



## Utilising the Emergency Planning Cycle for the Transport of Radioactive Material

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### 1. Abstract

As a world leader in the transport of radioactive material (RAM) British Nuclear Fuels plc (BNFL) and its subsidiary Pacific Nuclear Transport Limited (PNTL) recognise the importance of adopting the emergency planning cycle.

The emergency response arrangements prepared and maintained in support of the International Transport business have been developed through this cycle to ensure that their emergency response section may achieve its aim and that the business unit is able to respond to any International Transport related incident in a swift, combined and co-ordinated manner [1].

This paper outlines the eight key stages of the planning cycle and the experience that BNFL has gained in respect of its emergency response activities.

### 2. Introduction

The BNFL and PNTL fleet of marine vessels are used for the world-wide transport for RAM and all comply with the International Maritime Dangerous Goods Code (IMDG) [2] and The Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships (INF) [3].

The emergency plans prepared to respond to incidents involving the release of radioactivity are prepared and maintained by a dedicated emergency response section, which forms part of BNFL International Transport. The plans themselves are living documents that have evolved through the emergency planning cycle.

### 3. The Emergency Planning Cycle

In the paper 'Plans and Plan Validation' [4] Hardie-Forsyth and Hick explain the types of emergency plans and the essential elements. They also introduce the eight stages of the planning cycle:

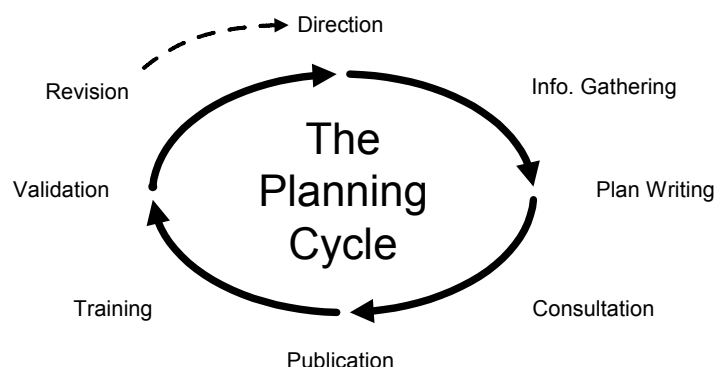


Figure 1. Emergency Planning Cycle

Further detail on each of the stages of the emergency planning cycle and how BNFL utilises them for the transport of RAM are included below.

### 4. Direction

Those involved in writing emergency plans must work to a set of clearly defined aims and objectives. For the transport of RAM and BNFL activities this clear direction is included in the IMDG / INF codes and the Regulations

for the Safe Transport of Radioactive Material [5] and Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material [6].

## **5. Information Gathering**

In order to obtain the information required to write an emergency plan it is important to gather information from each of the key stakeholders likely to be involved in the various stages of assessment, prevention, preparedness, response and recovery [7]. It is also an advantage to understand and appreciate the framework in which the plan will be used and any other plans or procedures with which it should interface.

A good example from a BNFL perspective is the Shipboard Marine Emergency Plan (SMEP) [8], the Emergency Response Procedures (ERP) and the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (NCP). The SMEP is produced by James Fisher and Sons (BNFL ship managers) and provides an aide memoire to the Master of a vessel in the event of an incident. The ERP are produced by BNFL and provide the detailed response actions that should be undertaken by their officers involved in the response to an incident. Finally, the UK Maritime and Coastguard Agency (MCA) produce the NCP in order to provide advice and guidance on marine oil pollution. All three of these emergency plans dovetail to ensure that any response actions will be efficiently and effectively executed without duplication of effort.

## **6. Plan Writing**

When starting to write an emergency plan it is important to remember that it is likely to be the first of many editions that will require regular update, revision and modification. It is therefore vital to consider how the revision process will be undertaken and ensure that the plan is as easy to update as possible. The use of modern information technology can be used to assist authors in both the initial writing and the subsequent update and revision of the plan.

The BNFL ERP are prepared and maintained using Microsoft Word<sup>®</sup> and form part of the International Transport and PNTL Management System [9] which is certified by Lloyd's Register for Quality Assurance as compliant with ISO 9001 and 14001. The procedures are issued as controlled copies and each page therefore carries the security markings 'Authorised Distribution' in both the header and the footer.

## **7. Consultation**

Once a plan has been written the author should consult the key stakeholders on the content and format of the document prior to its publication. The consultation process should ensure that any comments, suggestions, amendments and additions are recorded in order to form an audit trail. At this stage it is worth considering all those from whom information was obtained during the 'gathering stage' and ensure that the document dovetails with any other emergency plan in the framework that it will be used.

Once consultation on all BNFL documents has been undertaken a final copy must be produced for acceptance by the Quality Assurance Manager for compliance with the requirements of the management system. In the case of all emergency plans and procedures they are then authorised for publication by the Head of International Transport.

## **8. Publication**

Whilst the publication of an emergency plan should be a relatively simple procedure the issue of distribution can often be another matter. The question of who 'needs' a copy of the plan, rather than who 'wants' a copy is usually more appropriate. As a general rule copies should be held by anyone with a potential role to play in the response to an incident. The production of electronic plans using tools such as an Adobe Acrobat<sup>®</sup> writer to issue documents on compact disc are also becoming a popular and cost effective method of publication. Another alternative to producing 'hard copies' is to make the documents available on a secure Intranet or Internet site.

A system of document control such as the BNFL management system mentioned above should also be considered to ensure that plans and any subsequent amendments are actually received and updated by the intended recipient.

## **9. Training**

It has often been said that emergency plans would not be worth the paper that they are written on if response personnel were not trained to respond in accordance with the plan. When choosing people to fulfil certain roles in respect of incident response it is important to ensure that they are suitably qualified and experienced. It is also worth considering the duties that response personnel undertake in their normal day to day activities and those which they would be expected or required to carry out during the response to an incident. If it is possible to align these duties then it may be possible to reduce the amount and level of training required i.e. in the event of an incident response personnel will be required to do their normal job under extraordinary circumstances.

Whilst training and exercises are often used in the same breath, it is important to note that training should be seen as a distinct stage in the planning cycle and that it should really be completed prior to subjecting the emergency plan to any type of exercise.

It is important to ensure that everyone with a role to play in the response to an incident has read the emergency plan and that they understand what actions will be required of them. A training needs analysis of the emergency response personnel should be undertaken and a training programme introduced to ensure that they develop any new or additional skills required for the role.

BNFL International Transport has developed an annual training programme and a job description / specification for each officer with an emergency response responsibility. Once they have completed the necessary training and are considered suitably qualified and experienced, the Head of International Transport approves all personnel to undertake their emergency response duties.

## **10. Validation**

The consultation stage of the planning cycle will assist in validating some elements of the plan prior to its publication. However, once it has been issued and personnel have been training it is vital one undertakes formal plan validation to ensure that the emergency plan is correct, current, effective and easy to use.

There are numerous exercise types that may be used to successfully validate an emergency plan and the Home Office Exercise Planners Guide [10] covers the four most quintessential methods of plan validation: seminar, table top, control post and live. In addition to deciding upon the type or types of exercise to be used, consideration should be given to any external organisations with a role to play in the response to an incident and whether or not the exercise should include multi-agency participation.

When planning an exercise it is common to establish a working group to undertake the organisation, execution and evaluation of the final validation exercise. Items for this group to consider could include aims, objectives, finance, planning, staffing, briefing, directing, recording, debriefing and evaluation of the exercise.

The validation exercise may also provide the opportunity to review, test and improve emergency plans, procedures, practices and the individual skill of those personnel involved in the response to an incident [6].

Recent emergency exercises undertaken by BNFL as part of its annual exercise programme followed the publication of revised ERP. Exercise Avenger included a scenario based upon the response to an incident involving the marine transport of irradiated nuclear fuel. Exercise Baltimore was designed to test the arrangements for a security related incident involving the road transport of category one RAM. Both exercises were debriefed and the lessons learnt were fed back into the emergency planning cycle.

## **11. Review**

The final stage of the cycle is that of review. The feedback obtained from training sessions and validation exercises should be used to review the emergency plan and to confirm whether it is in fact correct, current, effective and easy to use or whether it will require further development, once again through the various stages of the planning cycle.

Reviewing an emergency plan should not only be undertaken post exercise, but also reviewed following any significant changes in respect of factors that could influence the response to an incident.

In respect of those emergency plans prepared for the transportation of RAM, International Atomic Energy Agency (IAEA) advocates that an annual comprehensive review should be completed [6]. The International Transport Management System self-verification procedure and regulator audits ensure that in addition to post exercise, the BNFL ERP are reviewed on a regular basis and at the very minimum, every twelve months.

## 12. Conclusion

With over 30 year's experience, BNFL / PNTL have transported more than 5,000 flasks in over 300 voyages without a single incident resulting in the release of radioactivity. During this time, their response arrangements have evolved through the eight stages of the emergency planning cycle. Further utilisation of the cycle and each of the key elements will ensure that should the need arise then the company will be able to response in a swift, combined and co-ordinated manner.

As for areas of improvement or recommendation for the future, then the IAEA may wish to consider collating reports from exercises involving the transport of RAM. The world-wide sharing of lessons learnt from emergency exercises may promulgate good or even best practices and help avoid the duplication of effort or the 'reinvention of the wheel'.

## 13. References

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