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**northern**minerals

# Exploring High Value Heavy Rare Earths

**2011BBY RARE EARTH CONFERENCE**

**George Bauk Managing Director**

**ASX: NTU**

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Information that relates to exploration results has been compiled by the Company and is based on information provided by Robin Wilson, a employee of Northern Minerals who is a member of the Australasian Institute of Mining and Metallurgy. All information of this type is expressed in terms of the 2004 edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”. Robin Wilson has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a competent person as defined in the 2004 edition of the “Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves”.

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# Company Overview



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## Rare Earth Elements

- High value **Heavy Rare Earth** projects
- **Xenotime** mineralisation - simple

## Uranium

- **Strategic 11,000km<sup>2</sup> land position**
- Unconformity style targets

## Phosphate

- Close to rail and road, growth commodity
- PCF Capital engaged to divest/seek partner

## Quality Management

- Expanded and experienced board/team
- REE expertise, **D.Kingsnorth/J.Goulevitch**

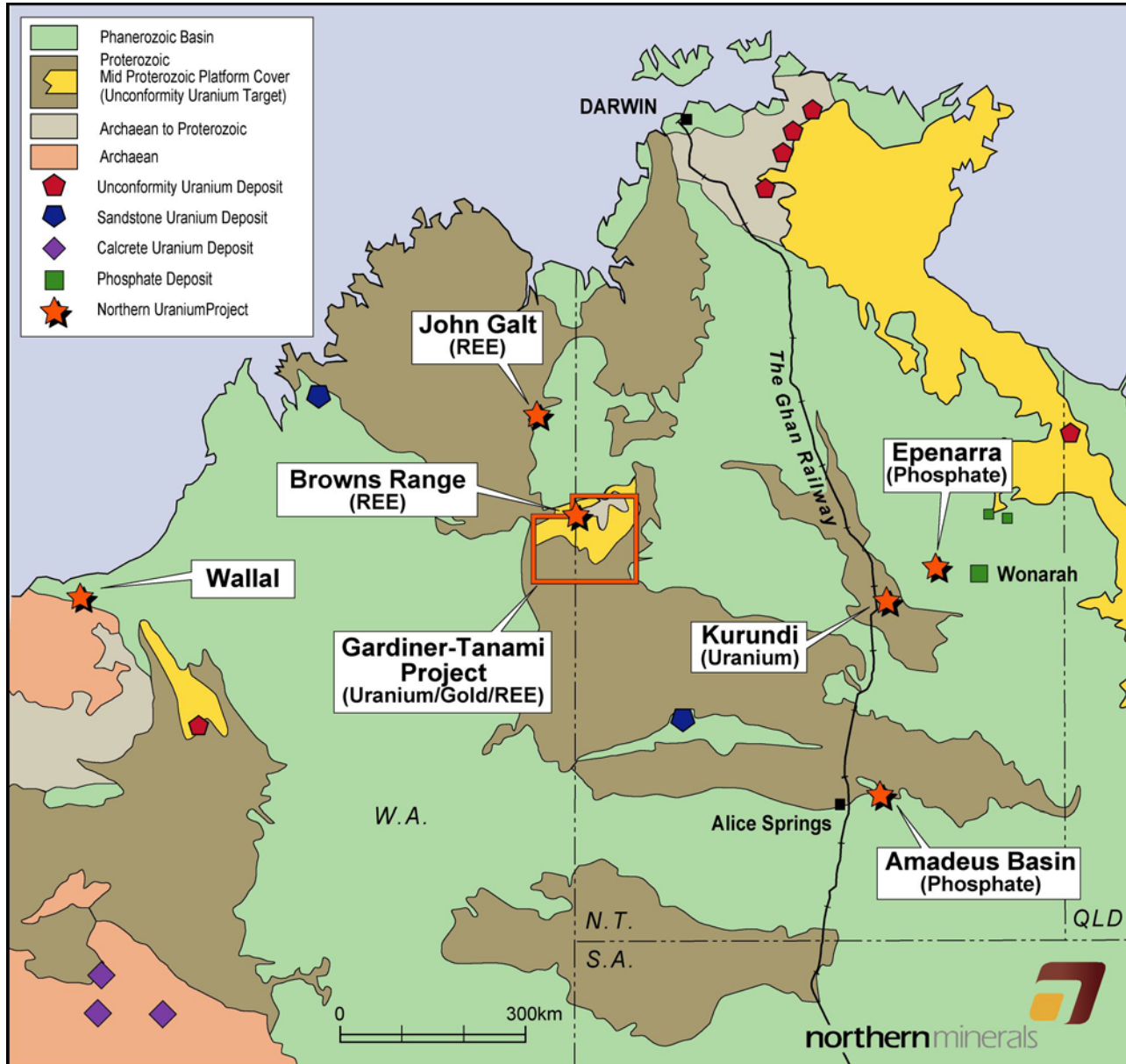
## Funding

- Strong cash position - \$7.7m
- Major exploration program underway

# Diverse "New Energy" Portfolio



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# Capital Structure



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## ASX Codes

NTU	Ordinary Shares	169.7m*
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## Listed Options

NTUOA	\$0.20 expires 30 Sept 2012	11.6m
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NTUOB	\$0.15 expires 31 Mar 2012	14.3m
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## Unlisted Options

Various prices and expiry dates	8.5m
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## Trading Summary

Market Capitalisation (as at 7 April 2011 @ \$0.705)	\$120m
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52 week trading range	\$0.063-\$0.815
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Daily Traded Volume (average over 3 months)	1.77m
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## Balance Sheet

Cash (31 Mar 2011)	\$7.7m
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## Major Shareholders

Conglin Yue	19.3%
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Lynas Corporation	7.8%
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Geiger Counter	6.4%
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Board & Management	5.8%
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\*includes 3.7m restricted shares issued under the share plan

# Board & Management



**Kevin Schultz**  
***Non Executive Chairman***

- Formerly Managing Director – Polaris Metals
- Global industry experience, multi commodity



**Adrian Griffin**  
***Non Executive Director***

- Specialising in mine management and production
- Managing Director Midwinter Resources



**George Bauk**  
***Managing Director***

- 20 years mining operation and corporate experience
- Former MD Indago Resources, CFO Arafura, WMC



**Dudley Kingsnorth**  
***Non Executive Director***

- 20+ years experience in the Rare Earth Industry
- MD of IMCOA, Roskill Report REE Editor 2001/04/07



**Colin McCavana**  
***Non Executive Director***

- Former Managing Director Haddington Resources
- Mine production and operations mgmt experience



**Robin Wilson**  
***Exploration Manager***

- 20 years exploration experience
- CRA, Woodside, Tanganyika Gold, Troy Resources

# REE - new technology, new energy



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# REE - uses



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## **Electronics - *Faster, lighter, smaller and more efficient***



## **Clean energy - *increasing efficiency, reducing emissions***





# HREE – serious supply shortfalls



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China produces 95% of world's REE and 99.8% of all Heavy REE

New near term production from other countries is predominately light REE

HREE Supply confined to Southern China, where there are significant resource and environmental issues

**If China conserves HREEs for its own use; then ROW will meet only 10% of its needs in 2015 (IMCOA)**



# Demand for 'Heavies'



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Rare Earths Group	Supply			
	2010		2015 <sup>1</sup>	
	China	ROW	China	ROW <sup>2</sup>
Lights (La, Ce, Pr and Nd)	94%	6%	67%	33%
Mediums (Sm, Eu and Gd)	97%	3%	89%	11%
Heavies (Tb, Dy, Er and Y) (Ho, Tm, Yb & Lu not included)	99.8%	0.2%	<b>96%</b>	<b>4%</b>

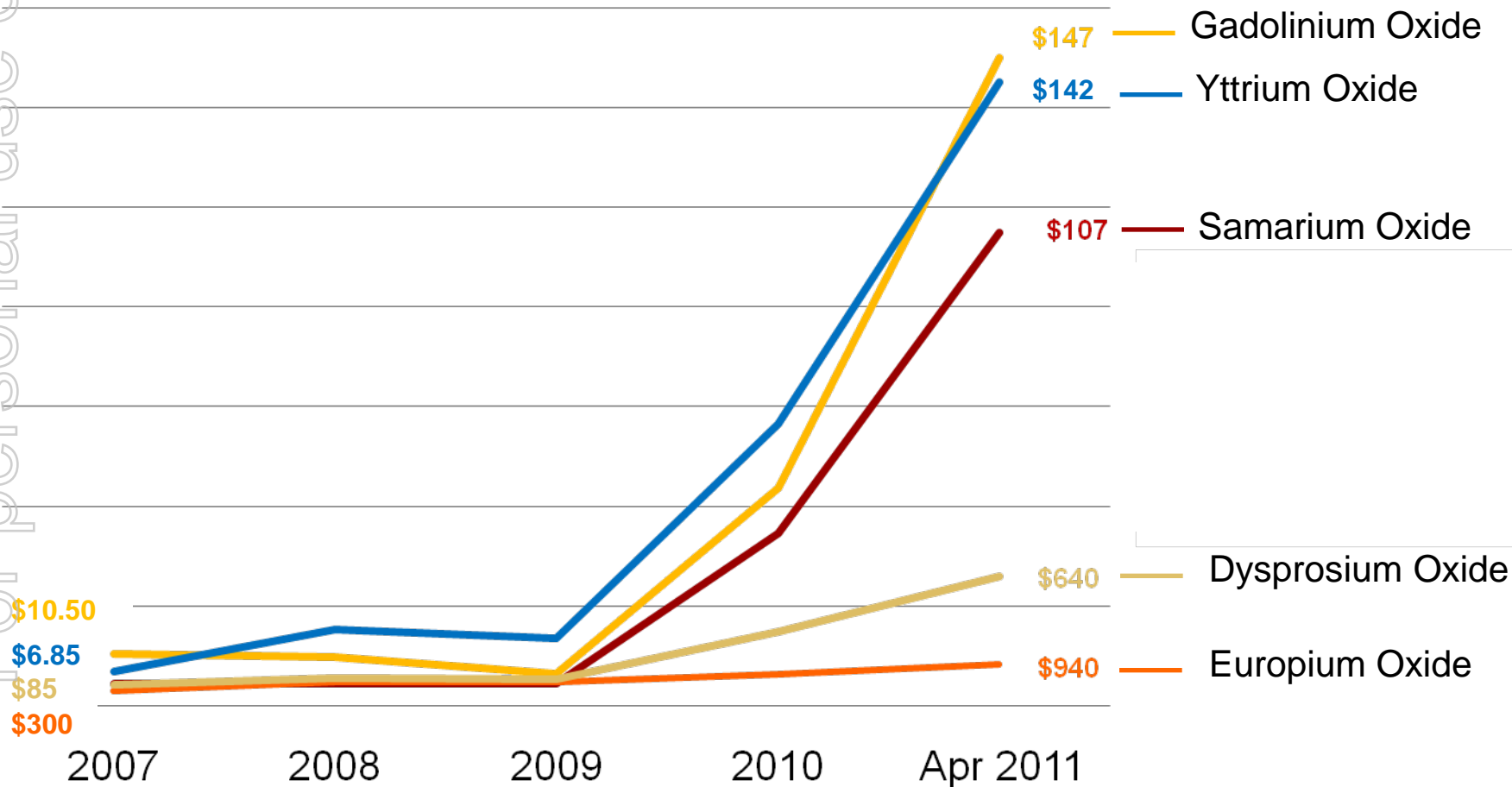
Notes:

1. In 2015 ROW demand will be approx 40% of global demand.
2. Assumes ROW maximises Ce supply from ROW

# Rare Earth Prices



## Comparison of Average Annual REE Prices



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# Browns Range Project



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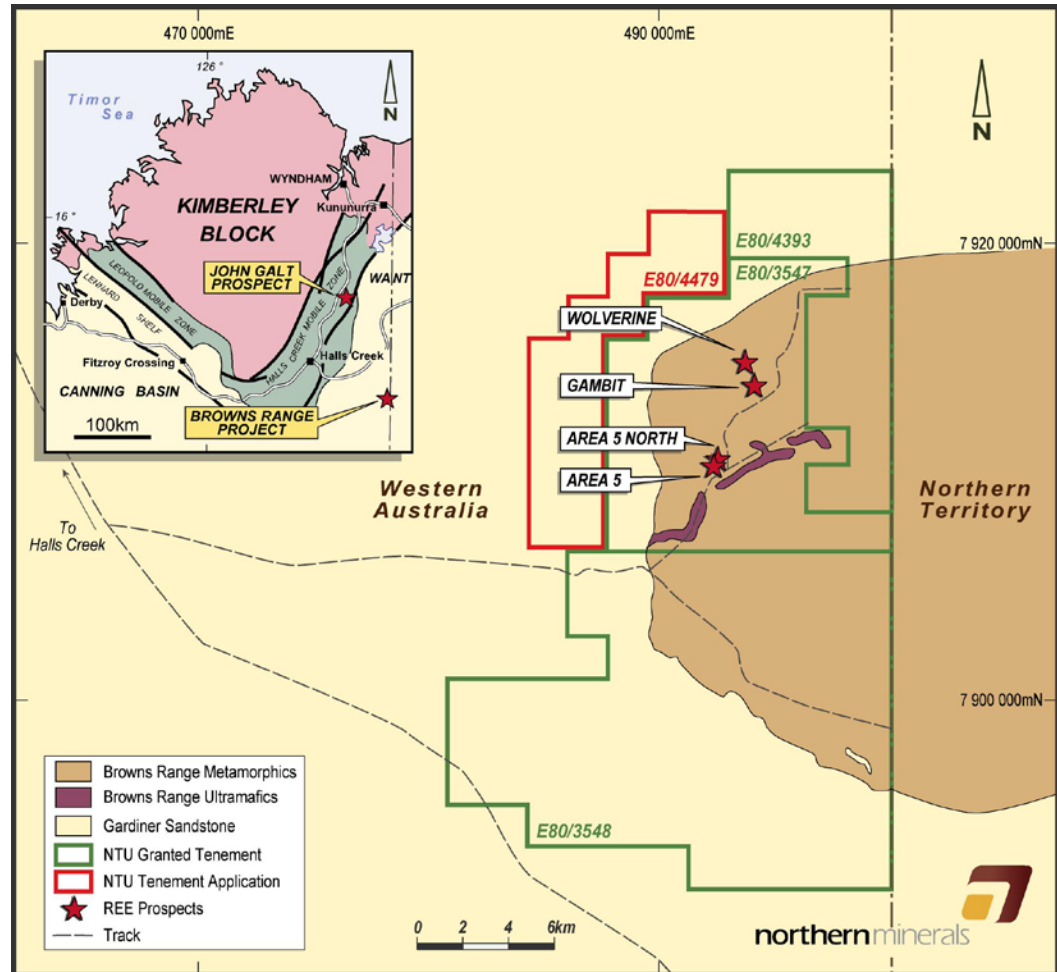
Significant heavy rare earth discoveries confirmed in the East Kimberley Block in 2009

Wide spaced radiometric imagery used in the identification of HREE mineralisation at Browns Range

Xenotime mineralisation is hosted within hydrothermal quartz veins and quartz vein breccias

2010 NTU work program identifies four REE prospects that require drill testing

Northern Minerals 100% ownership and marketing rights



# Browns Range – 2010 Exploration



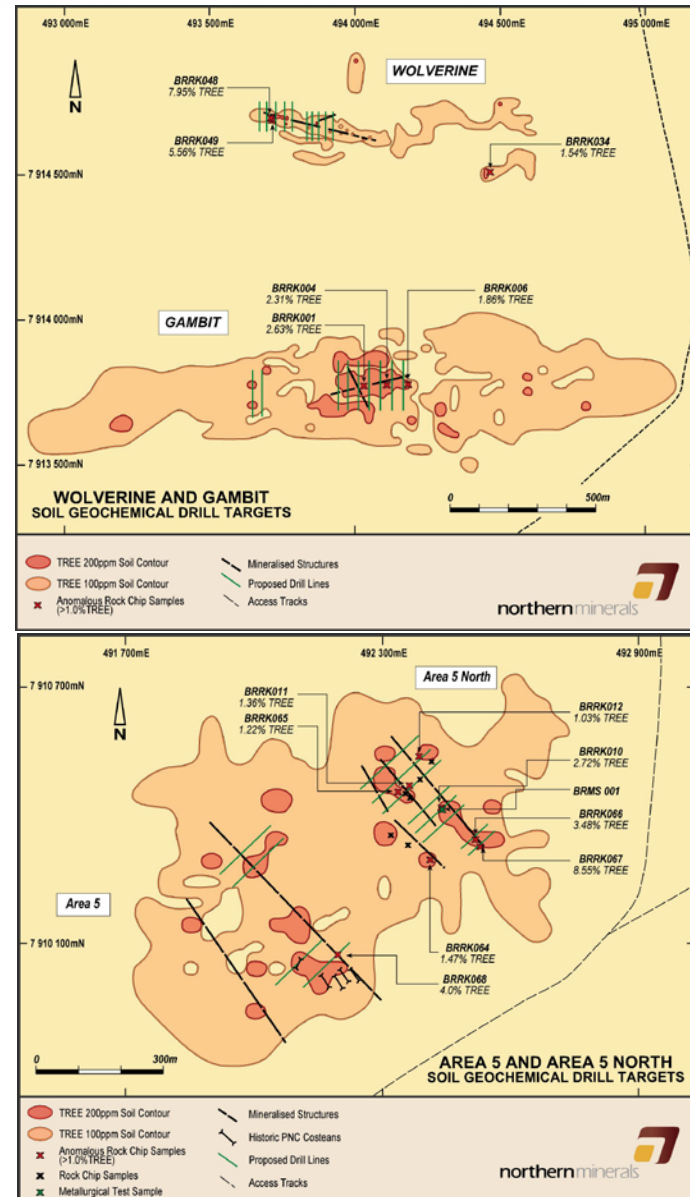
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Encouraging rock chip assay results up to 8.55% TREE

Soil sampling highlights extensive HREE geochemical anomalies at the Wolverine, Gambit, Area 5 North and Area 5 prospects

Rock chips analysis indicates a dominance (>85%) of high value HREE, and extend target area

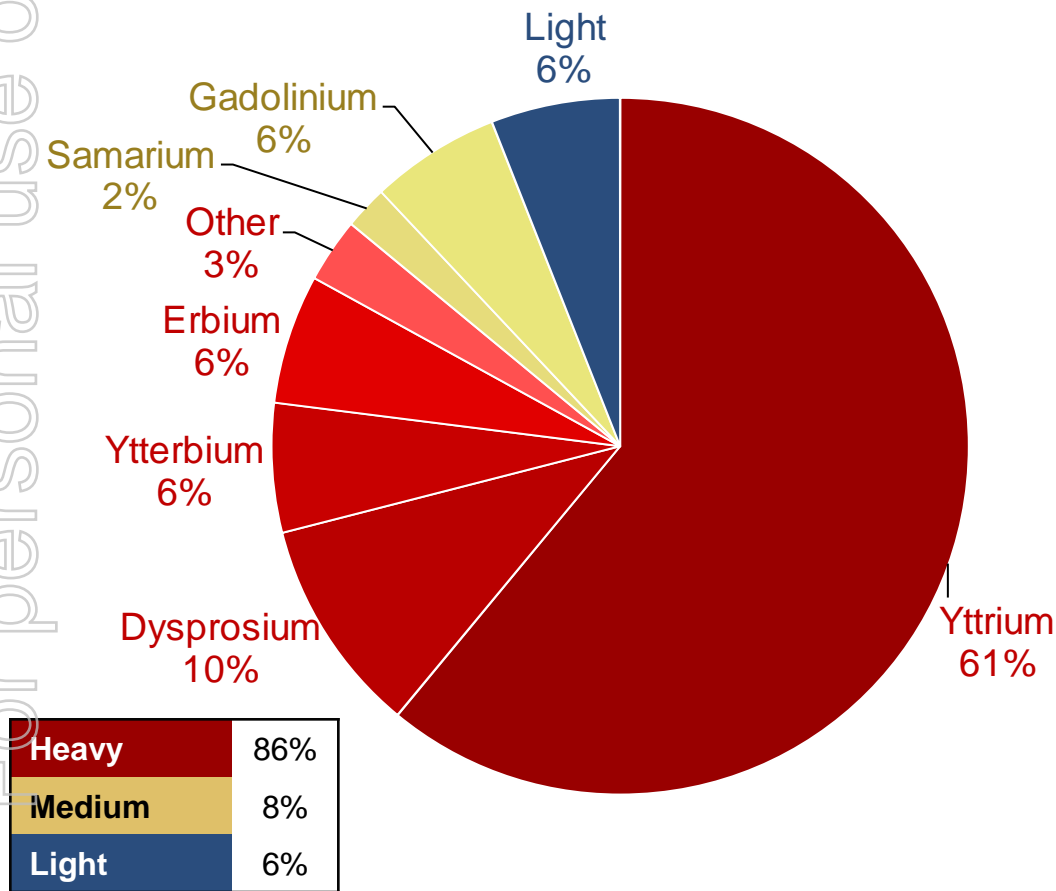
Metallurgical testing confirms accessibility of xenotime – easy processing



# Browns Range – HREE Distribution



## Distribution of Rare Earths\*



Preliminary tests indicate:

- Majority of the rare earths elements in the high value heavy rare earths category
  - Heavy Rare Earths represents 86%
- Low radioactivity
  - Uranium: Average 47ppm per 1% grade
  - Thorium: Average 10ppm per 1% grade
- High Metallurgical Recoveries at 89%

\* Based on 16 rock chip samples taken at Browns Range – Average Grade 3.47% TREE

# Processing Xenotime



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Similar mineral to monazite but much lower radioactivity (less thorium)

Well understood; processed for >50 years (c.f. Guangdong, China)

Potential additive to standard bastnasite/monazite feed as a sweetener to yield 'heavies'

Multiple customers for a xenotime concentrate

Browns Range metallurgical results completed by NAGROM have reported a maximum Yttrium recovery of 89.5%



# Browns Range – Work Program



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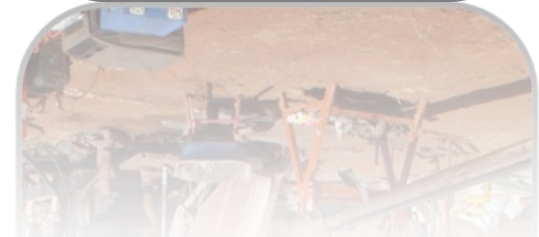
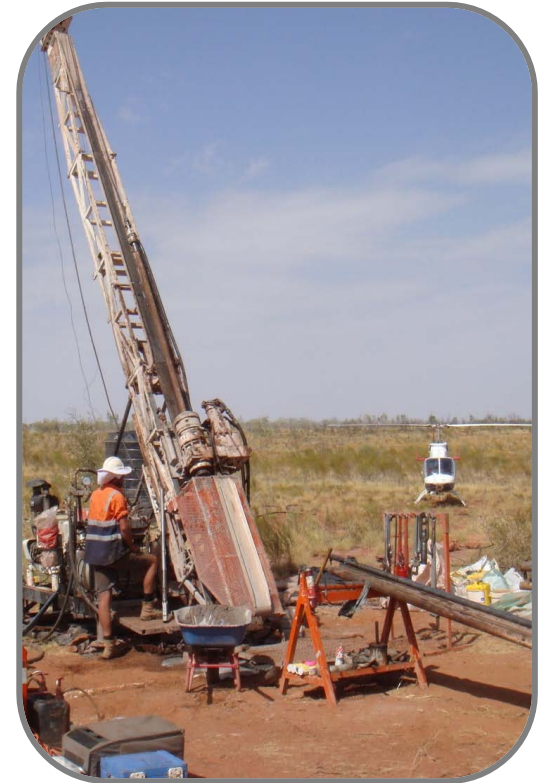
High resolution airborne magnetics and radiometrics survey  
– Q2 2011

RC Drilling program ~ 5,000m at Area 5/Area 5 North and  
Gambit/Wolverine targets – Q2 2011

On-going metallurgical studies of mineralisation from the  
four priority drill targets – Q2 & Q3 2011

Soil/rock chip sampling and mapping of regional targets to  
define second phase drill targets – Q2 2011

Follow-up RC Drilling ~ 5,000m at Area 5/Area 5 North and  
Gambit/Wolverine targets – Q3 2011





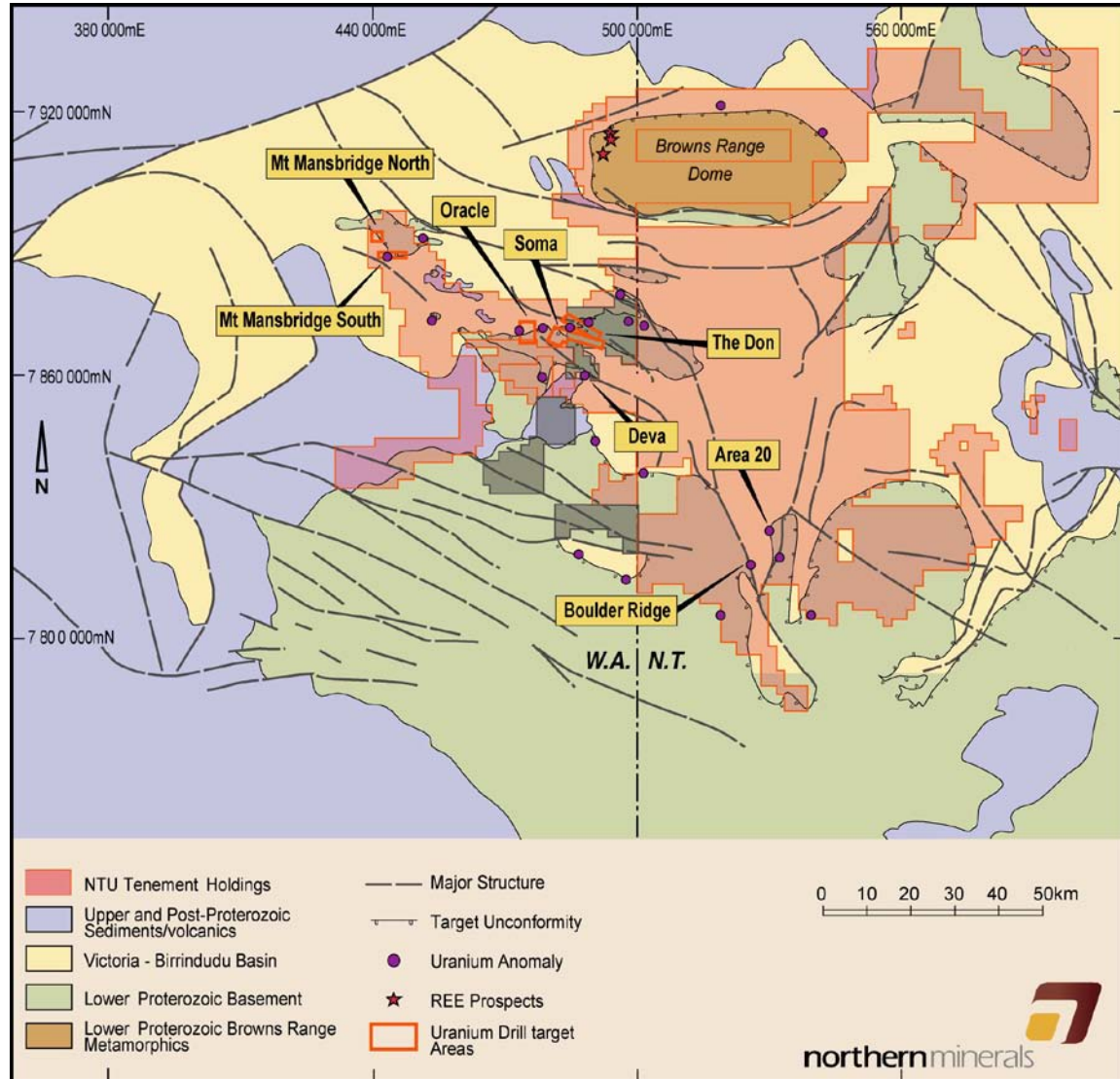
# Future HREE Exploration Potential



Historical reports of xenotime occurrences at Mt. Mansbridge and east of The Don, on-ground follow-up required

Assessment of Tanami region proximal to Birrindudu Basin for HREE potential – never systematically explored for HREE

NTU dominant landholder in a potential HREE province with over 11,000km<sup>2</sup>



# John Galt Project



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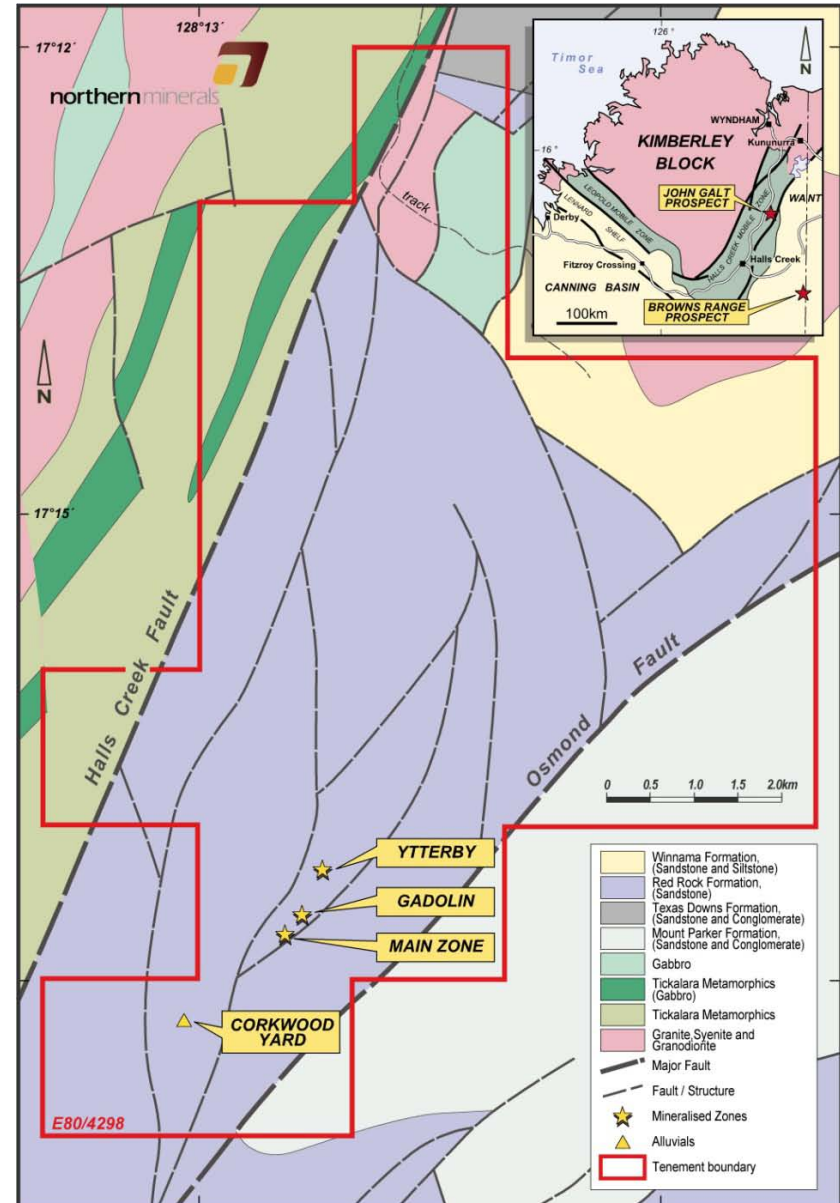
Exciting REE prospect, acquired in June 2010 – granted December 2010

Regional proximity to the Browns Range HREE Project

Similar geology – high value HREE in xenotime mineralisation

Detailed data study confirms dominance of HREE at John Galt

Northern Minerals has option to acquire 100% of the project



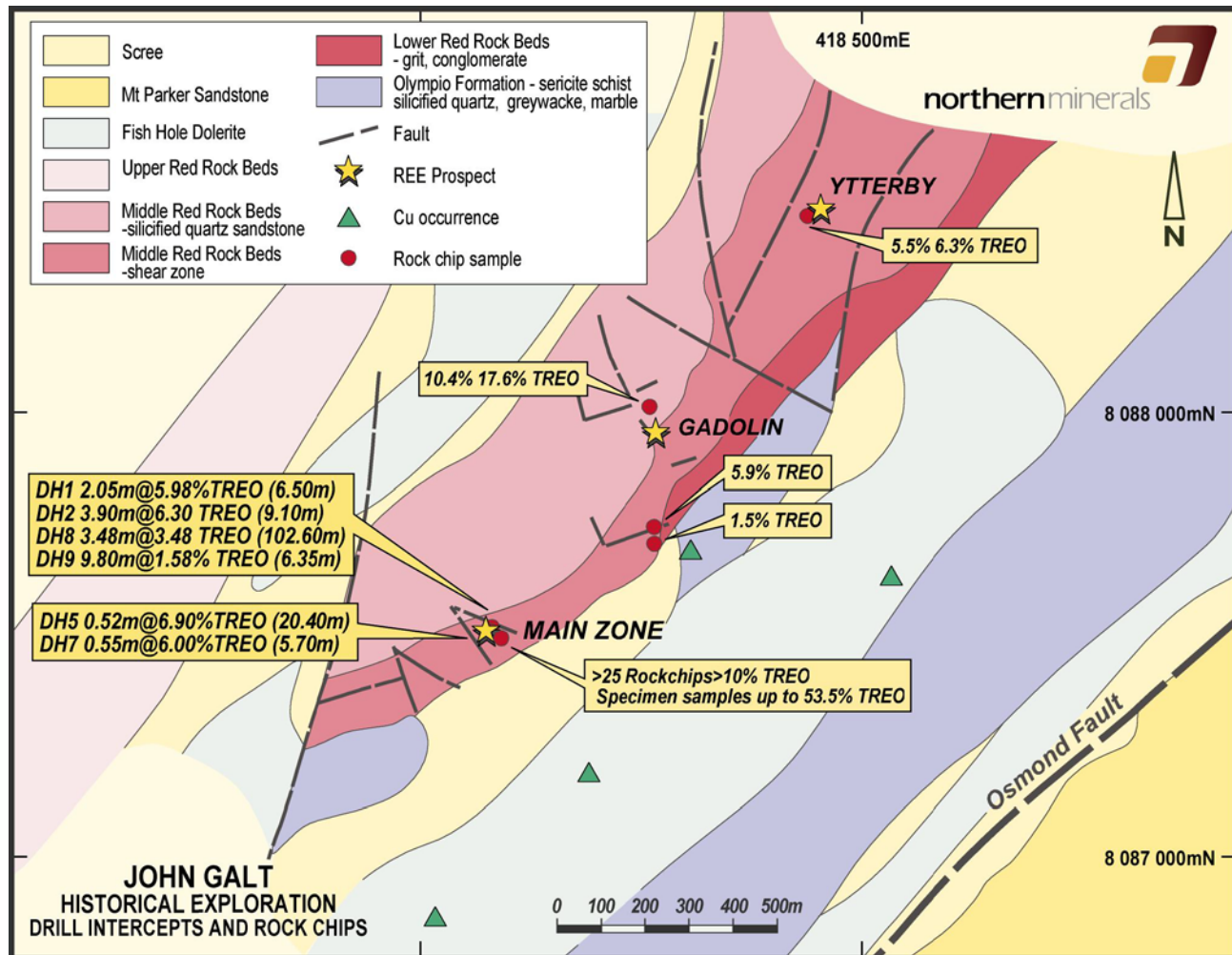
# John Galt – Historical Exploration



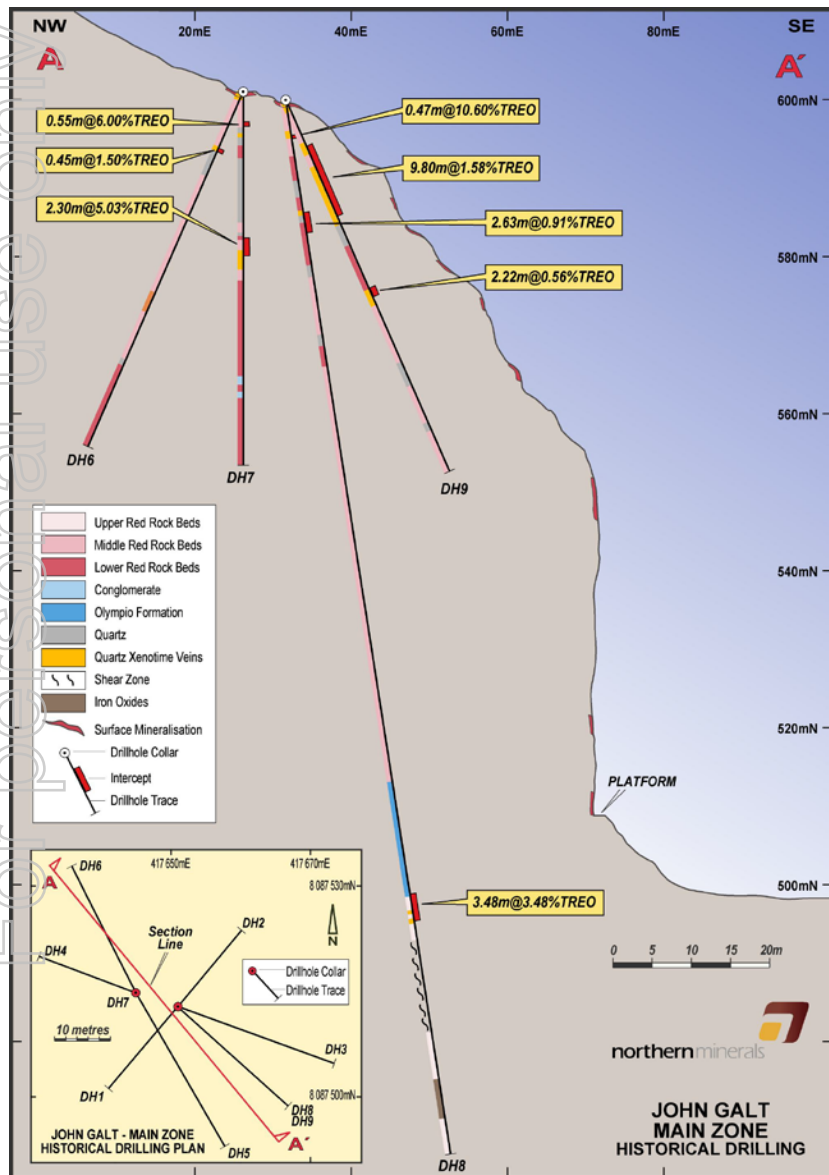
Xenotime-hosted mineralisation at three different zones

Rock chip assays up to **53.5% TREO**

At Gadolin prospect three radiometrically anomalous zones extend over 360m along a N-S trending fault, with rock chip assays up to **17.6% TREO**



# John Galt – Historical Drill Intersections



Fan of nine diamond drill holes for 503m from two drill sites

Detailed analysis of structural controls using 3D software

Every drill hole intercepted at least one mineralised zone

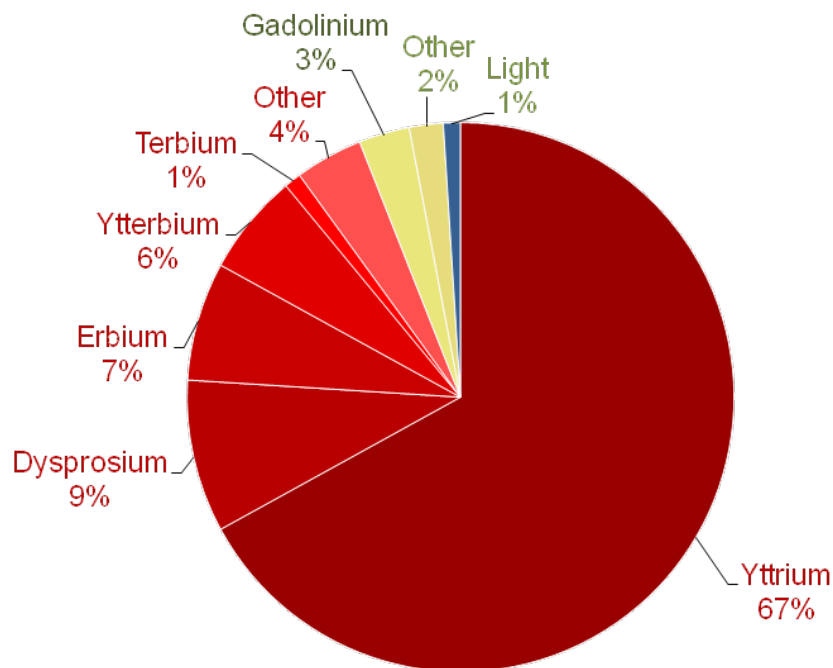
Excellent correlation between downhole radiometrics and assayed samples

Not all downhole radiometric anomalous zones submitted for assay

# John Galt – HREE Distribution



## Distribution of Rare Earths\*



Heavy	94%
Medium	5%
Light	1%

\*Based on average of mineralised drill hole samples + surface sampling + 20 ore samples before concentration from John Galt Main Zone

Historical Sampling indicate:

- Majority of the rare earths elements in the high value heavy rare earths category
  - Heavy Rare Earths represents 94%
- Significant Yttrium, Dysprosium, Terbium, and Erbium(HREE)
  - Significant Gadolinium and presence of Europium
- Similar HREE distribution to Browns Range (86%)

\*TREO – Total Rare Earth Oxide as calculated by the previous explorer using what was termed the “Yttrium Ratio Method”. In the original work on samples of John Galt Main Zone mineralisation it was found that after assaying for a suite of REE a consistent ratio existed between the total rare earth content and the yttrium content. By assaying the yttrium (Y) content of each sample using XRF techniques it is possible to estimate the total rare earth content, based upon that consistent ratio between Y and TREO. It should be noted that it was estimated that the accuracies range from +/- 15% for high concentrations and +/- 20% for low concentrations.

# John Galt - Work Program



Further regional compilation and 3D Interpretation of data – Q2 2011

Aboriginal Heritage Survey - Q2 2011

High resolution helicopter magnetics and radiometric survey - Q2 2011

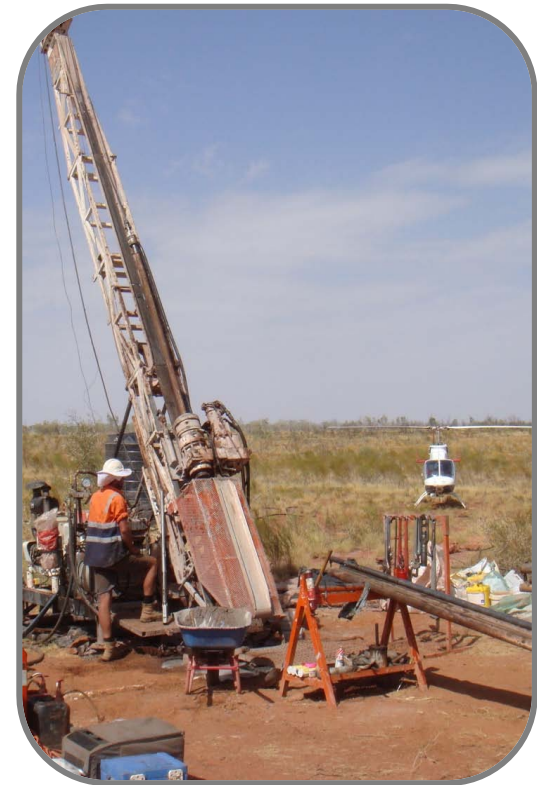
Reconnaissance geological mapping - Q2 2011

Detailed structural mapping and systematic program of rock chip and soil sampling - Q2 2011

Ground radiometric surveys - Q2 2011

Determine and rank drill targets - Q3 2011

First phase drilling program - Q3 2011



# 2011 – The Year Ahead



## Schedule of Exploration Program

QTR 1

QTR 2

QTR 3

QTR 4

Rebranded to Northern Minerals

X

Browns Range geophysics

X

John Galt geophysics

X

REE drilling at Browns Range

X

John Galt soils/rock chip sampling

X

Finalise NT tenements with T/Os

X

Follow up REE drilling at Browns Range

X

Regional Browns Range HREE exploration

X

Gardiner Tanami Uranium and Gold drilling

X

John Galt drilling and metallurgical test work

X

Ongoing exploration at Browns Range and John Galt

X

REE exploration at Gardiner Tanami Project

X

# Value Proposition



## Rare Earths

Prospective High Value HREE projects

Xenotime mineralisation – amenable to processing

## Uranium

Highly prospective high grade unconformity-related targets

11,000km<sup>2</sup> with 30km of drill target areas to date

## Phosphate

Strategic location, near to infrastructure and existing phosphate projects

## People and Partners

Expanded management and geological team – specific experience with uranium and rare earths

Highly experienced Rare Earth experts, Dudley Kingsnorth and John Goulevitch



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# For more information

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**northern**minerals

George Bauk  
Managing Director

Suite 10, Level 2  
12-14 Thelma Street  
West Perth WA 6005

T: +61 8 9481 2344  
[info@northernminerals.com.au](mailto:info@northernminerals.com.au)  
[www.northernminerals.com.au](http://www.northernminerals.com.au)



# Appendices

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# Gardiner-Tanami Project



## Gardiner-Tanami

Large project, multiple uranium targets

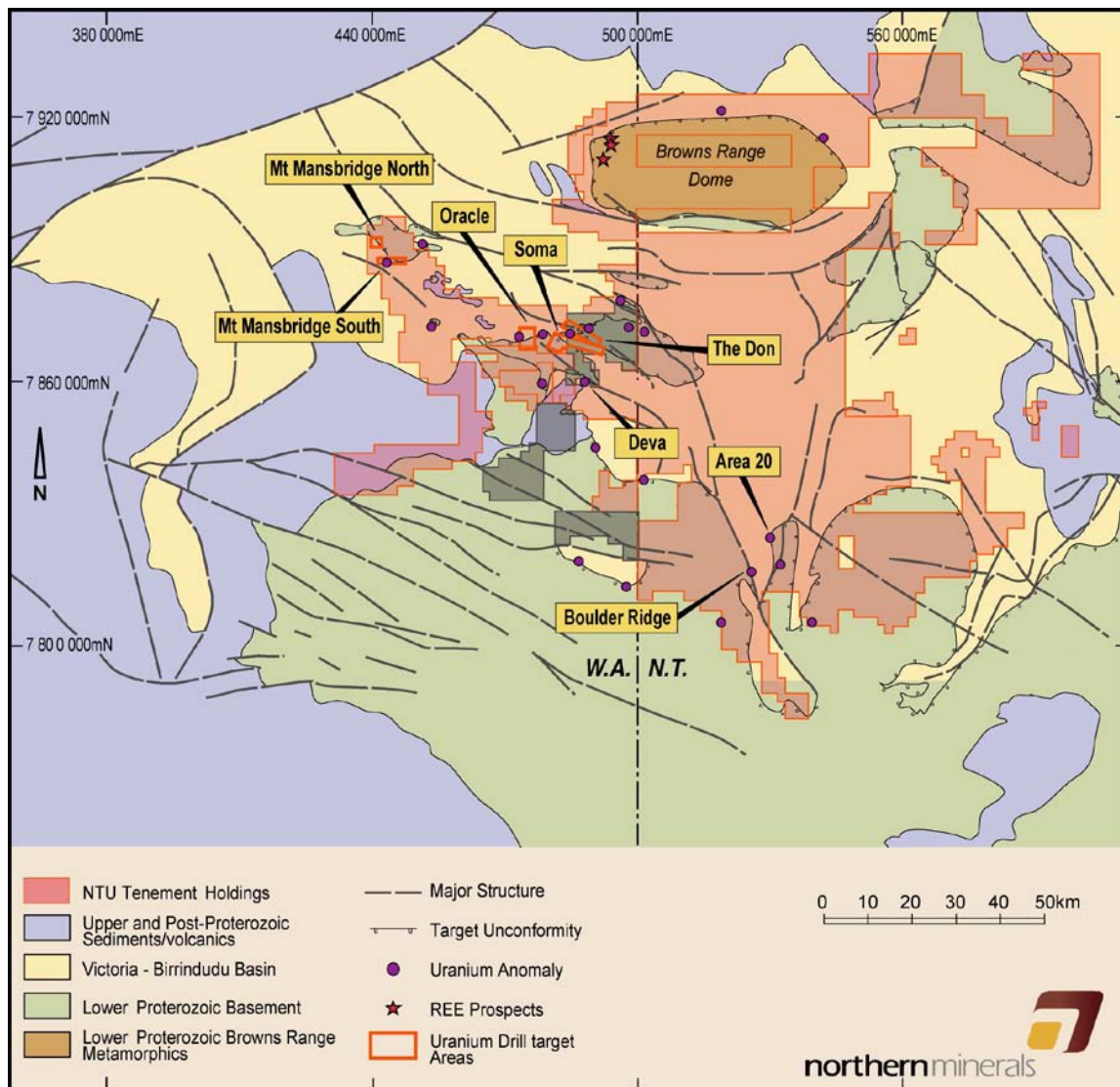
100% ownership

NTU now holds rights for all minerals

## Gardner Range JV

Earning up to 60%

JV with Manhattan (ASX:MHC)



# Gardiner-Tanami Drilling



## Soma

Intersected Gardiner Sandstone / Killi Killi formation

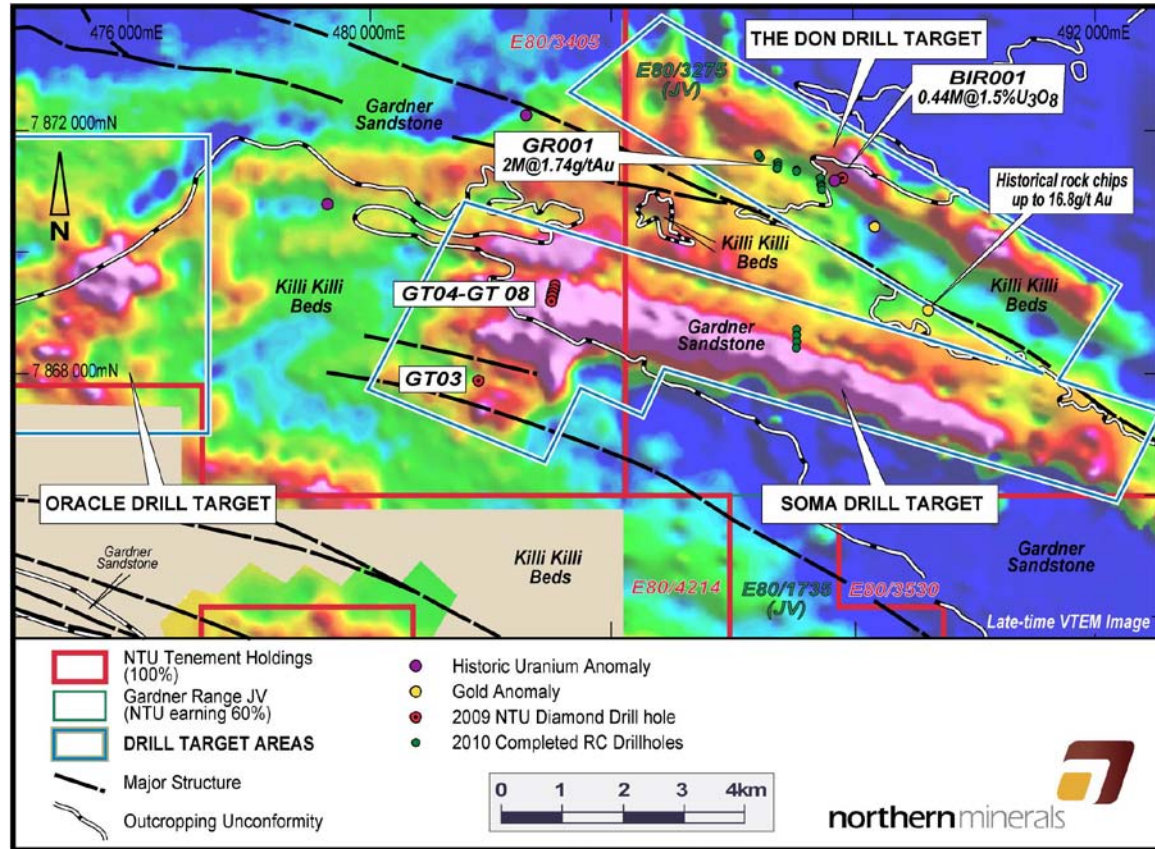
Confirms large (8km) target for high grade unconformity mineralisation

Follow up drilling in 2011

## The Don

Encouraging gold intersections - 2m @ 1.74ppm Au

Follow-up drilling at The Don, Whites Beach and Venus gold targets in 2011



ORACLE, SOMA AND THE DON DRILL TARGETS. GEOLOGY AND TENEMENTS OVER VTEM IMAGE

# Phosphate Projects



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Phosphate – strong growth forecast with increasing population and food demand

Well located portfolio in close proximity to existing phosphate deposits and infrastructure

Projects in prospective Georgina and Amadeus Basins

PCF Capital engaged to divest and/or seek JV partner

