Tellus Holdings Ltd

The Proposed Chandler Facility

NT Major Projects Conference
October 2017, Darwin

Richard Phillips, GM HSECCQ

18 October, 2017
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Tellus’ strategy is safety first and we maintain internationally recognised management systems.
Tellus Holdings Ltd overview

**Vision**
- In the business of creating economic, social and environmental value from hazardous waste, clay and salt

**Strategy**
- Develop a portfolio of geological repositories
- Develop national hub & spoke logistics model
- Develop a portfolio of sustainability parks (support the circular economy)

**Established “Utility Style” business**
- Tellus’ business model follows world’s best practice techniques in Europe & N. America.
- Dual use facilities – mine salt and clay, long term storage, recovery of valuable materials, permanent isolation of equipment and waste

- WA Gov.’s IWDF (ClayVault 50/50 JV)
- Sandy Ridge (WA)
- National Warehouses (Toll)
- Chandler (NT)
Over the last 6 months, Tellus has achieved significant technical and commercial progress.

2009 – 2011
- Incorporation of Tellus
- IWDF(1)/SR(2) Concept Study completed
- Site selection studies: 5 salt beds (CH(3)) and 1 kaolin bed (SR) across Australia (IAEA guidelines)
- Started engagement with local communities

2012 – 2014
- 5 year (3+2) contract to operate the IWDF
- SR and CH Scoping Study completed
- Continued engagement with community and Gov.
- Commenced 39 t pilot kaolin pilot (Perth)
- Commenced wet salt processing pilot (US)
- Commenced dry salt processing pilot (Germany)
- Major Project Status for CH, granted by NTGov.

2015 – 2017
- Independent value engineering reviews
- SR Completed our Bankable Feasibility Study
- CH completed BFS planning stage
- Continued Gov. and local community engagement
- Lodged SR Draft (PER) and Supplement
- Lodged CH Draft EIS and Supplement
- Toll logistics MOU - 8 storage and transfer stations
- Hundreds of millions of dollars of signed MOUs with major customers
- Strengthened our balance sheet
- Awarded Major Project Facilitation Service buy the Federal Government -

1. IWDF = Intractable Waste Disposal Facility, 2. SR = Sandy Ridge, 3. CH = Chandler, PFS = Pre-feasibility Study, BFS = Bankable Feasibility Study
# The Salt Problem, Solution and Market Trends

## The Problem

<table>
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<tr>
<th>Problem</th>
<th>Description</th>
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<tr>
<td>supply reliability</td>
<td>Asian market concerned about reliable supply of salt</td>
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<tr>
<td>supply shortfall</td>
<td>Expected 6 Mt shortfall of salt by 2018</td>
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<tr>
<td>massive new evaporative ponds required</td>
<td>To meet this demand, 47,000 ha of new solar evaporative facilities</td>
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<tr>
<td>extreme weather can affect evaporative ponds</td>
<td>Evaporative ponds also affected by extreme weather (cyclones, heavy rain events – can take up to two years from filling up the pond to final product over ship bow).</td>
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## The Proposed Solutions

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<tr>
<th>Solution</th>
<th>Description</th>
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<td>Chandler salt mine (500 year mine life)</td>
<td>Extensive investigations have proven millions of tonnes of salt exist in the Chandler Formation.</td>
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<td>scale up to meet supply shortfall</td>
<td>Mining Chandler Formation could be scaled up to meet Asian demand</td>
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<tr>
<td>recovery</td>
<td>Existing infrastructure is in place and has capacity. Existing commercial agreements demonstrate the need</td>
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<tr>
<td>jobs</td>
<td>Creating more jobs</td>
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<tr>
<td>diversify economy</td>
<td>Diversifying the economy in regional areas</td>
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## Salt Market

| Market value | Australia produces 13.2 Mt salt p.a. |
| Salt market growth rates | Demand for salt is growing at 3-5% p.a |
| Australia large salt supplier | Largest external supplier of salt to Asia. Main supply via evaporative solar ponds. |
| Growth linked to population | As Asian middle class grows, industrial and edible salt requirements grow |
# The waste problem, solution and market trends

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<tr>
<th>Problem – national level</th>
<th>The Proposed Solutions</th>
<th>Waste Market</th>
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<tr>
<td><em>Australia is one of the highest emitters of haz. waste per capita</em></td>
<td><strong>Solution – sustainable infrastructure</strong>&lt;br&gt;• Tellus’ can store or permanently isolate waste using ESM principals</td>
<td><strong>Market value</strong>&lt;br&gt;~ $14.2 billion Australian waste market</td>
</tr>
<tr>
<td>Problem – forecast stockpile</td>
<td><strong>Solution – best practice</strong>&lt;br&gt;• A “local” global best practice solution</td>
<td><strong>Jobs in industry</strong>&lt;br&gt;~ 50,000 + jobs</td>
</tr>
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<td><em>Annual hazardous waste market in 2015 was 5.3 M tpa &amp; growing</em></td>
<td><strong>Solution – recovery</strong>&lt;br&gt;• Tellus’ sustainability parks designed to recover valuable materials and push materials back into the circular economy</td>
<td><strong>Waste market growth rates</strong>&lt;br&gt;~ 7.0% pa growth rate since 2010 linked to population and GDP</td>
</tr>
<tr>
<td>Problem – legacy stockpile</td>
<td><strong>Solution – jobs</strong>&lt;br&gt;• Creating more jobs</td>
<td><strong>Growth linked to GDP</strong>&lt;br&gt;• Haz. waste growing at 3 X GDP rate</td>
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<td><em>1 Billion tonnes and growing</em></td>
<td><strong>Solution – economy</strong>&lt;br&gt;• Diversifying the economy in regional areas</td>
<td><strong>Growth linked to population</strong>&lt;br&gt;• Haz. waste growing at 5 X population rate</td>
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<th>Problem - infrastructure</th>
<th>The current situation</th>
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<td><em>Insufficient infrastructure at competitive price points to permanently solve the problem or recover valuable materials</em></td>
<td><em>Regulators and community demanding higher ESM and sustainability levels</em></td>
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ESM = Environmentally Sound Management
Proven international business model
Tellus' service offering

- Tellus is focused on developing two flagship geological repository projects, the Sandy Ridge facility (WA) and the Chandler facility (NT).

- To assist Customers Tellus can facilitate a range of waste characterisation, packaging and transport pre-gate services with reputable 3rd party providers.

- Tellus’ core services are: long term storage above or below ground, recovery of valuable materials or the permanently isolation of difficult to manage waste types.

- The Customer value add proposition:
  - Risk and title transfer
  - Certification process can be used as evidence to assist in liability reduction
  - Cost certainty and potential savings
  - Best practice HSE systems
  - Providing confidence to the waste producers and their stakeholders the solution is best of class or permanent.
Waste hierarchy & Environmentally Sound Management

“Applying Environmentally Sound Management (ESM) principles may result in a lower option in the hierarchy being chosen but result in a better overall environmental outcome” UK Government - DEFRA
• Landfills **do not permanently isolate waste from the biosphere**
• Risk of groundwater contamination (pollution risk)
• Typical landfill liner thickness ~1.5m or less
• Lifespan of containment – 10-30 years\(^1\)
• Can not issue permanent isolation / disposal certificates
Chandler - safety case

**Geography**
- Remote location
- No land uses

**Geology**
- Low permeability
- Low erosion

**Seismology**
- 500 million year old
- Stable formation

**Engineering**
- Cell construction
- Cell closure
- Packaging

**Processes**
- Waste acceptance
- Segregation
- Treatment

**Climatology**
- Arid landscape
- No aquifer
Unique assets: Waste permanently isolated in a ~ 500 million year old salt bed
Geology: Salt bed ~ 800m deep, ~ 250m thick, ~ 18km wide, salt bed (length unknown)
Aquifer and climate: No aquifers have passed through the salt bed over the last ~ 500 million years. Located in an arid area.
Infrastructure: Next to Central Australian (Adelaide to Darwin) railway line
Chandler – decline and shaft access
Layout - underground

- Salt hoisted up the vertical shaft and materials driven down the decline
- Equipment, archives and waste materials unpacked underground
- Backfilling of waste with salt (salt creep supports passive safety)
- Plug design for permanent isolation
Tellus bringing “world’s best practice” solutions for a difficult to manage problem

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<th>Sandy Ridge - wastes accepted and excluded</th>
<th>Chandler - wastes accepted and excluded</th>
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<td>Chemical waste (NEPM Schedule A List 1: Waste categories)</td>
<td>Chemical waste (Waste Management Pollution Control Regs)</td>
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<tr>
<td>Naturally occurring radioactive waste (“NORM”) - LLW level</td>
<td>Naturally Occurring Radioactive Waste (“NORM”) – Exempt Level</td>
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<tr>
<td>Low level radioactive waste (LLW)</td>
<td></td>
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<tr>
<td>Intermediate (ILW) &amp; High level radioactive waste (HLW)</td>
<td>Nuclear Waste (enriched uranium &amp; plutonium) - LLW, ILW, HLW</td>
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Chandler - Consultation activities

Methods of engagement

- Face to face meetings.
- Workshops.
- Presentations
- Interviews.
- Community information sessions.
- Site visits with key stakeholders.
- Telephone and email communications.
- Media releases.
- Website updates.
Tellus supports training, local jobs and business, investment and regional development in regional Central Australia.

Chandler - Community engagement in the NT

- Supporting local businesses
- Creating local jobs for Traditional Owners
- Supporting local communities (Titjikala Tidy Town)
- Supporting education programs - CDU
- Supporting local indigenous programs
- Site visits for Traditional Owners
Chandler - Economic and social benefits to NT

- Economic modelling over 25 years
- Three regions— the local, the NT and Australia
- CAPEX ~$676 M (including indirects)
  - 36% in NT (37% local region $216 M)
- OPEX ~ $81 M pa
  - 52% in NT (32% local region $26 M pa)
- Ave. of $144 M pa over LOP to the GSP of the NT
- A Social Impact Management Plan has been drafted for the Proposal.
- Progressing with ILUA.
- Progressing with Industry Participation Plan (IPP)
Gov’t Policies that align with Chandler Facility

Government Social and Economic Policies

- Diversifying the Economy
- Royalties and Taxes
- Community Investment
- Waste Infrastructure
- Asian Trade

Government Environmental and Haz. Waste Policies

- Transport of Dangerous Goods Reg’s
  Prevents accidents and promotes safe transport
- Haz. Chem. (OHS Reg’s)
  Reduce OHS risk in the workplace
- Environmental Protection Reg’s
  Minimise adverse impacts on environment and human health and meeting national and international obligations
- Product Stewardship Reg’s
  Waste oil, asbestos, e-waste, tyres, batteries, mercury, medicines

Jobs - Local & Indigenous
- Jobs – Women and Youth
- Training and Skills
- Contracting
- Innovation
Project progress and next steps

1. NT EPA Assessment Report – 30 Nov 2017
2. Ministerial Approval Jan 2018
3. Bankable Feasibility Study 2018
4. Qtr 3 2019 Construction begins

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NT Gov. Major Project Status (MPS) September 2014 Northern Territory Government grants Major Project Status to the Chandler Project

Questions?
Contact Details

Richie Phillips
General Manager, Health, Safety, Environment, Community, Compliance and Quality

E: richie@tellusholdings.com

A: Suite 2, Level 10, 151 Castlereagh Street, Sydney, NSW, 2000
T: +61 2 8257 3395 F: +61 2 8233 6199

www.tellusholdings.com.au
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