

AUSTRALIA'S RETURNING NUCLEAR WASTE

Summary

On October 15, 2015, the BBC Shanghai left the French port of Cherbourg with 10 tonnes of nuclear waste, bound for Port Kembla in Australia. The ship was allowed to leave despite concerns expressed by Greenpeace over the vessel's safety record.

The nuclear waste on the BBC Shanghai was generated by the Australian Nuclear Science and Technology Organisation (ANSTO) and was sent to France in 2001 to be reprocessed. It is now being returned to Australia to be stored temporarily at the Lucas Heights nuclear facility in Sydney.

This investigation by Greenpeace Australia Pacific reveals a worrying lack of transparency about the nature of the ship's radioactive cargo, inconsistencies between how French and Australian authorities classify the waste and serious concerns about the ship's safety record and suitability for transporting such dangerous cargo.

Key findings

- The nuclear waste aboard the BBC Shanghai has been classified as high-level waste by French authorities, despite Australian authorities classifying it as intermediate-level waste
 - The nuclear waste reprocessing that took place in France did not remove all the plutonium, which remains toxic for thousands of years.
 - The ship has a highly worrying safety record and has been detained three times in the last five years during safety inspections, including by Australian authorities.
-

Inconsistent information about the radioactivity of the nuclear waste

Supposedly intermediate-level nuclear waste being transported to Australia from France on board a ship with a worrying safety record has been classified as high-level waste by French authorities.

Communication between the French Nuclear Safety Authority (ASN) and Greenpeace has revealed a container aboard the BBC Shanghai contains reprocessed nuclear waste classified as high-activity (long-life) waste by the French national radioactive waste management agency ANDRA, (fig 1). The classification is ANDRA's most severe nuclear waste category (fig 2).

Fig 1. Email from ASN

----- Message transféré -----
De : INFO DU PUBLIC Asn <Asn.INFOPUBLIC@asn.fr>
Date : 12 octobre 2015 15:13
Objet : RE: Transport de déchets vitrifiés australiens
À : Yannick Rousselet <yannick.rousselet@greenpeace.org>

Bonjour M. Rousselet,

Comme indiqué au CEDRA, les déchets vitrifiés renvoyés en Australie sont des conteneurs CSD-U.

Chaque CSD-U pèse environ 450 kg et a une activité d'environ 500 TBq. D'après l'inventaire national de l'ANDRA, les déchets peuvent être considérés de moyenne activité si leur activité est comprise entre 1 MBq/g et 1 GBq/g.

Il ne s'agit cependant pas d'une définition réglementaire. Les CSD-U australiens ont une activité massique de 1,1 GBq/g, c'est pourquoi nous parlons de déchets de haute activité (à vie longue).

À titre de comparaison, les déchets suisses qui ont traversé la France en septembre dernier étaient des conteneurs CSD-V, dont chacun avait une activité d'environ 14 000 TBq (pour un poids comparable). La différence entre les CSD-V et les CSD-U vient principalement de la nature des combustibles retraités : en l'occurrence les combustibles usés australiens proviennent d'un réacteur de recherche. Les CSD-U sont moins actifs que les CSD-V.

Le transport vers l'Australie comprend un TN 81 qui contient 20 conteneurs CSD-U. Il sera accompagné par un colis DV78 contenant 6 conteneurs CBFC2. Les CBFC2 contiennent des déchets solides d'exploitation de moyenne activité, conditionnés dans un fût en béton-fibre. L'activité d'un CBFC2 (3,78 TBq) est bien inférieure à celle d'un CSD-U.

Cordialement,

Centre d'information du public
Autorité de sûreté nucléaire
15 rue Louis Lejeune
92120 Montrouge

Email from ASN:

Chaque CSD-U pèse environ 450 kg et a une activité d'environ 500 TBq. D'après l'inventaire national de l'ANDRA, les déchets peuvent être considérés de moyenne activité si leur activité est comprise entre 1 MBq/g et 1 GBq/g.

Il ne s'agit cependant pas d'une définition réglementaire. Les CSD-U australiens ont une activité massique de 1,1 GBq/g, c'est pourquoi nous parlons de déchets de haute activité (à vie longue).

English translation:

Each CSD-U [container] weighs about 450kg and has about 500 TBq [terabecquerels] activity. According to ANDRA's national inventory, the waste can be considered medium activity if its activity is between 1 MBq/g [megabecquerel per gram] and 1GBq/g [gigabecquerel per gram]

It is not, however, a regulatory definition. The Australian CSD-U [waste] has a specific activity of 1.1 GBq/g, which is why we speak of high waste activity (long life).

Fig 2. ANDRA's nuclear waste classifications

Classification of radioactive waste

		HALF-LIFE →		
		Very short-lived Half-life < 100 days	Short-lived Half-life ≤ 31 years	Long-lived Half-life > 31 years
ACTIVITY ↑	Very low level (VLL)	Stored to allow radioactive decay on the production site then disposed of adopting conventional solutions	Surface disposal facility (Very-low-level radioactive waste disposal facility in the Aube district)	
	Low level (LL)		Surface disposal facility (Low-and intermediate-level waste disposal facility in the Aube district)	Shallow disposal facility (studied in accordance with the Act of 28 June 2006)
	Intermediate level (IL)			
	High level (HL)		Reversible deep geological disposal facility (studied in accordance with the Act of 28 June 2006)	

- ANDRA nuclear waste classifications ([link](#), [cache](#))

The Australian Nuclear Science and Technology Operation (ANSTO) has classified the incoming waste as low and intermediate-level.

"The low and intermediate level radioactive waste resulting from the reprocessing will be returned to Australia, as required under the inter-country agreements.

Australia does not produce nuclear energy or nuclear weapons and does not produce or store high level radioactive waste.

There is no high level radioactive waste in Australia."

– Australian Nuclear Science and Technology Organisation (ANSTO) ([link](#), [cache](#))

The waste's activity levels have been recorded at 1.1GBq by ASN, which is above ANDRA's maximum threshold for intermediate-level waste (1GBq/g), and therefore qualifies as high-level long-life waste, ANDRA's most severe nuclear waste classification.

A becquerel is a metric measurement unit of radioactivity; a gigabecquerel is the equivalent of 1bn becquerels.

Australian and French authorities use different waste classification standards. However Greenpeace remains concerned at the inconsistencies between the two countries. The discrepancy is particularly concerning as French authorities have significantly more experience in handling nuclear waste than Australian authorities: 75% of France's electricity is generated using nuclear power while Australia produces no electricity using nuclear power. France has 58 operational nuclear power reactors and nine research reactors. Australia, by contrast, has a single nuclear reactor and no nuclear power reactors.

Greenpeace also understands that the returning shipment of nuclear waste still contains plutonium. Plutonium can remain harmful to humans for up to hundreds of thousands of years.

The nuclear waste was created at the Lucas Heights nuclear facility in Australia before being shipped to France in 2001 for reprocessing, which was intended to extract the uranium and plutonium before returning the waste to Australia. However Areva, the French nuclear energy company responsible for the reprocessing, has confirmed that the plutonium was not fully extracted before being sent back to Australia (fig 3).

"In the further process steps, uranium will be separated for storage and subsequent recycling. Fission products, the very low quantity of plutonium, and structural pieces will then be conditioned into a very stable form suitable for transport, storage and final disposal."

– AREVA ([link](#), [cache](#))

Fig 3. Screenshot of AREVA information on Australia's nuclear waste ([link](#), [cache](#))

■ THE PROCESS - THE DIFFERENT STEPS

Recycling involves several successive steps. In addition, preliminary operations are carried out before actual recycling begins.

On arrival at the AREVA NC La Hague plant, after checking the transport casks and their contents, the fuel elements will be removed from the transport casks, placed in baskets and stored underwater in a deactivation pool, enabling cooling, as necessary, before the commencement of recycling.

Used fuel recycling

Recycling will begin with the dissolution operation. Once out of the pool, the used fuel will be cut into pieces as necessary and dissolved into a nitric acid liquor. The liquor arising from HIFAR used fuel dissolution will be blended down with liquors from dissolution of commercial power reactor used fuel.

In the further process steps, uranium will be separated for storage and subsequent recycling. Fission products, the very low quantity of plutonium, and structural pieces will then be conditioned into a very stable form suitable for transport, storage and final disposal.

Waste conditioning

The industrial process applied to the conditioning of these various categories of wastes will vary according to their nature. Fission products and plutonium will be vitrified, that is, incorporated into a stable glass matrix, while structural pieces will be compacted in discs.

Almost all the radioactivity will be encased in the glass matrix.

Both the glass matrix and compacted discs will then be encased in a standard stainless steel package referred to as the Universal Canister.

After being filled, the canisters will be hermetically sealed and will undergo a series of thorough checks.

The ANSTO website claims multiple times that the plutonium will be removed from the waste before being returned to Australia:

"With uranium and plutonium removed, the waste will be placed in 20 steel canisters weighing 500kg each, placed inside a loaded container which will weigh between 109-112 tonne."

– ANSTO website ([link](#), [cache](#))

"Nuclear fuel reprocessing entails removal of materials such as uranium and plutonium, stabilisation of the remaining material in glass, and placing that material in a transport/storage container"

– ANSTO spokesperson in media release ([link](#), [cache](#))

Q. How much uranium and plutonium was extracted in France?

A. The spent fuel was exported to France in four shipments that occurred between 1999 and 2004. The spent fuel amounts to 20 stainless steel canisters and a total weight of 10 tonnes, which is removed during reprocessing and will be recycled and used for nuclear energy generation. The remaining waste will be vitrified and returned to Australia for safe storage
 – ANSTO FAQ ([link](#), [cache](#))

Greenpeace is concerned at the lack of transparency around the ship’s radioactive cargo, the international inconsistencies about the waste’s activity levels and the lack of information provided to the Australian public.

Concerns about the BBC Shanghai’s safety record

Greenpeace remains concerned about the poor safety record of the vessel carrying the nuclear waste. The BBC Shanghai is currently banned from carrying government cargo by the United States (fig 4).

Fig 4. US Coast Guard’s list of vessels banned from carrying government cargo

Vessels Prohibited from Carrying Government Impelled Cargoes

Vessel Name:	IMO Number	Call Sign
ALTAGRACE	7710264	JBQI4
ANA CECILIA	7237547	J8QG2
ARTVIN	9595034	9HA2782
ASPHALT SPRING	9394727	V7YJ5
ASTRO PERSEUS	9280873	SVMD
ASTRO SCULPTOR	9235713	SYMO
ATLANTIC DREAM	9611589	9V9135
ATLANTIC PROGRESS	9611577	9v9134
BARNACLE	9409742	5BNK2
BBC MAGELLAN	9569528	V2EC6
BBC SHANGHAI	9224623	V2DQ
BRAHMS	9473327	9HA3558
CARIB TRADER II	7396599	HO2252

Official documents seen by Greenpeace have also revealed the BBC Shanghai has been detained by three countries in the last five years after safety inspections uncovered deficiencies – including a detention by [Australian authorities](#) in March 2014.

It was [detained in America](#) (pdf) in March 2015 for three days after the US Coast Guard found five deficiencies, including a number concerning its fire safety precautions. Australia [detained the vessel](#) for six days in March 2014 after finding 11 deficiencies onboard, including problems with its voyage plan, fire safety, emergency power, electrical systems and alarms. It was also detained by Spain in August 2010 after 14 deficiencies were discovered.

Deficiencies have also been found by authorities in South Korea, Denmark, the UK, Chile, the Virgin Islands, Italy, China, Finland, France, Egypt, the Canary Islands, Norway, Iran and Canada.

The ship's final inspection before leaving France (fig 5) revealed seven deficiencies: four about the ship's fire safety precautions and one about its temperature control for carrying dangerous goods.

Fig 5. Screenshot of record of BBC Shanghai's latest inspection

Vessel Incidents							
Inspections showing deficiencies, date, place, name, beneficial owner, and Port State Control authority (MOU)							
Inspections: 64		Detentions: 3		Casualties: 0			
Date	Country	Place	Vessel Name At Time	Registered Owner At Time	Beneficial Owner At Time	Detained	MOU
14-Oct-2015	 France	Cherbourg	Bbc Shanghai	Briese Baltic Sea	Briese		Paris
Deficiencies: <ul style="list-style-type: none"> • Life saving appliances - 11117 - Lifebuoys incl. provision and disposition - (Not as required) • Dangerous goods - 12105 - Temperature control - (Not as required) • ISM - 15150 - ISM - (Not as required) • Certificate & Documentation - Ship Certificates - 01101 - Cargo Ship Safety Equipment (including exemption) - (Not properly filled) • Fire safety - 07105 - Fire doors/openings in fire-resisting divisions - (Not as required) • Fire safety - 07113 - Fire pumps and its pipes - (Inoperative) • Fire safety - 07115 - Fire-dampers - (Inoperative) 							

Voyage plan

Greenpeace is also concerned about the ship's voyage plan.

The BBC Shanghai did not use the Suez Canal to access the Indian Ocean - the most direct route - and instead is taking a longer, riskier route from Europe around the west and south coast of Africa. This route involves an extended journey in a famously stormy ocean tract known as "the roaring forties".

Given the concerns about the ship's safety record and the dangers posed by its radioactive cargo, Greenpeace is alarmed that a longer and riskier route to Australia was decided.

Greenpeace sources have indicated that this route is being taken because the radioactive cargo was refused entry to the Suez Canal. Indonesian authorities have also [prohibited the ship from its waters](#) on its return journey due to fears over the nuclear waste.

Safety standards

The BBC Shanghai is classified as an INF2 vessel and therefore meets the official requirements to carry the waste. However the ship does not meet international best practice or the International Maritime Organisation's standards for purpose-built vessels for carrying nuclear waste, which include twin engines and two rudders ([.pdf](#)). Documents seen by Greenpeace reveal the BBC Shanghai is a single-engine vessel with one rudder.

Overall concerns

Nuclear waste is extraordinarily dangerous and can remain so for hundreds of thousands of years.

Greenpeace is alarmed at the confusion between French and Australian authorities about how dangerous the BBC Shanghai's radioactive cargo really is, the lack of transparency about the operation, and the choice of vessel used to transport the cargo to Australia.

Greenpeace is concerned that this operation – which is managed by a government organisation – contains so many safety oversights. At a time when Prime Minister Malcolm Turnbull is considering [using Australia as a storage dump](#) for the rest of the world's nuclear waste, the potential for damage when such arrangements are instead made by companies within a privatised industry should be of grave concern for Australia and the environment.

ENDS

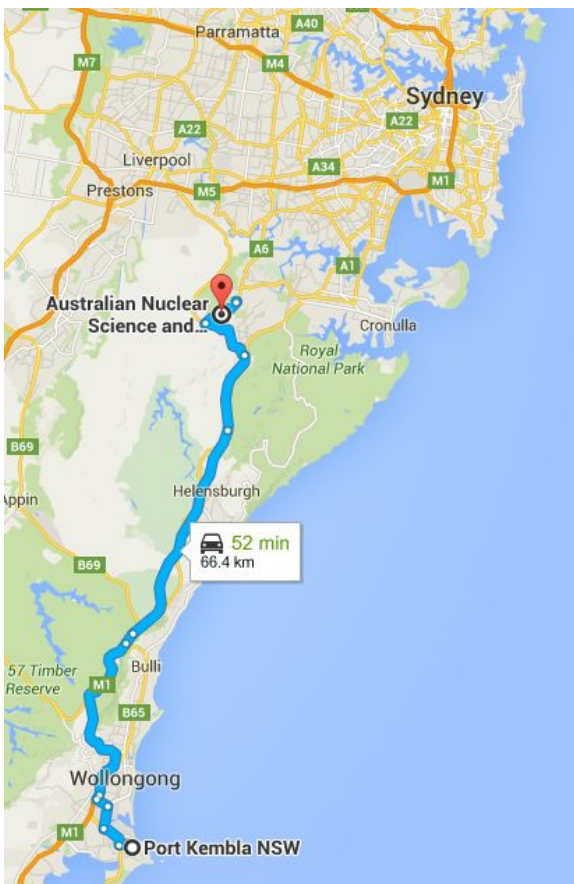
December, 2015

Background information

The nuclear waste being transported to Australia was originally created at the Lucas Heights nuclear research facility in Australia and was sent by ANSTO to France for reprocessing in 2001. Reprocessing involves the extraction of uranium and plutonium from the nuclear waste.

The Australian Government will [spend approximately \\$30m](#) on repatriating and temporarily storing its Australian-made nuclear waste from France. Australia is obliged to store its own nuclear waste.

The government has said Lucas Heights in NSW will be the interim store for the returning nuclear waste and has proposed construction of a national radioactive waste management facility.



The BBC Shanghai is likely to dock at Port Kembla on the evening of Saturday 5 December, where it will unload the nuclear waste for transportation 66km by road to Lucas Heights.

The most direct route will pass close to or directly beside three schools*, the University of Wollongong, the Woronara Dam and the Royal National Park.

At Lucas Heights, the waste will be stored in an interim facility until the Australian government decides the next step.

The Australian government has released a [shortlist](#) of six potential sites for storing the country's nuclear waste. The creation of a permanent nuclear waste facility in Australia has been [strongly opposed by communities for years](#).

* Illawarra Grammar School, Waterfall Public School and Heathcote High School