

Environment Protection Authority

Review of the transport of uranium oxide concentrate (UOC) in South Australia

Review of the transport of uranium oxide concentrate (UOC) in South Australia

For further information please contact:

Information Officer
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8124 4670

Free call (country): 1800 623 445

Website: <www.epa.sa.gov.au>

Email: <epainfo@sa.gov.au>

ISBN: 978-1-876562-91-5

October 2019

© Environment Protection Authority

This document may be reproduced in whole or part for the purpose of study or training, subject to the inclusion of an acknowledgment of the source and to it not being used for commercial purposes or sale. Reproduction for purposes other than those given above requires the prior written permission of the Environment Protection Authority.

Contents

Acknowledgements	1
Executive summary	3
1 Background	5
2 Introduction	6
3 Discussion	7
3.1 Overview of requirements for UOC transport in South Australia	7
3.2 Review of regulatory oversight	7
3.3 Guidance for content of transport plan	8
3.4 Conduct first responder training for UOC transport	9
3.5 Conduct scenario planning or exercises – desktop/field.....	9
3.6 Develop communications protocols for UOC incidents.....	10
3.7 Develop engagement expectations for UOC shipments.....	11
3.8 Review notification protocols	11
3.9 Develop UOC resources table	11
3.10 Industry agreements.....	11
Appendix 1 Project governance	13

List of tables

Table 1 UOC Stakeholder Workshop participant summary.....	13
Table 2 UOC Steering Committee membership	14
Table 3 UOC Working Group membership.....	14
Table 4 Summary of the UOC Working Group and Steering Committee meetings.....	15

Acknowledgements

The Uranium Oxide Concentrate Steering Committee wishes to acknowledge the contribution and leadership of Ms Rebecca Otte to the uranium transport project and industry as a whole. Her work to promote the safe transport of uranium, within Australia and overseas, leaves a legacy that will be recognised well into the future.

Executive summary

South Australia is the primary path in Australia for transport and export of uranium oxide concentrate (UOC). The transport of UOC attracts a high degree of community interest and while UOC is at the lower end of the risk spectrum for dangerous goods, it is important to ensure that there is a framework in place providing demonstrable capability to transport material safely and respond efficiently and effectively to any incident.

In 2017 the EPA initiated a review of UOC transport and its regulation to assess the adequacy of the existing framework against leading practice, and to identify opportunities to strengthen arrangements. The review considered existing transport arrangements, regulatory requirements and oversight, and capability of government agencies and operators involved in UOC incident response.

The review included participation of key state and Commonwealth government agencies, first responders and uranium mining operators. A Working Group and Steering Committee were established to undertake and oversee the work. Recommendations arising from the review are owned by the participating organisations, and this report was presented to the State Emergency Management Committee (SEMC) for information, in order to provide accountability and evaluation (if required) of process.

The objectives for an appropriate UOC transport framework were identified as:

- UOC continues to be transported in a safe manner.
- Stakeholders understand their obligations and are appropriately engaged throughout the process.
- Uranium operators have a consistent standard for meeting their obligations.
- The transport framework is able to accommodate new entrants as well as interstate operators.
- Processes and infrastructure are in place to adequately manage an incident.
- Response is adequate in the event of an incident.
- UOC transport occurs in accordance with South Australian radiation protection legislation.
- UOC transport accounts for Commonwealth regulatory requirements (Australian Safeguards and Non-Proliferation Office, Exports).
- Regulation and control measures are commensurate with risk of uranium transport.

Against these objectives, a gap analysis of existing arrangements was undertaken, with evaluation of options to address gaps and opportunities, and then formulation of recommendations.

The review found that UOC is currently transported in a safe manner and in accordance with state and Commonwealth legislative requirements. It also found that existing response systems are capable of responding to and managing an incident.

The workshop, SWOT (Strengths, Weaknesses, Opportunities and Threats) and gap analysis also identified a number of opportunities for improving the existing system that will ensure a continual improvement cycle. The primary opportunities are:

- Responsibilities and accountabilities of carriers and owners under an incident scenario and during a recovery phase need to be summarised.
- Competencies expected of owners and carriers need to be defined.
- There is variability in expertise and resources across operations.
- The existing framework and associated contingencies need to be demonstrated under the variable scenarios and locations which an incident may occur.
- The existing framework needs to accommodate new entrants and interstate operators

The Steering Committee endorsed the following recommendations:

- Responsibilities and key requirements of parties involved in transport of UOC in South Australia should be clarified, including responsibilities of consignors and carriers.
- The existing Radiation Protection (Transport of Radioactive Substances) Regulations and Radiation Protection and Control Bill should be reviewed.
- The regulator should produce a document for operators that provides the minimum requirements that must be included in a UOC transport plan.
- Industry and the regulator should provide briefings to Metropolitan Fire Service (MFS) and Country Fire Service (CFS) on UOC transport safety and regulation, to increase shared understanding.
- Desktop and field exercises (with an associated report) should be undertaken to enable the regulator, first responders, operators, service providers and other government agencies to assess existing UOC response and recovery systems and capabilities, and identify opportunities.
- A communications document should be developed.
- Community expectations on engagement for UOC should be incorporated into either policy document or transport plan guidance.
- A UOC shipment notification protocol should be formalised to enable effective review of UOC transport plans.
- A compendium of UOC incident recovery capabilities and resources should be made available to all parties, which and used as a resource in the event of an incident.
- Industry should develop formal arrangements to share resources and expertise.

Against these recommendations, the following actions have already been delivered:

- A description of responsibilities and key requirements of parties involved in transport of UOC in South Australia, including key responsibilities of consignors and carriers.
- A review of the existing Radiation Protection (Transport of Radioactive Substances) Regulations and Radiation Protection and Control Bill.
- A document that provides the minimum requirements that must be included in a UOC transport plan.
- Joint training by BHP and EPA Radiation to Metropolitan Fire Service (MFS) and Country Fire Service (CFS) on UOC transport safety and regulation.
- Execution of a desktop exercise, Rocky River II to assess existing UOC response and recovery systems.
- A document that describes how industry and government communications will be led, developed and distributed (including key stakeholders) for UOC incidents.
- Incorporation of community engagement expectations into UOC responsibilities documents.
- Development of a formalised UOC shipment notification protocol and process for review of UOC transport plans.
- Development of a table of UOC recovery resources that can be used as a source of response resources in the event of a UOC incident.

The UOC review has worked to establish and strengthen coordination and cooperation between the uranium mining industry, state and Commonwealth regulators and first responders. While the project deliverables are directly applicable to transport of UOC, the stakeholder engagement process and framework established can be applied to transport of other radioactive sources both within and outside the jurisdiction of South Australia.

1 Background

Uranium oxide concentrate (UOC) has been transported in South Australia for over 25 years without major incident.

UOC is a mildly radioactive, slightly chemically toxic, non-flammable, inert and water insoluble substance. It is classified as a Class 7 Dangerous Good.

South Australia, as the primary path nationally for transport and export of UOC, is of strategic importance. There is a need to ensure industry has a continued ability to access commodity markets.

Transport of radioactive substances attracts a high degree of community interest. It is important to ensure the regulatory framework is not only capable of managing risks associated with this activity, but provides the community with a degree of confidence that ensures a social licence is maintained.

2 Introduction

The transport of UOC in South Australia is controlled by the *Radiation Protection and Control (Transport of Radioactive Substances) Regulations 2018*, made under the *Radiation Protection and Control Act 1982* (RPC Act). The regulations principally draw on the *Commonwealth Code of Practice for the Safe Transport of Radioactive Material* (Transport Code)

Transport of UOC is also subject to Commonwealth safeguards and export legislation which have some common ground with EPA requirements.

In addition to legislative requirements, UOC is subject to a number of state imposed requirements, including development of a transport management plan and a system of shipment notification.

UOC is generally handled through a number of stages from the mine gate, and transport by road or rail, to interim storage (normally at a berth) and loading onto a ship. The Regulations outline responsibilities for the transport and handling of radioactive material for each stage of this process, which include:

- during routine operations
- in the event of an incident
- for the post management of an incident.

In 2016, the EPA initiated a formal review of UOC transport in South Australia. The review brought together members of the uranium mining industry and key government agencies to enable sharing of experiences in the transport of UOC, undertaking the review of existing frameworks and capturing the opportunities to further strengthen the robust systems and safeguards that are in place. A governance framework was established to oversee the project and execute key deliverables (Appendix 1).

3 Discussion

The UOC review sought to achieve a number of objectives and outcomes:

- UOC continues to be transported in a safe manner.
- Stakeholders understand their obligations and are appropriately engaged throughout the process.
- Uranium operators have a consistent standard for meeting their obligations.
- The transport framework is sufficiently robust to accommodate new entrants as well as interstate operators.
- Processes and infrastructure are in place to adequately manage an incident.
- UOC transport occurs in accordance with state radiation protection legislation.
- UOC transport accounts for Commonwealth regulatory requirements (ASNO, Exports).
- Response is adequate in the event of an incident (appropriate contingencies).
- Regulation and measures are commensurate with the risk of uranium transport.

Over the course of the project, a range of deliverables were executed, aimed at addressing gaps identified during the review. Deliverables also accounted for input from the Steering Committee and through feedback loops during the project activities, for example learnings from the desktop UOC incident scenario Rocky River II.

3.1 Overview of requirements for UOC transport in South Australia

Deliverable

A document which describes the responsibilities and key requirements of parties involved in transport of UOC in South Australia, including key responsibilities of consignors and carriers. The 'Uranium Oxide Concentrate (UOC) – Requirements for safe transport in South Australia' document includes references to the UOC transport plan guideline, also developed during the project.

Gaps addressed

This high-level document describes the processes and expectations with respect to transport of UOC in South Australia. It clarifies owner and carrier responsibilities under conditions of routine transport, in addition to incident and recovery situations. The document applies to existing operators, as well as those entering the market or operating in other jurisdictions. Development of the document includes existing legislation.

Tasks performed

- Review and document existing Act and Regulations (including the Transport Code) to identify responsibilities of carriers and owners under routine, incident and recovery operations.
- Identify areas that require further development (informed by transport plan review).
- Incorporate any outcomes of legislative review, for example requirement for transport authorisations/licences).

3.2 Review of regulatory oversight

Deliverable

A review of the existing Transport Regulations and Radiation Protection and Control Bill.

Gaps addressed

Radiation Protection and Control (Transport of Radioactive Substances) Regulations 2018

The *Radiation Protection and Control (Transport of Radioactive Substances) Regulations 2003* (Regulations) was established under the *Radiation Protection and Control Act 1982* (RPC Act) and is concerned with the responsibilities of

consigners, carriers, drivers and storekeepers in the transportation of radioactive substances. The Regulations expired on 1 September 2018.

The EPA sought to consider learnings of the UOC project as part of the review of the Regulations.

The remake of the Regulations incorporated amendments pertaining to updates to the Australian Government *Code of Practice for the Safe Transport of Radioactive Material* (2001) since the Regulations were last amended. This has resulted in providing greater clarity surrounding requirements for the transportation of radioactive substances. In the review, the Working Group engaged with SafeWork SA to understand and, where possible, align with regulatory frameworks related to transport of other dangerous goods. The changes allowed the following to occur:

- Adoption of the updated version of the *Code of Practice for the Safe Transport of Radioactive Material* (2014) or Transport Code.
- A provision to require that a consigner, carrier, driver or storekeeper must, on request, provide relevant emergency information about the consignment to an authorised officer or emergency services officer.
- Improved instruction and training requirements for carriers.

Radiation Protection and Control Bill

The Radiation Protection and Control Bill (RPC Bill) underwent a review in 2018. As part of this review, a proposal was put forward where a radioactive source will require a licence. The new provision directly relates to transport and allows for better targeted licensing requirements and also for better oversight of the Transport Code.

The EPA undertook a review in relation to transport of radioactive sources in other jurisdictions that identified South Australia as one of only a few jurisdictions that does not license transport of Class 7 sources.

While not formally endorsed by members of the Working Group, the proposal was raised at a number of meetings and will be considered in the context of feedback received through the consultation process.

Tasks

- Undertake review of existing Act and Regulations related to transport of UOC.
- Undertake a review of Class 7 authorisations in Australia.
- Review dangerous goods transport in SA.
- Undertake a review of the RPC Bill in the context of UOC transport.

A copy of the explanatory report¹ for the Regulations and relevant sections of the proposed Bill is available online.

3.3 Guidance for content of UOC transport plan

Deliverable

A document stating the minimum requirements that must be included in a UOC transport plan was developed principally by Working Group members, allowing industry to influence how they comply with legislation.

Gaps addressed

Presently, transport plans are developed in isolation by operators. A documented framework will provide consistency in the content between existing operators, new entrants and interstate operators. The document will set relevant competencies of operators and carriers, and provide an increased level of detail to enable appropriate contingency requirements for incident management. The transport plan will also consider communications and engagement arrangements during an incident.

¹ https://www.epa.sa.gov.au/files/8154_ir_regs_review

Tasks

- Review existing plans being used by operators.
- Develop consistent format and content.
- Review and update guidance in light of the document.
- Include competencies of carriers for transport of UOC.
- Review content in light of scenario exercises.
- Develop policy describing how transport plans are assessed and implemented (to complement the document).

The guideline sets a review period for operator transport plans to ensure they remain up to date.

3.4 Conduct first responder training for UOC transport**Deliverable**

A joint presentation by BHP and EPA Radiation to MFS and CFS on UOC transport safety and regulation. The presentation was recorded and delivered to multiple first responder crews

Gaps addressed

The training provides for improved understanding of radiation safety among first responders, and provides an opportunity for industry and government to interact around UOC transport.

3.5 Conduct scenario planning or exercises – desktop/field**Deliverable**

Execution of desktop exercise and field exercises (with an associated report) that provides an opportunity for operators, service providers and government agencies to assess existing UOC response and recovery systems, and identify opportunities to further develop systems.

Rocky River II

A desktop scenario was conducted on 23 August 2018. It consisted of four 'Special Ideas' involving spillage of a shipment of UOC onto a road south of Port Augusta. The exercise was funded by BHP and facilitated by the EPA. The exercise scenario focused on how agencies would interact and manage the incident and subsequent recovery. Attendees included:

- operators (BHP)
- carriers (Toll)
 - state government regulators – SafeWork SA, Department of the Premier and Cabinet (DPC), Department for Energy and Mining (DEM), EPA
- federal government regulators – ASNO
- state first responders – SA Police, MFS, CFS, State Emergency Services, SA Ambulance.

The exercise was able to demonstrate that existing systems for management of hazardous material are applicable to UOC. For the scenarios presented, there were adequate systems for incident response and protracted operations.

BHP as the exercise host, demonstrated resources, systems and expertise were available and of value in attending to an incident, including their working arrangement with Toll as a contracted UOC transporter.

A recurring theme of the exercise recognised UOC and radioactive substances as being an area of community interest and scrutiny.

Opportunities for further development were captured through a table of actions with most being fulfilled through development of remaining project deliverables.

UOC Overpack Training (planned action)

An activity of the Working Group was to assess contingencies as applied to a UOC incident. In response to this assessment, BHP procured a container overpack to assist with removal of a damaged UOC shipping container in the event of an incident.

The Working Group has undertaken to execute an exercise where use of the overpack will be practised. The exercise will increase the efficiency in use of the overpack in the event that it is utilised and ensure that there are trained personnel both within industry and government.

All learnings from the exercise will inform development of future iterations of project outputs, including the transport plan template.

Gaps to be addressed

Execution of desktop and practical scenarios provides an opportunity for mine operators, government regulators and first responders to assess systems for their capability to effectively manage a UOC incident. They also allow an assessment of the degree to which each stakeholder's systems can interact and integrate. Testing of systems through scenarios allow multiple scenarios to be assessed, providing for a greater degree of improvements to be identified and intergraded into existing systems. As an example, the Rocky River II exercise identified a need for integration of communications between stakeholders to ensure accuracy and consistency of information. This opportunity was then developed further with industry and government, and incorporated into relevant UOC guidance documents.

Conducting incident scenarios will highlight any gaps of operators and carriers, and will:

- enable operators to be better prepared with resources and equipment to appropriately respond to incidents
- highlight any regulatory requirements, such as radiation management plans, licenses required to clean up, etc
- highlight any gaps in the initial driver response training currently in place in transport plans.

Tasks

- Conduct desktop scenario for a UOC incident (Rocky River II) and update guidance documents with learnings.
- Conduct field exercise with UOC shipping container overpack and update guidance documents with learnings.

3.6 Develop communications protocols for UOC incidents

Deliverable

A document that describes how industry and government communications will be led, developed and distributed (including key stakeholders) for UOC incidents. The framework includes different phases of an incident and where appropriate holding statements.

Gaps addressed

The UOC Steering Committee identified and acknowledged the importance of consistent, efficient and accurate communications between government, industry and first responders. This was reinforced during the Rocky River II desktop exercise by ensuring all key stakeholders understand their role with respect to communication during an incident, in addition to ensuring key stakeholders have an opportunity to review messages prior to being distributed. Furthermore, development of 'fat facts' or holding statements ensures messages are pre-developed, increasing the efficiency for standard messages to be distributed.

The communications framework has been integrated into the 'Uranium Oxide Concentrate (UOC) –Requirements for safe transport in South Australia' document.

3.7 Develop engagement expectations for UOC shipments

Deliverable

Incorporate community engagement expectations for UOC into policy document or transport plan guidance.

Gaps addressed

The Steering Committee noted the importance of operator's role with regards to engagement with stakeholders along a UOC transport route. Presently, there are no drivers for such engagement.

A discussion of engagement expectations is provided in the *Uranium oxide concentrate (UOC) – Requirements for safe transport in South Australia*.

3.8 Review notification protocols

Deliverable

Development of a formalised UOC shipment notification protocol and process for review of UOC transport plans.

Gaps to be addressed

The UOC Steering Committee acknowledged that while there was an existing convention for review of UOC transport plans and notification of shipments, the process was not documented and had not undergone review.

A Steering Committee subgroup was convened with the EPA, DPC and DEM to discuss existing processes and formalisation of an agreed structure. The revised framework provides greater certainty to operators and government for expectations with regard to notification of UOC shipments and review of UOC transport plans.

The revised framework is integrated into the 'Uranium Oxide Concentrate (UOC) – Requirements for safe transport in South Australia' document for government and industry clarity.

3.9 Develop UOC resources table

Deliverable

Table of UOC recovery resources that can be used as a source of response resources in the event of a UOC incident.

Gaps addressed

One of the key opportunities identified in the UOC initial workshop was that operators and government needed to demonstrate that in the event of a UOC spill, that the response and recovery will be done in an efficient manner. In order to achieve this aim, responders needed to understand what resources may be needed under common response situations and where the resources are located.

In response to this opportunity, operators and government responders identified what resources they have at their disposal and summarised these within a single table. The table serves to not only identify what and where resources are located, but can assist in the identification of new or additional resources that may be needed.

The resources table has been added as a requirement within the UOC Transport Plan Guideline.

3.10 Industry agreements

Deliverable

Industry develop formal arrangements to share resources and expertise

Gaps to be addressed

The UOC review identified that while government has excellent first responder capability for hazardous material response and recovery, industry has varying degrees of UOC incident recovery resources and emergency response expertise. One of the objectives of the UOC review is to ensure transport is managed to maintain its social licence, with the performance

of any single player impacting upon industry as a whole. The review identified that there is an opportunity for industry to share resources in order to allow a consistent capability between operators. Such agreements will ensure operators are able to effectively meet their legislative obligations in an efficient manner.

Formal arrangements are yet to be developed, however the ongoing review of UOC transport plans for operators will inform further iteration of the UOC resources table which provide a benchmark for resource capability and assist in driving agreements between operators.

Appendix 1 Project governance

Phase 1 – UOC stakeholder workshop

The first phase of the review was initiated in 2016 where the EPA facilitated a workshop with the mining industry and key government agencies (MFS, DSD, DPC, ASNO). Table 1 provides a full list of participants.

Table 1 UOC Stakeholder Workshop participant summary

Organisation	Participant
EPA – facilitator	People, Capability and Performance Branch
EPA x 6	Resources and Energy Branch
DSD x 2	Mineral Resources Division
MFS x 2	HAZMAT CBRN
ASNO x 1	Nuclear security
DPC x 1	Security and emergency management
Industry x 6	Mining company representatives – SA
Industry x 1	Mining company representative – NT/WA
Industry x 1	Consultancy services provider for Class 7 transport

There were a number of presentations from industry, and state and Commonwealth agencies to provide context and highlight any learnings from previous experiences.

The primary workshop activity was a SWOT analysis which, following the conclusion of the workshop, was compiled and distributed to attendees.

The workshop and SWOT identified a number of gaps in the existing system, that while not critical to the ongoing safety of UOC transport, will ensure a continual improvement cycle. The primary gaps are:

- Responsibilities and accountabilities of carriers and owners under an incident scenario and during a recovery phase need to be clarified.
- Competencies expected of owners and carriers need to be defined.
- There is variability in expertise and resources across operations.
- The existing framework and associated contingencies need to be demonstrated under the variable scenarios and locations that an incident may occur.
- The existing framework needs to accommodate new entrants and interstate operators.

At the conclusion of the workshop, participants agreed that ongoing collaboration was necessary to further the identified areas for improvement. A commitment was made by the EPA to coordinate ongoing collaboration between industry and government to close the identified gaps.

Establishment of a UOC Working Group and Steering Committee

Following the workshop, authority was sought from EPA Executive for the establishment of a Working Group and Steering Committee to develop, oversee, coordinate and execute key actions to address the identified gaps. Terms of reference was developed for each committee/group and is provided in.

The Steering Committee was restricted to government agencies, and included state and commonwealth regulators and first responders. Industry participation was not supported to ensure overall government independence and control over the anticipated project outputs.

The Working Group was extended to include South Australian and Northern Territory uranium miners in addition to Western Australian proposed uranium miners.

Inclusion of industry representatives was intended to allow better engagement with government and influence how they may meet expectations and deliverables of the project. In addition to radiation-specific stakeholders, a dangerous goods expert was also included from SafeWork SA to identify opportunities for alignment with other transport regulations.

A summary of participants in each committee/group is provided in Tables 2 and 3 below.

Table 2 UOC Steering Committee membership

Position	Organisation
Director Science and Information	Environment Protection Authority
Director Mining Regulation	Department for Energy and Mining
Deputy Director, Security and Emergency Management	Department for Energy and Mining
Principal Policy Officer, Security and Emergency Management	Department of the Premier and Cabinet
State Training Officer	Country Fire Service
Metropolitan Commander – Special Operations	Metropolitan Fire Service
Director Nuclear Security	Australian Safeguards and Non-Proliferation Office
Emergency Management Coordinator	SA Police

Table 3 UOC Working Group membership

Position	Organisation
Team Leader Mining and Environment	Environment Protection Authority
Scientist Project Coordinator	Environment Protection Authority
Radiation Protection Officer	Environment Protection Authority
Project Facilitator	Department for Energy and Mining
Principal Regulator	Department for Energy and Mining
Scientific Officer	Metropolitan Fire Service
State Training Officer	Country Fire Service
Nuclear Security	Australian Safeguards and Non-Proliferation Office
Superintendent Logistics	BHP
Marketing Manager	BHP
General Manager	CAMECO
Emergency Management Coordinator	SA Police
Managing Director	Boss Resources
Senior WHS Inspector - Scientific	Safe Work SA
UOC Logistics and Compliance	Heathgate Resources
Chief Advisor Radiation Governance	Energy Resources of Australia

The principle role of the Working Group was to develop a plan of action for endorsement by the Steering Committee and provide regular updates to the Steering Committee as deliverables were executed. A summary of meetings held is included in Table 4.

Table 4 Summary of the UOC Working Group and Steering Committee meetings

Meeting	Date
Steering Committee	16 August 2017
Working Group	29 August 2017
Working Group	17 October 2017
Steering Committee	20 October 2017
Working Group	13 December 2017
Working Group	11 April 2018
Steering Committee	16 April 2018
Working Group	17 June 2018
Steering Committee	31 October 2018

