

# WHY BALED WHOLE TYRE EXPORTS FAIL THE TEST OF 'ENVIRONMENTALLY SOUND USE'

## A Report for Tyre Stewardship Australia by the Australian Tyre Recyclers Association

March 2016

### OUTLINE

The following paper is submitted by the Australian Tyre Recyclers Association (ATRA) to Tyre Stewardship Australia (TSA) in good faith to support the development of Australia's Tyre Stewardship Scheme (TSS).

ATRA is the peak body representing Australia's legitimate used tyre collection and recycling industry. Collectively, ATRA member companies, process around 20 Million EPU's<sup>1</sup> per annum including passenger, truck and mine sector (OTR) tyres. This processed material is exported as a fuel replacement (TDF) for coal or utilised domestically as crumb in sports fields, adhesives, asphalt and bitumen and in civil work applications.

ATRA is a member of TSA and has an ACCC designated TSA Board position.

This paper is designed to educate and inform TSA's policy position in relation to baling for export of whole used tyres.

### SUMMARY

ATRA is concerned with the ongoing practice in Australia of exporting baled whole tyres and TSA accreditation of these operators.

While this export might currently be legal (though for instance, India bans these imports<sup>2</sup>, requiring one-cut to the bead for safety/ non-reuse reasons) it does not make it acceptable and certainly does not strive for best practice or the evolution of the Australian industry.

TSA should phase out support for baled whole tyre exports, requiring existing accredited collectors/ recyclers to shift away from 'baling' within six months and disqualify new applicants engaged in the practice.

The basis for this position is the significant environmental, biosecurity, safety and industry / market problems associated baled whole tyre exports; and the TSA and Basel convention guidelines that prejudice the practice.

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<sup>1</sup> An EPU, or Equivalent Passenger Unit, is equal to around eight kilograms and represents the approximate weight of a used passenger vehicle tyre. All used tyres are measured against this with a small truck tyre being approximately five EPU's, etc

<sup>2</sup> Foreign Trade Policy, retreaded or used Pneumatic Tyres under ITC (HS) codes 40121100, 40121200, 40121300, 40121910, 40121990, 40122010, 40122020 is "Restricted". These imports are subject to Policy Condition 1 of Chapter 40 of ITC (HS), 2012 Schedule I (Imports). However, **import of used rubber tyres with one cut bead wire** is free under TIC (HS) code 40040000.

## INTRODUCTION

ATRA, in early 2014, agreed a policy position to exclude baling of whole tyres for export from its membership criteria.

The result of this policy position was that several existing ATRA members mothballed baling equipment – this unused machinery can still be viewed at various ATRA member's sites; members lost existing baled tyre export markets; and any new applicants were required to abandon the practice of baling – resulting in the loss to ATRA of several new members.

The establishment in 2014 of this strict new policy position was the result of months of deliberation and debate. It was based on a principled position, from decades of industry experience, that the export of baled whole tyres did not constitute 'environmentally sound use'.

From a biosecurity, traceability, public safety, environmental and industry sustainability perspective baled whole tyre exports are the lowest grade of 'recycling'. The continuation of the practice in Australia is failing to evolve the industry and TSA should be assisting to lead the market toward more sustainable solutions.

## ATRA'S POSITION OPPOSING BALING

In undertaking this analysis, ATRA's Executive Officer canvassed the views and sought current market intelligence from ATRA members who collectively have around 215 years of industry experience.

ATRA's position opposing baling of whole tyres for export (there may be merit in the use of bales in domestic civil works and for transportation) is based on the following principles:

- Biosecurity
- Traceability
- Safety
- Environmental and public health
- Industry development

### Biosecurity

Whole tyres (including when compacted as bales) can retain water that can be exported. They may also gather water upon arrival and removal from a container at an export destination.

One ATRA member estimated his whole tyre bales<sup>3</sup> contained about '3% by weight of water', or, 'bales weighed about 30kilo's more<sup>4</sup> than they should have' from retained water.

Another ATRA member recounted the following, *The 'Baling (process) released almost no foreign matter and no more water than normal handling of wet tyres. After installing the shredder we have had to fit water recycling equipment to handle 1000 litres per hour for a system that shreds 5.5 tonnes per hour. Measurements have shown a passenger tyre can still contain 300 ml of water as it*

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<sup>3</sup> This, like all, ATRA members no longer bales for export. ATRA would however note that for a short period in late 2014 one member was forced to bale as the global market for shred collapsed. This member kept the executive informed of this departure from best practice and returned to shredding operations, including cancelling existing bale markets, within a reasonable time period.

<sup>4</sup> A bale of whole tyres will constitute about 100 tyres or 120EPU's, made up of passenger and 4\*4 tyres, with a total weight of approx. 1000kilo's (one tonne)

*enters the shredder even after water has been released in transport and unloading. 300ml per EPU is 937litres (almost one tonne) of water per container.'*

Infamously, there is no better mosquito habitat in the world than a tyre. As the Basel convention technical guidelines note, *'When transported, used tyres not only spread mosquitoes that are otherwise limited in their reach, but also contribute to the introduction of non-native species, which are often more difficult to control, thereby increasing the risk of disease. The rapid spread of Aedes ablopticus (Asian tiger mosquito), in particular, has been attributed largely to the international trade in used tyres.*

An ATRA member in a drier part of the country has noted the increased quantities of dust coming out of his operation now he's shredding. He says, *Shredding is releasing about 1.5 tonnes of dirt for every 100 tonnes of shred and collected from the floor.* This raises the additional biosecurity risk of exports of baled whole tyres including seeds, insects and other vermin.

The risks cited above are not applicable to exported shred / tyre derived fuels (TDF). The Basel guidelines note, *'The production of shredded tyres also minimises the risk of providing breeding sites for mosquitoes'*<sup>5</sup>.

The export of bales would also contrast with the export of whole tyre casings (for reuse or retreading) due to the required condition for export and end use.

As casings are stored and handled undercover there is minimal likelihood of water being contained within, as a required condition of export. In addition, all casings upon leaving Australia go through a three-point check. This involves checking the bead, sidewall and crown for road worthiness. Included in this process is a rigorous inspection of the inside cavity to ensure there is no separation of (bubbling) under the surface.

This all serves to ensure no water inside a casing will leave Australia. These units then go into retail or retreading operations that again do not allow for water to be contained in the casing.

### Traceability

Export shred for TDF is cut to specification for a particular buyer and particular cement kilns. Homogenous TDF size is vital for the functioning of these facilities and shut downs occur if this material is outside specification. The current market for TDF requires two and six-inch shred and there is an emerging requirement for three inch to go to India. This material can replace or supplement the use of coal or natural gas in extremely sophisticated industrial processes. As the Basel guidelines<sup>6</sup> outline, using TDF in these facilities require;

- *Special monitoring equipment required to control emissions*
- *Needs a system for supplying the separated waste/tyre fractions*
- *Increased zinc loading filter dust and/or clinker*

The Basel guidelines detail the developments of TDF use in the cement kilns including the destruction of dioxins in the burning process through 1400+deg Celsius temperatures. TDF export from Australia is used in cement kilns in developed countries including South Korea and Japan with equivalent air emission standards to Australia. TDF would be used in Australia (and has in the past) if

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<sup>5</sup> Basel convention, revised technical guidelines for the environmentally sound management of used and waste pneumatic tyres, October 2011. Pg 12

<sup>6</sup> *ibid*

not for the reality of very cheap-coal, our proximity to this coal supply and the lack of cement kilns now operating in Australia.

TSA specifically endorses TDF in its list of 'environmentally sound' uses, outlining:

*'For the purposes of the Tyre Product Stewardship Scheme environmentally sound use includes:*

- (i) recycling into tyre crumb, shred, chips, granules, steel and other tyre components;*
- (ii) use as a fuel (other than in direct incineration without effective energy recovery and unsustainable burning for energy recovery) or other means to generate energy;*
- (iii) production of tyre derived products, including **tyre derived fuel**;*
- (iv) civil engineering.*

Bales of whole tyres from Australia are at best being applied to pyrolysis operations in Malaysia, Thailand and Indonesia. At worst they disappear into small back-yard operations or may be removed for reuse.

Vietnam is currently coping with containers of dumped used tyres that have been given temporary import certificates for re-export to third countries<sup>7</sup>. While it cannot categorically be claimed these containers hold bales of whole tyres, this is more likely than not as TDF is sourced against predetermined specifications.

An alternate destination for bales of Australian tyres is small 'backyard' energy recovery applications. Bales of whole tyres can easily be disassembled to smaller consignments, of 10 or 20 tyres, with this material transported on small trucks to unknown destinations.

Container loads of shredded tyres require relatively sophisticated equipment to remove, load and transport and it is generally retained in the container until it arrives at its consigned destination.

## Safety

Related to the issue of traceability is that of safety.

Unlike shredded tyres and TDF, there is an opportunity for unscrupulous operators to pull containers of bales of whole tyres apart and individual tyres themselves from bales. As noted above this may result in their being appropriated to backyard and highly polluting kilns. It may also result in their being reused as tyres for trucks and passenger vehicles.

*'We know it happens', said one ATRA member ... 'I've seen it'. 'Tyres have a memory. The bead might be bent but after a short period they will return to their approximate shape and maybe sold as casings.'*

As this operator outlined tyres removed from a bale are unsafe. *'We were contracted to collect a batch of compressed tyres, some of which were taken away for retreading and they all failed, despite appearing in relatively good shape.'*

The potential reuse of baled tyres undermines the legitimate tyre retailing and wholesaling industry, is a consumer safety issue and may also represent a legal liability issue for tyre manufacturers.

ATRA would contrast this practice with the export of casings for reuse or retreading. This practice is:

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<sup>7</sup> <http://vietnamnews.vn/economy/270497/move-to-rid-ports-of-old-rubber-tyres.html>

- An extremely small portion of the recycling industry (approximately 3%)
- Involves no safety issues as there is no corruption of the bead/ side wall etc
- Involves no inappropriate disposal to polluting pyrolysis operations

### Environment and public health

No used tyre pyrolysis operations that Australia exports bales of whole tyres to would be acceptable under Australian EPA requirements. Indeed, the Basel guidelines eschew pyrolysis as an 'environmentally sound use' noting, *In the United States, pyrolysis has not yet been proven to be an economically viable operation. It has been attempted over 30 times and has always failed as a full-scale operation; investors have lost millions and states have had to incur costly clean-up activities. The pyrolysis process is capable of creating hazardous waste pyrolytic oils that need to be managed accordingly.*

We are also yet to see any commercial used tyre pyrolysis operation in either Australia, or in the EU, according to an account by Peter Taylor of the UK Tyre Recovery Association in late 2015 to a TSA industry forum. This lack of viability will be a combination of emission controls and labor costs. A trial tyre pyrolysis operation in Western Australia was commissioned in 2002 with trials in 2003 and the use of this plant was discontinued in 2005<sup>8</sup>.

According to the West Australian waste authority Tox Free trialed this unit as a, 'A new and emerging technology subject to R&D, recovering Jet fuel, Diesel, Carbon black, Activated carbon. Tox Free is not pursuing this technology as **the purity of end products is not sufficient for sale.**' (Pg 37)

The WA waste authority went on to say, 'Tox Free Solutions undertook feasibility trials in WA in 2003. The feasibility trials were successful in that the equipment did break down shredded tyres to constituents, and provide the correct mass balance at the end of the process. However there were several difficulties that resulted in the company not pursuing the market. Firstly tyres must be shredded to an appropriate size for the kiln<sup>9</sup>. As tyres come in many different sizes this was a major issue, particularly for the larger OTR tyres. The biggest issue however was the lack of markets for the end products. **The carbon black produced was contaminated with heavy metals and would need to undergo several purification steps before it could be resold to tyre manufacturers and the oil is of low flammability and limited use.**'<sup>10</sup> Pg 73



Malaysian tyre pyrolysis operation

<sup>8</sup> [http://www.parliament.wa.gov.au/Hansard%5Chansard.nsf/0/4b4c3a8c483f210ac8257570007f3a30/\\$FILE/C36%20S1%202020416%20p9519d-9520a.pdf](http://www.parliament.wa.gov.au/Hansard%5Chansard.nsf/0/4b4c3a8c483f210ac8257570007f3a30/$FILE/C36%20S1%202020416%20p9519d-9520a.pdf)

<sup>9</sup> It's understood Australia's targeted exports for Malaysian, Thai and Indonesian pyrolysis operations all require whole tyre inputs.

<sup>10</sup> [http://www.wasteauthority.wa.gov.au/media/files/documents/tyre\\_recycling\\_tba.pdf](http://www.wasteauthority.wa.gov.au/media/files/documents/tyre_recycling_tba.pdf)

Environmental NGO's operating in the Philippines have long sought respite for local residents to tyre pyrolysis facilities. As this article in Rubber Journal Asia noted, 'According to a position paper produced by NDV's Technical Adviser Flora Santos, the pyrolysis operations were polluting the waterways and grounds, especially with the dumping of the char.

*Various ailments have also been observed in a majority of the residents, particularly some 4,000 residents who live near the Phil Pao plant, who have become more "sensitised". Common symptoms include chest congestion, irritation (pain) and clogged nasal passages, increased phlegm formation, eye and skin irritation, stomach and headaches and dizziness.*

*Santos also said that the chemicals emitted by the plant, such as ethylbenzene, xylenes and toluene, harm the nervous and respiratory systems, not to mention that emission of benzene, dioxans, furans, 1,3 butadiene and polycyclic aromatic hydrocarbons, all potent carcinogens<sup>11</sup>.*

## MALAYSIAN PYROLYSIS – A CASE STUDY

An industry source based in SE Asia and with over 20 year's experience in the used tyre industry has given the following account of the fate of whole tyre bales going into Malaysia.

*While many countries in the region ban the import of whole tyre bales due to safety (reuse of baled tyres) and other concerns, Malaysia absorbs up to 200,000 tonnes (around 24M EPU's) of imported bales from Australia, New Zealand, the UK, Singapore and other countries. Malaysia has also functioned in recent years as a trans-shipment point for countries that were banned as recipients for whole tyres by the exporting nations.*

*Of the 38 identified pyrolysis facilities in Malaysia, about 30 are represented in the equivalent of the Malaysian Pyrolysis Association. Of these 30 only 18 have any kind of operating permit (often not issued for the purpose of pyrolysis) and legal status (i.e. incorporation certificate or a tax registration etc). The association itself does not provide a list of its members which makes it more of a private club or an informal cartel.*

*In late 2014/2015 many Malaysian used tyre pyrolysis operations were shut. The reason for this was an edict from a corrupt government official (group of) demanding that any new licences would only be issued if and when these operations purchased Chinese pyrolysis equipment they were selling.*

*The industry is now down to around 40% of what it was previously mainly on account of low reference product cost (tyre oil is pegged against diesel at a discount 30-40%).*

*There is no doubt the Malaysian pyrolysis industry is riven with corruption. Operations are often hidden within palm oil plantations but may also be in close proximity to villages and populations.*

*All used whole tyres coming into Malaysia are consumed in pyrolysis operations, unless they are removed for reuse as happens in many poorer countries where tyres are a significant expense. Whole used tyres can theoretically also be used in cement kilns but the cement industry in Malaysia is not equipped for whole tyre feeding. Baled tyres, in any case, don't fit the feed chute since they have lost their shape and if fed will cause serious jamming of the system resulting in combustion at a low heat in the chute area that causes air pollution and OH&S risks.*

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<sup>11</sup> <http://rubberjournalasia.com/tyre-pyrolysis-an-epic-fail-or-a-recycling-nirvana/>

*These operations are highly polluting and the stench is overwhelming, as is the black soot from the carbon that blankets the nearby environment. As scientifically proven, VOC, SOx and other harmful substances are emitted from these operations lacking any basic emission control systems. A study could also be made on furans and dioxins emitted from these operations.*

*These are very cheap operations. Pyrolysis can be clean but to do so requires considerable investment in the region of \$15-20M. This is not the kind of investment that goes into Malaysian pyrolysis operations. The only professional installation went bust and ceased to exist in Port Klang about five years ago due to the illegal and therefore cheap competition in the market.*

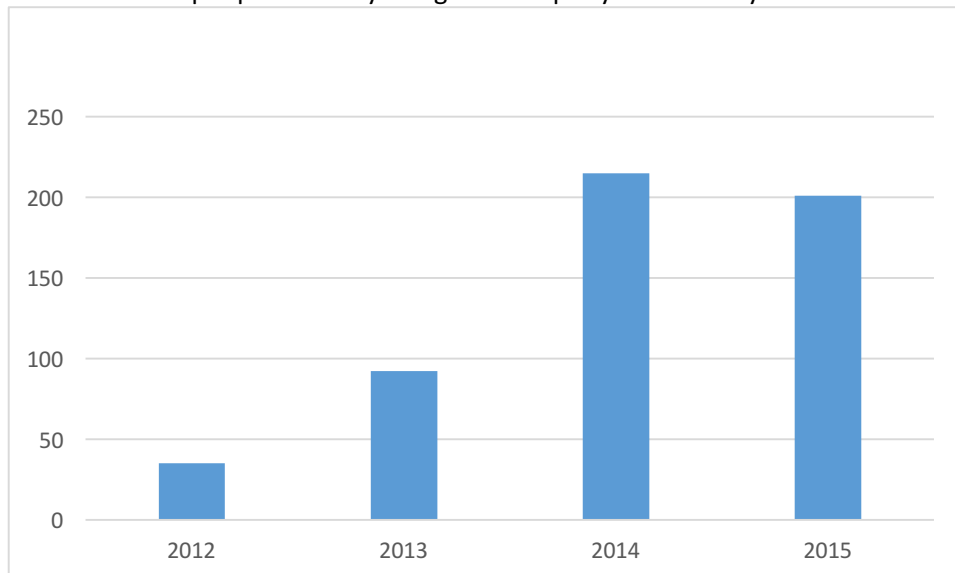
*The tyre oil is in Asia (Pakistan, India, Bangladesh, Malaysia, Vietnam, Philippines among the main culprits) typically and illegally blended into diesel and then sold at discount to fleet operators (trucks, busses and jeepneys). This practice causes an enormous level of exhaust gas emission which in these countries is not monitored as road tax renewal typically happens without any vehicle inspection there.*

*Another favorite segment for this “fuel” are so called “ghost trucks” operated by the palm oil estates.*

#### DENGUE FEVER ON THE INCREASE IN MALAYSIA

*In the past five years all countries in South East and South West Asia have seen a steep rise in dengue fever. The exponential rise (cases per capita as well as fatalities) is attributed to increased mosquito breeding habitats. All authorities involved mention tyres as the #1 contributing factor the mosquito habitat change. The fast breeding cycle allows mosquitos to reproduce even in fast moving inventories of tyres or bales.*

The number of people killed by Dengue fever per year in Malaysia has been rising sharply<sup>12</sup>



Source: Health Ministry (Malaysia)

*Pakistan does not allow the import of baled whole tyres though does have a large tyre pyrolysis operation. Bangladesh utilizes bales for pyrolysis; Indonesia has strict import controls; The Philippines have around 12 pyrolysis operations though bans the import of used tyres (so legally allows for domestic consumption only); and while Vietnam has an official ban this is not ‘water tight’ and material is still arriving. Pyrolysis in India has been banking on domestic tyres as well as imports from*

<sup>12</sup> <http://outbreaknewstoday.com/malaysia-dengue-fever-cases-top-120000-for-2015-selangor-state-reports-more-than-half-47481/>

*the Middle East.*

As the above account outlines used tyre pyrolysis in SE Asia is extremely fraught, likely corrupt and polluting. Given the low current price of oil there is also a real risk Australian baled whole tyres destined for Malaysia may be ending up in leaking into even worse end use, e.g. illegal shipments across borders to extremely polluting uses.

The failure to date of pyrolysis in Australia points to the need to be extremely cautious of its sustainability offshore and the use of Australian generated used tyres for this purpose should be excluded by TSA.

### Development of the Australian market for used tyres

Tyre shred is the first step in the conversion of a used tyre to higher value applications such as crumb for sporting fields, adhesives etc. These products are also to date largely used in the Australian domestic market. There are now however new markets emerging for Australian six inch shred exported for crumbing plants in India. This material is being used for playgrounds and sport fields in India.

A principle position of TSA, is the development of domestic markets for Australia's used tyres. Bales of whole tyres can only be for export to the lowest value of uses, pyrolysis. In fact TSA guidelines themselves note one of the risks to a viable tyre recycling industry in Australia as, '*demand for baled tyres from international energy markets*'<sup>13</sup>

Operating baling equipment also allows cheap, quick and low risk entry to the market which undercuts traditional, sustainable operators. With low capital costs new entrants undercut the established industry on price and endanger the financial sustainability of the sector.

Shredding is by nature a more expensive exercise than baling. Balers therefore out-bid shredding and crumbing plants for retail customers. By forcing collection prices lower the legitimate industry is less able to invest in the kind of equipment, processing capacity and products TSA is looking to support.

Australia should now be shifting out of baled whole tyre exports in order to evolve the industry. The continuation of this practice is forcing the agenda of environmentally sound use of ELT's backwards not forwards.

### TYRE STEWARDSHIP AUSTRALIA POSITION ON BALING

TSA is now accrediting 'recyclers' whose sole or primary activity is the export of baled whole tyres. This position contradicts all the evidence of biosecurity, traceability and safety risks as well as TSA's own guidelines.

TSA should refuse to endorse any additional balers and establish a six-month period of grace for existing accredited balers to adapt and shift out of baling altogether. This position would align with TSA's guidelines.

TSA states, *Disposal through landfill, dumping or export of baled tyres represents the loss of a valuable resource.* The TSA guidelines (pg.6) expand on this opposition to baled tyre exports;

*The following uses are excluded from the definition of environmentally sound use:*

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<sup>13</sup> TSA Guideline, pg 7



- (v) disposal through dumping, landfill, direct incineration or burning;*
- (vi) stockpiling as an end point;*
- (vii) unsustainable burning for energy recovery*
- (viii) **export of baled tyres for operations listed under (v), (vi) and (vii) above.***

Australia's whole baled tyre exports are at best being applied to 'burning for energy recovery' (clause vii) and may also be applied for 'direct incineration or burning' (clause v).

TSA reiterates its overall opposition to baled tyre exports requiring:

*All Participants in the scheme also commit to contribute to:*

- *the environmentally sound use of end-of-life tyres;*
- ***elimination of the inappropriate export of baled tyres from Australia;***
- *elimination of the illegal dumping of end-of-life tyres;*
- *elimination of disposal of end-of-life tyres to landfill (except where no viable alternative is available and subject to state and territory legislation; for example, in rural and remote areas where appropriate recycling facilities are not available, or transportation costs are prohibitive).*

TSA states it will be guided by the Basel convention which as outlined above also emphasises the 'unsustainable' nature of baled whole tyres.

## SOLUTIONS

There are a range of possible solutions available to TSA to ensure Australia's baled tyre exports could meet Australian standards<sup>14</sup>.

### Fumigation

TSA could require that all containerised whole tyre bales are fumigated in Australia prior to export. ATRA's research suggests the cost of this process would be around A\$150 per container (40 foot). Challenges however remain with the additional requirement to 'air' (leave container doors open) for 12 hours post fumigation to allow the chemicals used to disburse. These containers must also be stored away (up to around 14 metres) from human exposure.

While fumigation might solve part of the biosecurity risk – removal of pests and diseases being exported out of Australia – it would fail to eliminate the risk of stored bales of tyres gathering water on docks etc. at the importing country, and thus becoming breeding grounds for mosquitos at the export destination. Neither would it deal with the end use concerns of dangerous pyrolysis applications, nor the possible reuse/ safety issues identified.

### Sidewall removal/ one cut

Eliminating the risk of reuse could be undertaken by a requirement for at least one-cut (halve the tyre; or cut through the bead as required under India's import regulations) or removal of the sidewall. This would also serve to reduce volumes of water stored (though not all), exported or captured at the export site. Though seeds etc. could remain and again, this approach would fail to address the unsustainable, polluting, end use.

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<sup>14</sup> These 'standards' would include elimination of biosecurity risks, traceability, safety assurances (no reuse), emission standards when processed (pyrolised).

One-cut tyres remain, at present, the best solution for managing EOL OTR tyres from mine sites. Further work still needs to be done on optimising the management of this more problematic waste stream.

#### Banning export of whole tyre bales

Alignment with TSS and Basel convention guidelines and the evidence and risks outlined above require TSA to phase in a ban to the export of baled whole tyres from Australia for accredited collectors/ recyclers.

Only this approach eliminates the numerous environment and community risks as well as industry impacts TSA is specifically tasked with mitigating and advancing.

**END**