



ADELARD

24 Waterside
44-48 Wharf Road
London
N1 7UX

T +44 20 7832 5850
F +44 20 7832 5870
E office@adelard.com
W www.adelard.com

Authors

Robin Bloomfield
Nick Chozos

Distribution

As per Cinif list in
Adelard D1284v10

Copyright © 2020
ADELARD LLP

CAE MINI-GUIDE 3: CAE TOP-LEVEL CLAIM

Summary

This document is part of the Declare CAE guidance document set. It contains guidance on the formulation of the top-level claim.

Contents

1	Introduction	3
2	This mini-guide and the CAE document set	3
3	Formulation of top-level claim	4
4	Summary guidance	6
5	Acknowledgements.....	6
6	Bibliography.....	7
6.1	CAE main-guide	7
6.2	CAE mini-guides	7

Figures

Figure 1:	Summary of the CAE process and supporting mini-guides	3
Figure 2:	Example of CAE top-level claim.....	4
Figure 3:	Example derivation of top claims.....	6

Tables

Table 1:	Relationship of this mini-guide to the CAE process	4
----------	--	---

CONFIDENTIALITY, INTELLECTUAL PROPERTY RIGHTS, AND DISCLAIMER STATEMENT

The information contained in this Report has been produced on behalf of EDF Energy Nuclear Generation Limited, Nuclear Decommissioning Authority (Sellafield Ltd., Magnox Ltd.), AWE plc, Urenco UK Ltd., Horizon Nuclear Power and Westinghouse Electric Company Ltd. ("the Parties"). This Report is the property of EDF Energy Nuclear Generation Limited ("the Lead Party") who hereby grants each of the other Parties and their successor companies, an irrevocable royalty-free, non-exclusive licence to EDF Energy Nuclear Generation Limited's rights to the Intellectual Property generated in the Report. This is in accordance with Clause 10 of the Cinif Research Agreement. This information is to be held strictly in confidence within the Parties and duly authorised recipient organisations including the Office for Nuclear Regulation, the Health and Safety Executive, Government Departments, or non-Parties with a support contract to assess a Party's safety case. No disclosure is to be made to any other third party without the written agreement of the Lead Party and is to be used solely for the purposes sanctioned by the Parties.

DISCLAIMER

The views expressed in this Report are those of the author(s) and do not necessarily represent the views of the members of the Parties. The Parties do not accept liability for any damage or loss incurred as a result of the information contained in this Report.

1 Introduction

This document is part of the Declare CAE guidance document set. It contains guidance on the formulation of the top-level claim.

2 This mini-guide and the CAE document set

The CAE guidance can be seen as having two main components:

1. **CAE process:** The first component describes an overall process made up of five steps (the “CAE process”), explaining the evolution of a justification within an organisation and the activities involved. The approach is flexible, adaptable, and will apply differently to different scenarios of use.
2. **CAE mini-guides:** The second part provides specific technical guidance on the underlying concepts, their definition and their application. We have compartmentalised the technical guidance into “mini-guides”: small, dedicated sets of guidance each focusing on a particular issue. Each mini-guide contains a concise summary with a short list of the key points and risks and challenges that need to be considered, which is then supported by more detailed guidance.

The CAE process, and the supporting mini-guides, are summarised in Figure 1 below. This document is highlighted (mini-guide 3). For a list of all available mini-guides, please refer to Section 6.2.

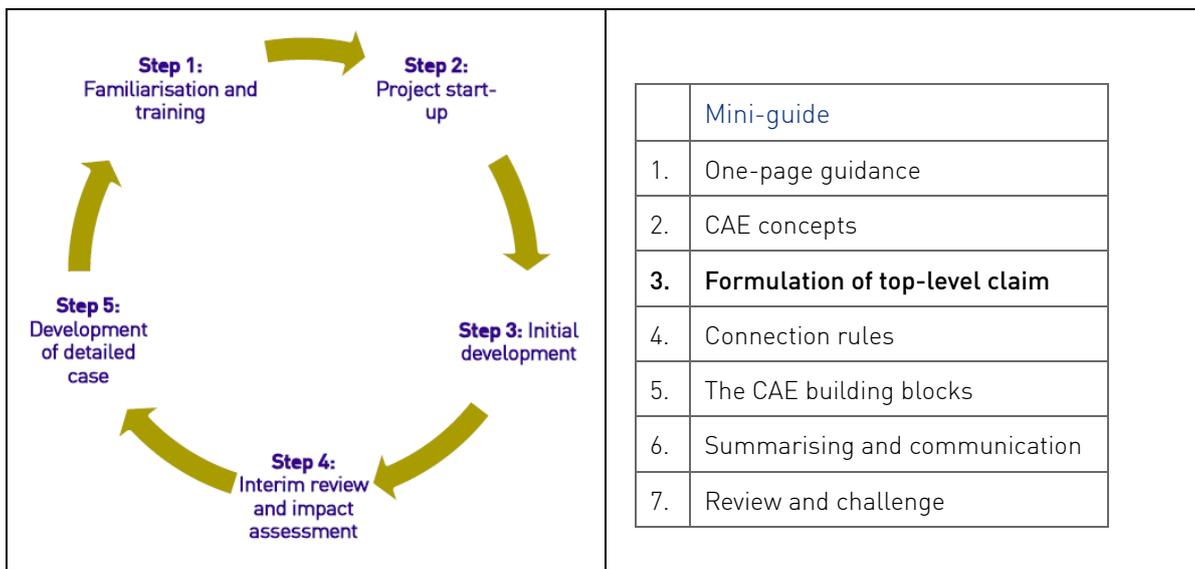


Figure 1: Summary of the CAE process and supporting mini-guides

The overall CAE process is described in the main CAE guidance document [1]. The main guide explains the various scenarios of use and how the guidance may apply in different cases. The document also discusses how the mini-guides may be used in different scenarios and at different phases of a project.

Table 1 below illustrates how this mini-guide applies throughout the CAE process.

CAE steps	Formulation of top-level claim
Step 1: Familiarisation and training	Review this mini-guide and the mini-guide on main CAE concepts [3] and in particular formulation of claims.

CAE steps	Formulation of top-level claim
Step 2: Project start-up	Create initial top-level claim using this guidance.
Step 3: Overview and initial development	Review top-level claim as the case evolves.
Step 4: Interim review and safety case impact assessment	As above.
Step 5: Development of a more detailed case	As above.

Table 1: Relationship of this mini-guide to the CAE process

3 Formulation of top-level claim

The top-level claim states the overall intention for the safety case. If the justification is developed to demonstrate some aspect of regulatory compliance, this is often derived from the regulation the safety case is trying to meet. As the top-level claim is a claim, the guidance on claim formulation provided in mini-guide 2 [3] typically applies here as well; however, there are a few additional considerations that need to be made when defining the top-level claim.

We have defined a safety case as:

“a documented body of evidence that provides a convincing and valid argument that a system is adequately safe for a given application in a given environment”

So we describe a safety case in terms of the claims we make about the system in its context, and in formulating the top-level claim we need to explore what we mean by “system”, what application it is being used for and in what environment. Figure 2 below provides an example of a top-level claim that has been formulated using the guidance on CAE main concepts in [3].

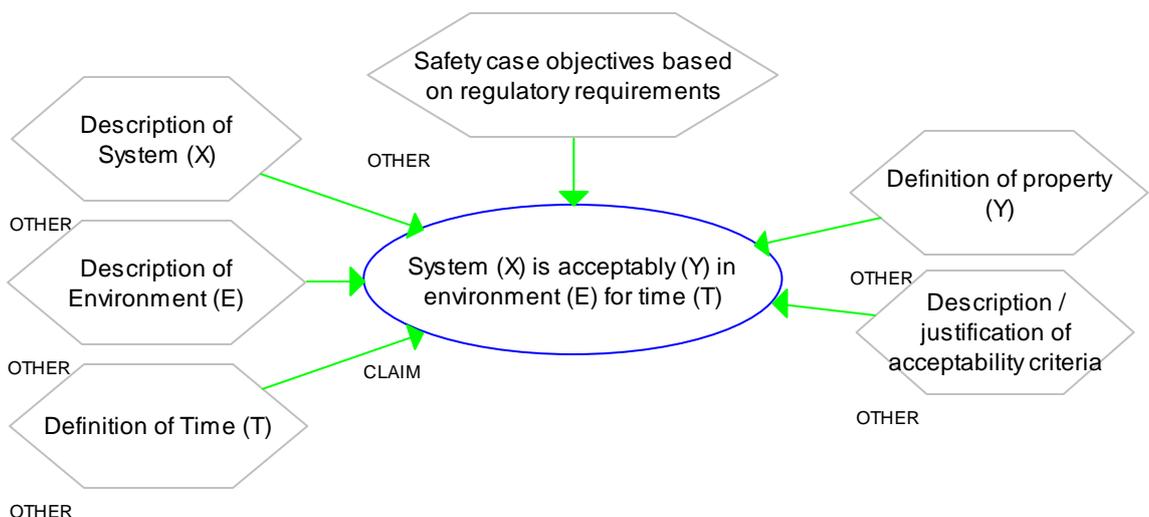


Figure 2: Example of CAE top-level claim

As illustrated above, the top-level claim must be supported by the required context definitions. This applies to all claims, but as the top-level claim states the purpose of the entire safety case, it is crucial that all relevant aspects are considered here.

The phrasing of the claim determines the scope of the entire case. It must be carefully considered so that it adequately matches the regulatory requirement the safety case is trying to meet. It is possible that the initial definition (most likely developed at the start-up meeting [see more guidance on this in the overall process document [1]]) will be revisited and refined as the project evolves.

There may be advantages in terms of safety, costs and wider benefits of exploring the top-level claims further and using CAE to record this type of creative reasoning. For example, often the system does not just have to be safe but also has to be effective. This effectiveness might be important because the system has a role in enabling the overall risks of the plant to be reduced. Therefore drawing the system boundary wider changes the top-level claim as well as the acceptability criteria and increases our understanding of the safety of the overall system.

The top-level claim will also be influenced by our current knowledge of the risks. While a classic safety case might claim that risks are tolerable and have been reduced ALARP, it might be that we are uncertain whether this is indeed the case. Instead it might be that we make a top-level claim that the action we are taking improves the safety although we would have to show that any uncertainties do not invalidate the improvement claim. Figure 3 captures this type of reasoning (also using the CAE blocks, see mini-guide 5 [6]).

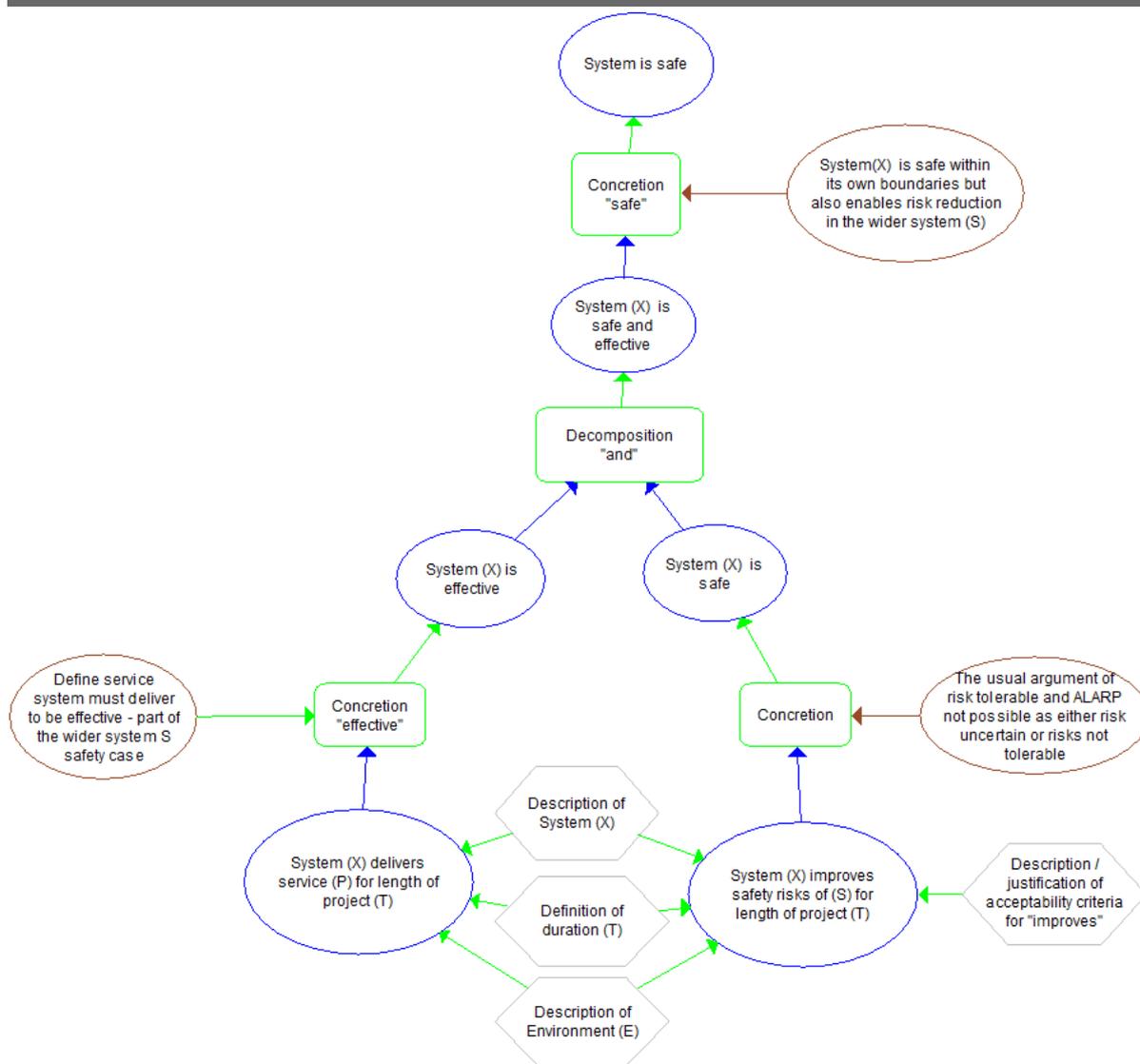


Figure 3: Example derivation of top claims

4 Summary guidance

- A claim is a true/false statement about a property of a particular object
- The top-level claim must be supported by the required context definitions
- Beware that the phrasing of the claim determines the scope of the entire case, and as such the scope definition should be carefully considered early on in the formulation of the top-level claim

5 Acknowledgements

We would like to thank Sellafield Ltd and ONR for their high level of engagement with the project, and particularly Sellafield Ltd for their support and involvement in the project workshops.

This deliverable draws on a number of sources developed in earlier Cinif, SSM and Adelard projects (and in particular.

6 Bibliography

6.1 CAE main-guide

- [1] Bloomfield R, Chozos N, Declare: CAE main guidance and process, Adelard document reference D/1284/43195/2, version v1.0, April 2020

6.2 CAE mini-guides

- [2] Bloomfield R, Chozos N, CAE mini-guide 1 – One-page guidance, , Adelard document reference W/3104/43195/1, version v1.0, April 2020
- [3] Bloomfield R, Chozos N, CAE mini-guide 2 - CAE concepts, Adelard document reference 2, Adelard document reference W/3104/43195/1, version v1.0, April 2020
- [4] Bloomfield R, Chozos N, CAE mini-guide 3 – Formulation of top-level claim, Adelard document reference 2, Adelard document reference W/3104/43195/1, version v1.0, April 2020 (this document)
- [5] Bloomfield R, Chozos N, CAE mini-guide 4 - Connection rules, Adelard document reference W/3104/43195/1, version v1.0, April 2020
- [6] Bloomfield R, Chozos N, CAE mini-guide 5 - The CAE building blocks, Adelard document reference W/3104/43195/1, version v1.0, April 2020
- [7] Bloomfield R, Chozos N, CAE mini-guide 6 – Summarising and communication, Adelard document reference W/3104/43195/1, version v1.0, April 2020
- [8] Bloomfield R, Chozos N, CAE mini-guide 7 - Review and challenge, Adelard document reference W/3104/43195/1, version v1.0, April 2020