased to report the organisation's performance and achievement in the July to December 2018 period. We continued to create and deliver globally influential science that contributes to a safer, cleaner, and more prosperous Aotearoa New Zealand for current and future generations. Some of the highlights over the Half Year were:

- launching the National Geohazards Monitoring Centre's 24/7 monitoring service for natural hazards
- working with iwi and hapū on the Lakes 380 programme that will provide a national overview of the health of our lakes,
- moving into the implementation phase of the GNS Science Strategic Review
- receiving a gold performance rating from the Ministry of Business, Innovation and Employment (MBIE) for three of our contestable programmes.

Recognition for our scientists and our research

CHIEF SCIENCE ADVISORS

Dr Gill Jolly has been invited to join the Forum of Chief Science Advisors working with the Prime Minister's Chief Science Advisor, Juliet Gerrard.

GOLD-RATED RESEARCH

Preliminary MBIE 2017-18 RAGG (Red, Amber, Green, Gold) ratings were provided, indicating three gold ratings out of our 17 contestable research programmes. This is a great achievement given 18% of our programmes obtained gold rating, against 9% nationally. Gold ratings were awarded to:

- 'Hikurangi subduction earthquakes and slip behaviour' programme for co-funding, great science and outreach
- 'Smart Models for Aquifer Management' for outstanding stakeholder engagement and commendations from key stakeholders
- 'Natural Hazards Research Platform' for best practice end-user engagement leading to impact.

FELLOW OF THE ROYAL SOCIETY OF NEW ZEALAND TE APĀRANGI

Dr Laura Wallace was named a Fellow of the Royal Society of New Zealand Te Apārangi, recognising her contribution to geodetic, seismological and geological information to understand complex tectonic processes occurring at plate boundary zones, including discovering the first slow-slip event at Hikurangi subduction zone.



SCIENCE NEW ZEALAND NATIONAL AWARDS

2018 Science NZ National Awards are high-profile awards that recognise outstanding science that benefits New Zealand. We had three category winners in the 2018 Science New Zealand National Awards: Dr Kelvin Berryman (Lifetime Achievement Award), Dr Wendy Saunders (Early Career Researcher Award), and the Tectonics and Structure of Zealandia programme (Team Award).

DIRECTOR OF ANTARCTIC SCIENCE PLATFORM

Nancy Bertler has been appointed as the inaugural Director of the newly established Antarctic Science Platform. This recognises her experience and reputation in the national and international science community, and GNS Science and Victoria University as New Zealand's leaders in Antarctic research.

NEW ZEALAND GEOTHERMAL ASSOCIATION (NZGA)

Brian Carey (Geothermal Applications and Industry Specialist) has been awarded honorary life membership of the New Zealand Geothermal Association (NZGA).

Financial performance

Our revenue for the half year ended 31 December 2018 is \$47,035k compared to \$40,034k for the same period last year. A net profit after tax of \$729k has been achieved for the 2018/19 half year period, compared to \$593k last year. The half year profit result is \$136k behind budget and we forecast a year-end result in the order of \$1.1m net profit after tax, lower than the budget of \$1.945m.

This is mainly due to costs associated with the Science and Corporate Reviews, any resulting productivity impact as we go through change, and some residual asset valuation issues that may need to be addressed.

FUNDING ACHIEVEMENTS

We have seen continued confidence in our research from funding bodies, with three new Endeavour projects awarded for a total of \$11.2M and two new Marsden projects totaling \$1.23M over three years.

Science for a Safer New Zealand

NATIONAL GEOHAZARDS MONITORING CENTRE TE PUNA MŌREAREA I TE RŪ

On 12 December 2018, the new National Geohazards Monitoring Centre Te Puna Mōrearea i te Rū was officially opened by Hon Dr Megan Woods, Minister of Research, Science and Innovation, and Hon Kris Faafoi, Minister of Civil Defence. The new Centre, which is staffed 24/7, enables GNS to provide more timely and accurate advice on all major geological threats to New Zealand (tsunami, earthquake, landslide and volcano). It will enhance the speed of detecting and assessing threats and providing fit-for-purpose advices to natural hazard management response agencies.

Official opening of the National Geohazards Monitoring Centre Te Puna Mōrearea i te Rū, in December 2018, by Honourable Doctor Megan Woods, Minister of Research, Science and Innovation and Honourable Kris Faafoi, Minister of Civil Defence. Attended by staff, members of the Board, Management and invited guests.

Photo Credit: Margaret Low



TSUNAMI WARNING

The Ministerial Review on Better Responses to Natural Disasters and other Emergencies recommended that GNS Science take on the role of tsunami warning. GNS Science, Ministry of Civil Defence and Emergency Management (MCDEM) and Department of Prime Minister and Cabinet (DPMC) have been collaborating on the implications of this new role so that we are well prepared.

EMERGENCY COMMUNICATION

Our hazard and risk management researcher Sally Potter received an award for Excellence in Emergency Communication Research at the 2018 Emergency Media & Public Affairs conference in Wellington. Sally's research focused on best practice in writing short warning messages for the public during emergencies to achieve an effective and timely response. The findings have been used by the Civil Defence and Emergency Management sector for New Zealand's new Emergency Mobile Alerts. This is an excellent example of the application of our science, and national acknowledgement of its excellence.

NEW GLOBAL EARTHQUAKE HAZARD AND RISK MAPS

International scientists, including GNS Science researchers, produced a new global earthquake hazard map and, for the first time, accompanying risk maps. These maps and associated software will set a new benchmark for developing disaster risk reduction strategies worldwide and improve risk mitigation and emergency preparedness for the future. With risk included, these models describe the impact of future earthquakes on infrastructure and people, often expressed as deaths, injuries and economic losses.

RESILIENCE TO NATURE'S CHALLENGES

The Resilience to Nature's Challenges National Science Challenge (the Challenge) is a key initiative to enhance New Zealand's preparation, response and adaptation to a range of natural hazards. Hosted by GNS Science, the Challenge continues to produce research results that communities, organisations, and agencies can use in real time to improve New Zealand's natural hazard resilience. It has now been awarded further funding of \$38.8m for an additional five years following a positive mid-term review. The review recognised the Challenge's end-user focus, attraction of co-funding, high quality multidisciplinary science outputs, and extended reach by improved external communications activities.

Science for a Cleaner New Zealand

WATER MANAGEMENT

The outcome of the Lakes 380 Project is to obtain a nationwide overview of the health of 10% of our lakes to enable prioritisation of regions or lake types for protection. This project involves working with multiple agencies and groups in a collaborative approach. It has been progressing with three field trips successfully completed and a core sample database being established.

In working with iwi and hapū (more recently Ngāti Apa and Ngāi Tahu) we are learning from their mātauranga and oral histories that draw upon long associations of tangata whenua interactions with lakes. Ngāti Apa's main





aspirations included reconnection of iwi with lakes, to have scientific/evidence-based data to inform lake restoration and management plans and how to pass on this knowledge to iwi and younger generations. The knowledge from this project will be used to assess water quality, characterise biodiversity and inform and prioritise mitigation strategies, on a national scale.

GROUNDWATER QUALITY

On behalf of the Ministry for the Environment GNS Science has assessed the state and temporal trends in New Zealand's groundwater quality. As with previous studies of this type, this investigation showed that 30% of long-term monitoring sites display nitrate concentrations above natural levels, indicating the effects of land use. The findings from this study will feature in the Ministry's synthesis report Environment Aotearoa (due for release in April 2019), which will provide an overall picture of New Zealand's environment across the air, atmosphere, climate, fresh water, land, and marine domains, and the natural and human interactions across these domains.

As part of the National Classification of Hydrogeological Systems, the classification and mapping of South Island groundwater resources is now complete and is being used as a base dataset for the Ministry for the Environment funded National Groundwater Atlas project. The project seeks to facilitate the presentation and delivery of spatially attributed groundwater information throughout New Zealand. Medium-to-long-term use for this dataset includes its national and inter-regional hydrogeological characterisation projects, and public engagement on New Zealand's groundwater resources.

GEOTHERMAL ENERGY

Our research supporting renewable geothermal power generation and low-enthalpy geothermal development is aimed at driving New Zealand towards a zero-carbon and renewable energy-based economy. Progress in this area has included:

- consultancy advice for Top Energy, Contact Energy, Mercury New Zealand Ltd and other organisations
- geoscience support to regional councils for sustainability, environmental management and appropriately scaled resource allocation
- delineation and characterisation of possible low-enthalpy resources for direct use and/or small power utilisation in Hauraki, West Coast and other regions.

Science for a More Prosperous New Zealand

In line with national priorities, we are now developing a new GNS Energy Futures programme under one of the Strategic Science Investment Fund (SSIF) platforms, to enable New Zealand to transition to a lower-carbon economy through next-generation geothermal, new materials and other relevant research. In line with Shareholding Ministers' expectations, the new SSIF programmes will increase GNS's overall investment in discovery science, as well as leverage our long-standing science collaboration, both in New Zealand and globally.

We are contributing to several Provincial Growth Fund proposals by eligible partners in Taranaki and Hauraki, with a primary focus on geothermal energy development.

Making a global contribution

RELATIONSHIP WITH AUSTRALIA

We have reached a reciprocal arrangement with Geoscience Australia for 24/7 earthquake monitoring and alert support, should a big event limit our systems and ability to communicate with authorities. We have also signed a letter of intent around broader collaboration around groundwater, data science and engagement with indigenous communities.

PACIFIC PROGRAMMES

GNS Science is part of an international consortium, to understand the feasibility of parametric insurance for mitigating the financial risks of volcanic eruptions on some of our Pacific neighbours, that will ultimately improve our own understanding of financial risk management options for New Zealand.

We continue to deliver hazards-centred programmes in the Pacific by completing technical work on the World Bank-funded Solomon Islands Seismic Network programme and through engagement with MFAT on the next stage of the Ambae eruption response and the long-term capacity building activity with the Vanuatu Meteorology and Geo-Hazards Department (VMGD).

OTHER INTERNATIONAL OPPORTUNITIES

GNS Science has also built relationships and developed contract opportunities to support Japan's renewable energy technology and Taiwan's exploration of renewable resources.

Following a meeting with MFAT representatives, we have also been asked to prepare a list of options to increase GNS engagement in the Caribbean on Disaster Risk Management (DRM) activities, and possibly also in areas of geothermal research.





INTERNATIONAL COLLABORATION ON CLIMATE CHANGE

GNS Science has been part of an international collaboration across 17 countries, which brought together experts in ice core analysis, climate modelling, and paleoceanography. The team demonstrated that the majority of currently used climate models, designed to project changes within this century, may underestimate the longer-term changes. Specifically, climate zones and ecosystems will shift, rapid polar warming may release additional greenhouse gases, and sea-level will rise by several meters over several thousand years, even with a global warming limited to within 2°C above preindustrial levels, as aimed at in the Paris Agreement. The findings underscore the urgency of reducing human induced global CO2 emissions.

Shaping the organisation to support science priorities

GNS Science has been implementing a Strategic Review to ensure that its science is well aligned to the needs of New Zealand and enables us to continue to participate in global science. The Strategic Review has so far included a Corporate Review, SSIF Review and Science Review.

We have completed the Corporate Review, which involved making appointments to the new Executive Leadership Team, implementing a new corporate structure and further enhancing our capability. We have also progressed the Science Review to determine a new science structure and have been appointing new managers to lead science teams.

Following internal and external stakeholder consultation, we have scoped several new GNS Science SSIF-funded programmes. These will form the backbone of science activity in each of our new science areas – Environment and Climate, Natural Hazards and Risk, Land and Marine Geoscience and Energy Futures.

For and on behalf of the Board

Dr. Nicola Crauford

Chairman GNS Science

Financial Statements

Institute of Geological and Nuclear Sciences Limited

Condensed consolidated interim statement of comprehensive income
For the six months ended 31 December 2018

	Unaudite 6 Month		Audited 12 Months
in thousands of New Zealand dollars	Note Dec-1	8 Dec-17	Jun-18
Revenue			
Research contracts	32,28	8 27,436	60,429
Commercial	8,56		15,745
GeoNet	6,13	· ·	11,978
Other income	4		9
Total revenue	47,03	5 40,034	88,161
Expenses			
Employee benefit expense	22,57	4 19,883	41,302
Operating expenses	19,26	· ·	37,800
GeoNet direct expenses	1,97	· ·	3,764
Depreciation	2,30	· ·	4,647
Amortisation	24	2 472	2,319
Total expenses	46,35	9 39,495	89,832
Net profit before interest and tax	67	6 539	(1,671)
			070
Interest income	33		672
Interest expense		- (23)	(33)
Net profit before tax	1,01	4 837	(1,032)
Income tax expense	(285	i) (244)	259
income tax expense	(200	(244)	209
Net profit after tax 4	72	9 593	(773)
Other comprehensive income			(29)
Total comprehensive income attributable to owners	72	9 593	(802)

Condensed consolidated interim statement of changes in equity For the six months ended 31 December 2018

	Note	Share Capital	al Equity reserves		Total Equity
in thousands of New Zealand dollars			Retained earnings	Cash flow hedge reserve	
Balance at 1 July 2017		6,167	28,715	29	34,911
Profit after tax Hedging reserve		-	593 -	(29)	593 (29)
Balance at 31 December 2017		6,167	29,308	-	35,475
Balance at 1 July 2017		6,167	28,715	29	34,911
Loss after tax Other comprehensive income		-	(773)	(29)	(773) (29)
Balance at 30 June 2018		6,167	27,942	-	34,109
Profit after tax		-	729	-	729
Balance at 31 December 2018		6,167	28,671	-	34,838

Condensed consolidated interim balance sheet as at 31 December 2018

in thousands of New Zealand dollars Note	Unaudited Dec-18	Unaudited Dec-17	Audited Jun-18
Share capital	6,167	6,167	6,167
Retained earnings	28,671	29,308	27,942
Total equity	34,838	35,475	34,109
Represented by:			
Non-current assets			
Property, plant and equipment	27,213	28,142	27,505
Intangible assets	897	3,018	1,195
Investments	30	30	30
Total non-current assets	28,140	31,190	28,730
Current assets			
Cash and cash equivalents	2,321	1,402	2,292
Short-term investments	15,000	20,389	19,000
Trade receivables	5,463	3,037	6,872
Prepayments	2,421	2,072	1,838
Work in progress	3,312	3,115	2,009
Current tax	585	434	292
Deferred tax	239	-	239
Total current assets	29,341	30,449	32,542
Total assets	57,481	61,639	61,272
Non-current liabilities			
Deferred tax	-	401	-
Non-current provisions	1,898	1,727	1,897
Total non-current liabilities	1,898	2,128	1,897
Current liabilities			
Trade and other payables	6,016	6,881	10,571
Current provisions	3,149	2,851	3,011
Revenue in advance	11,580	14,304	11,684
Total current liabilities	20,745	24,036	25,266
Total liabilities	22,643	26,164	27,163
Iotal liabilities	22,043	20,104	21,103
Net assets	34,838	35,475	34,109

For and on behalf of the Board:

Dr Nicola Crauford Chairman 20 February 2019 Sarah Haydon Deputy Chairman 20 February 2019

THE ACCOMPANYING NOTES FORM PART OF THESE FINANCIAL STATEMENTS

Condensed consolidated interim statement of cash flows For the six months ended 31 December 2018

	Unaudited 6 Months	Unaudited 6 Months	Audited 12 Months
in thousands of New Zealand dollars Note	Dec-18	Dec-17	Jun-18
Cach flows from approxing activities			
Cash flows from operating activities Cash was provided from:			
Receipts from customers	47,035	42,707	85,540
Interest received	338		597
interest received	47,373		86,137
Cash was applied to:	47,070	+0,000	00,107
Payments to suppliers and employees	(48,809)	(38,570)	(79,874)
Interest paid	(10,000)	(23)	(33)
Income tax paid	(578)	(1,489)	(1,484)
	(49,387)	(40,082)	(81,391)
Net cash flows from operating activities 4	(2,014)		4,746
	() ,	,	
Cash flows from investing activities			
Cash was provided from:			
Maturity of short-term investments	4,000	-	33,000
	4,000	-	33,000
Cash was applied to:			
Purchase of property, plant, equipment and	(1,957)	(1,711)	(4,009)
intangible assets Placement of short-term investments	,	(20,389)	(34,000)
T Idodinant of anote term invocationte	(1,957)	(22,100)	(38,009)
Net cash flows from investing activities	2,043		(5,009)
- tot sach he he he he had a deathable	_,0:0	(22,100)	(0,000)
Cash flows from financing activities			
Cash was applied to:			
Dividends paid	_	-	_
· · · · · · · · · · · · · · · · · · ·	-	-	_
Net cash flows from financing activities	-	-	_
Net increase/(decrease) in cash and cash equivalents	29	(19,174)	(263)
Effect of exchange rate changes on cash held in foreign currency		21	-
Opening cash and cash equivalents	2,292	20,555	2,555
- Francis - Trans and additional	_,_0_	23,300	2,000
Closing cash and cash equivalents	2,321	1,402	2,292

Notes to and forming part of the condensed consolidated interim financial statements For the six months ended 31 December 2018

1. Reporting entity and activities

The Institute of Geological and Nuclear Sciences Limited is established under the Crown Research Institutes Act 1992 and the Companies Act 1993. Its subsidiary companies, Isoscan Limited, Isoscan Food Limited, Geological Surveys (New Zealand) Limited, GNS Science International Limited and Geological Risk Limited are established under the Companies Act 1993.

The principal activities of the Group are to undertake geoscience and isotope science research, development and consultancy, predominantly in New Zealand.

These unaudited condensed consolidated interim financial statements are for the six months ended 31 December 2018 and were approved by the Board on 20th February 2019.

2. Summary of significant accounting policies

These unaudited condensed consolidated interim financial statements have been prepared in accordance with section 17 of the Crown Research Institutes Act 1992, the Public Finance Act 1989, the Companies Act 1993, the Crown Entities Act 2004 and generally accepted accounting practice in New Zealand, IAS 34 and NZ IAS 34 Interim Financial Reporting and NZ IFRS 15 Revenue Recognition. The latter represents a change to reflect the introduction of this standard. To meet this new standard, GNS has implemented a practice of reviewing all major contestable contracts every month to ensure the revenue being recognised reflects a fair assessment of the revenue the company is entitled to receive under the terms of the contracts.

These unaudited condensed consolidated interim financial statements for the six months ended 31 December 2018 do not include all the notes of the type normally included in an annual financial report but have been prepared using the same accounting policies and methods of computation as, and should be read in conjunction with, the financial statements and related notes included in the Group's Annual Report for the year ended 30 June 2018.

The same significant judgments, estimates and assumptions included in the notes to the financial statements in the Group's Annual Report for the year ended 30 June 2018 have been applied to these unaudited condensed consolidated interim financial statements.

The financial statement figures for the six-month period ended 31 December 2018, and for the comparative six-month period to 31 December 2017, are unaudited. The figures for the year ended 30 June 2018 are audited.

These financial statements are presented in New Zealand dollars (\$), which is the Group's functional currency. Amounts have been rounded to the nearest thousand dollars.

3. Related party transactions

The Government of New Zealand (Crown) is the ultimate shareholder of the Group. No transactions with other Crown-owned entities are considered as related party transactions under NZ IAS 24.

Notes to and forming part of the condensed consolidated interim financial statements For the six months ended 31 December 2018

4. Reconciliation of profit after tax to net cash flows from operating activities

in thousands of New Zealand dollars	Unaudited 6 Months Dec-18	Unaudited 6 Months Dec-17	Audited 12 Months Jun-18
The state of the s			
Profit after tax	729	593	(773)
Add/(less) items classified as investing activities:			
Net gain on disposal of property, plant and equipment	(2)	(1)	506
	(2)	(1)	506
Adjust non-cash items:			
Depreciation	2,307	2,292	4,647
Amortisation	242	472	2,319
Bad and doubtful accounts	43	-	84
Net unrealised exchange (gain)/loss	7	(49)	(113)
(Decrease) in provision for income tax	(293)	(1,189)	(1,047)
(Decrease) in deferred tax	-	(56)	(696)
Increase/(decrease) in non-current provisions	1	(130)	40
	2,307	1,340	5,234
Add/(less) movements in working capital items:			(= 0 +)
Decrease/(increase) in trade receivables and prepayments	783	2,840	(761)
Increase/(decrease) in payables, current provisions, revenue in advance	(4,528)	(1,783)	(552)
Change in trade payables relating to investing activities	(4.000)	(00)	49
Increase in work in progress	(1,303)	(63)	1,043
	(5,048)	994	(221)
Not each flows from an arcting activities	(0.01.4)	0.000	4.740
Net cash flows from operating activities	(2,014)	2,926	4,746

5. Dividend

No dividends were declared by the Group for the six months ended 31 December 2018 (2017 – none).

Notes to and forming part of the condensed consolidated interim financial statements For the six months ended 31 December 2018

6. Commitments

(a) Capital commitments

Commitments for future capital expenditure:

	Unaudited	Unaudited	Audited
in thousands of New Zealand dollars	Dec-18	Dec-17	Jun-18
Contracted and on order	1,076	529	582
Authorised but not yet contracted	2,114	2,375	1,528
	3,190	2,904	2,110

(b) Operating lease commitments

	Unaudited	Unaudited	Audited
in thousands of New Zealand dollars	Dec-18	Dec-17	Jun-18
Within one year	28	175	32
Between one and five years	19	352	18
Over five years	-	-	-
	47	527	50

7. Contingent liabilities

The Group has no contingent liabilities at 31 December 2018 (2017 - Nil).

8. Subsequent events

There were no significant events after 31 December 2018 (2017 – None).

Directory

DIRECTORS

Chairman

Dr Nicola Crauford

Deputy Chairman

Sarah Haydon

Chris Bush

Felicity Evans

Dr John Sharpe

Professor Steve Weaver

Paul White

EXECUTIVE

Chief Executive

Ian Simpson

General Manager, Science

Peter Benfell

Acting General Manager, Strategy

Gill Jolly

General Manager, Stakeholder Relations

Justine Daw

General Manager, Business Services

Allan Frost

General Manager, People & Culture

Rose Macfarlane

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ANZ Bank New Zealand

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On behalf of the Auditor-General

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