Dose per RCA Hour – a useful RP indicator?

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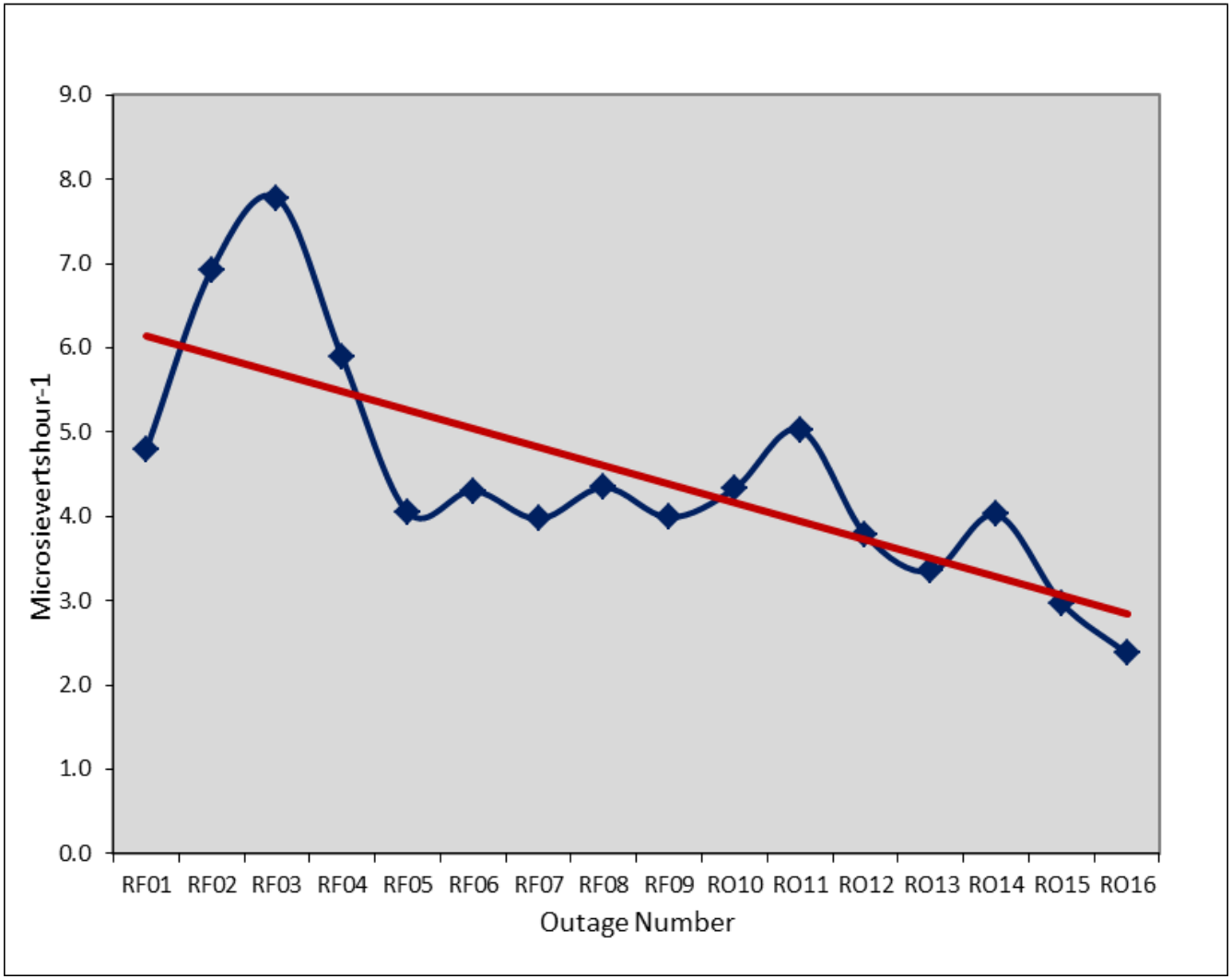
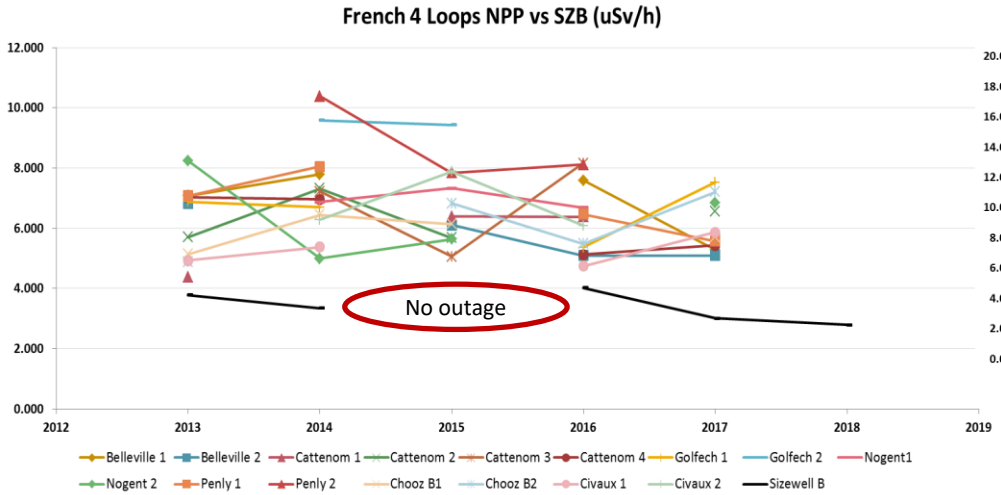
Introduction

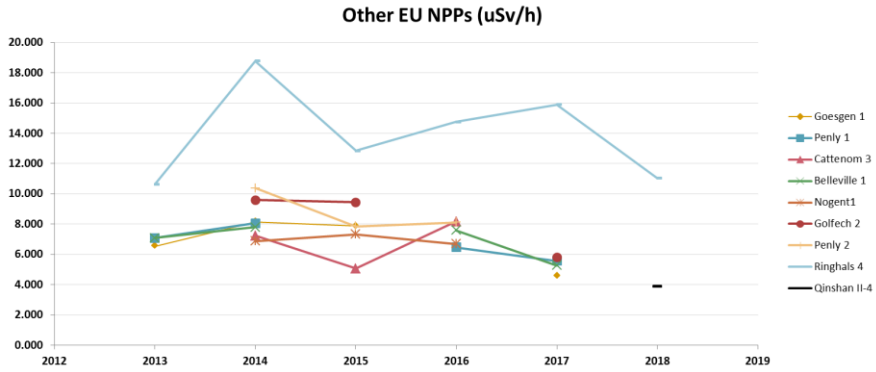
- The nuclear industry makes wide use of indicators to analyse performance and to understand what influences organisational effectiveness.
- Since start-up Sizewell B RP has measured and trended dose per RCA hour in outages.
- In recent outages we have seen a decreasing trend in this indicator – but what is this indicator telling us?

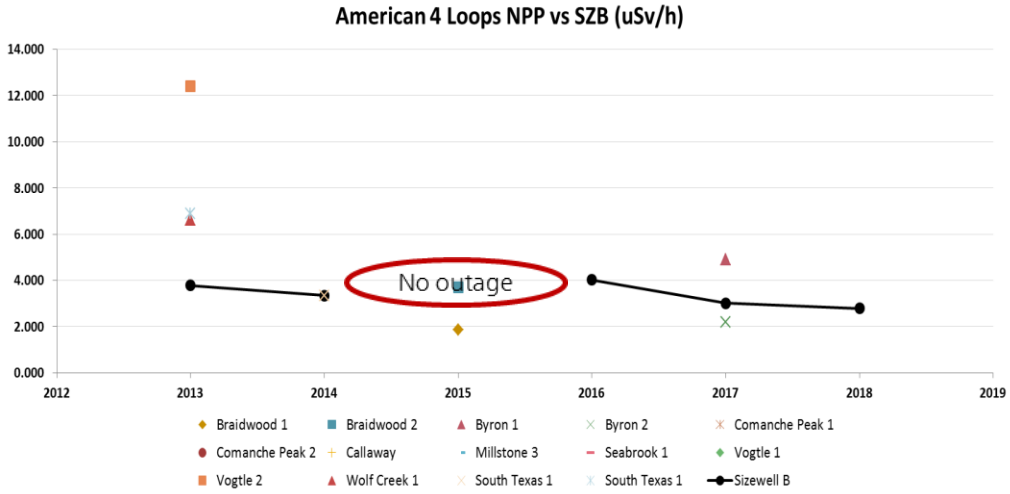
Sizewell B Trend of Outage Dose per RCA Hour



International Comparisons 1







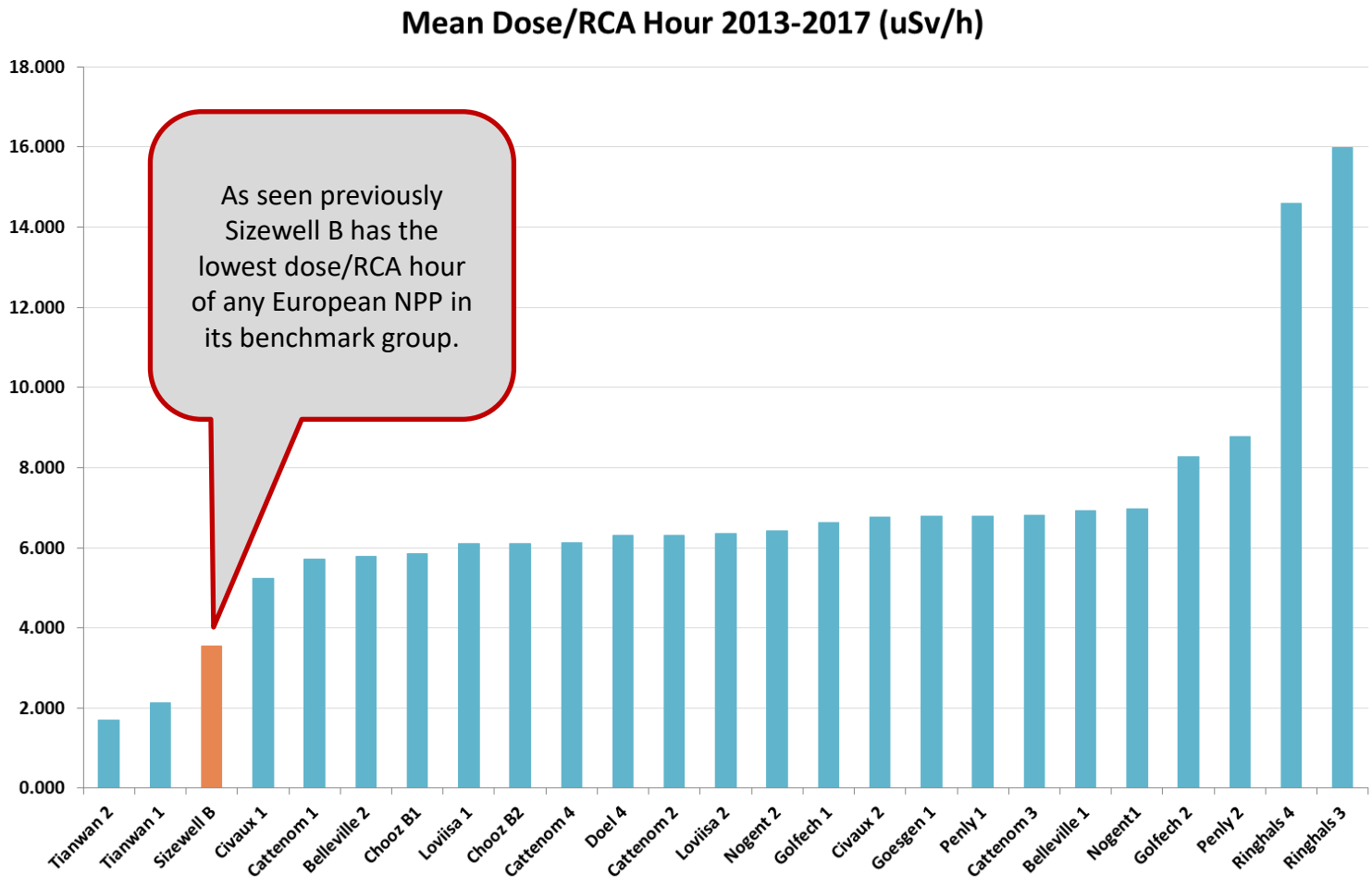
We can see that:

Sizewell's outage doserate is below benchmarks.

Ringhals' outage doserate is above benchmarks.

There is very little data for the US W42 sister group.

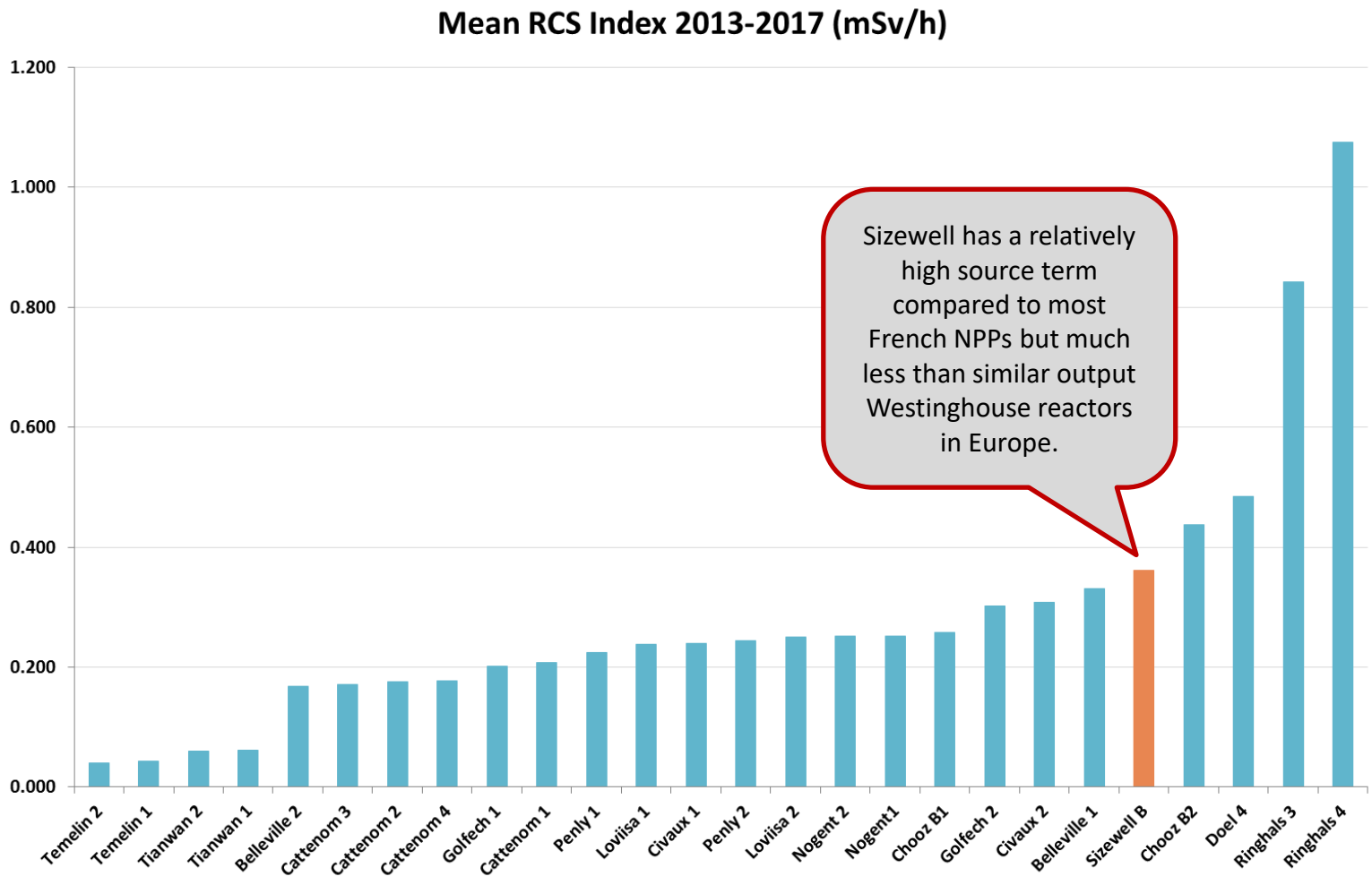
International Comparisons 2



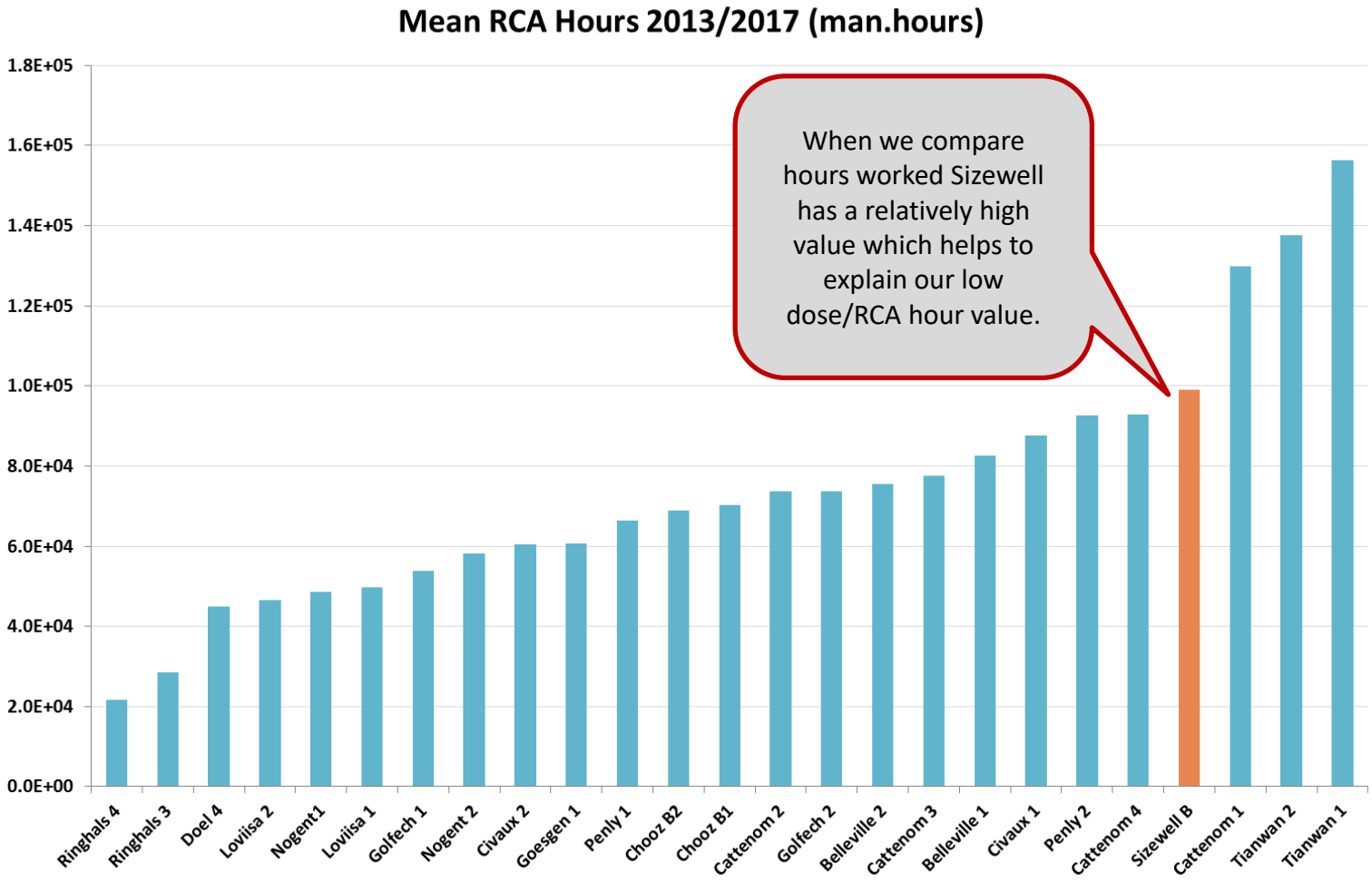
Outage Doserate

- The indicator “outage doserate” is simply Collective Radiation Exposure divided by RCA hours worked.
- Therefore to better understand the basis of a plant’s outage doserate one needs to examine the source term and the RCA hours worked.
- To determine an NPP “source term” we calculated an average RCS index, using the hot and cold leg doserates recorded in the ISOE annual returns.

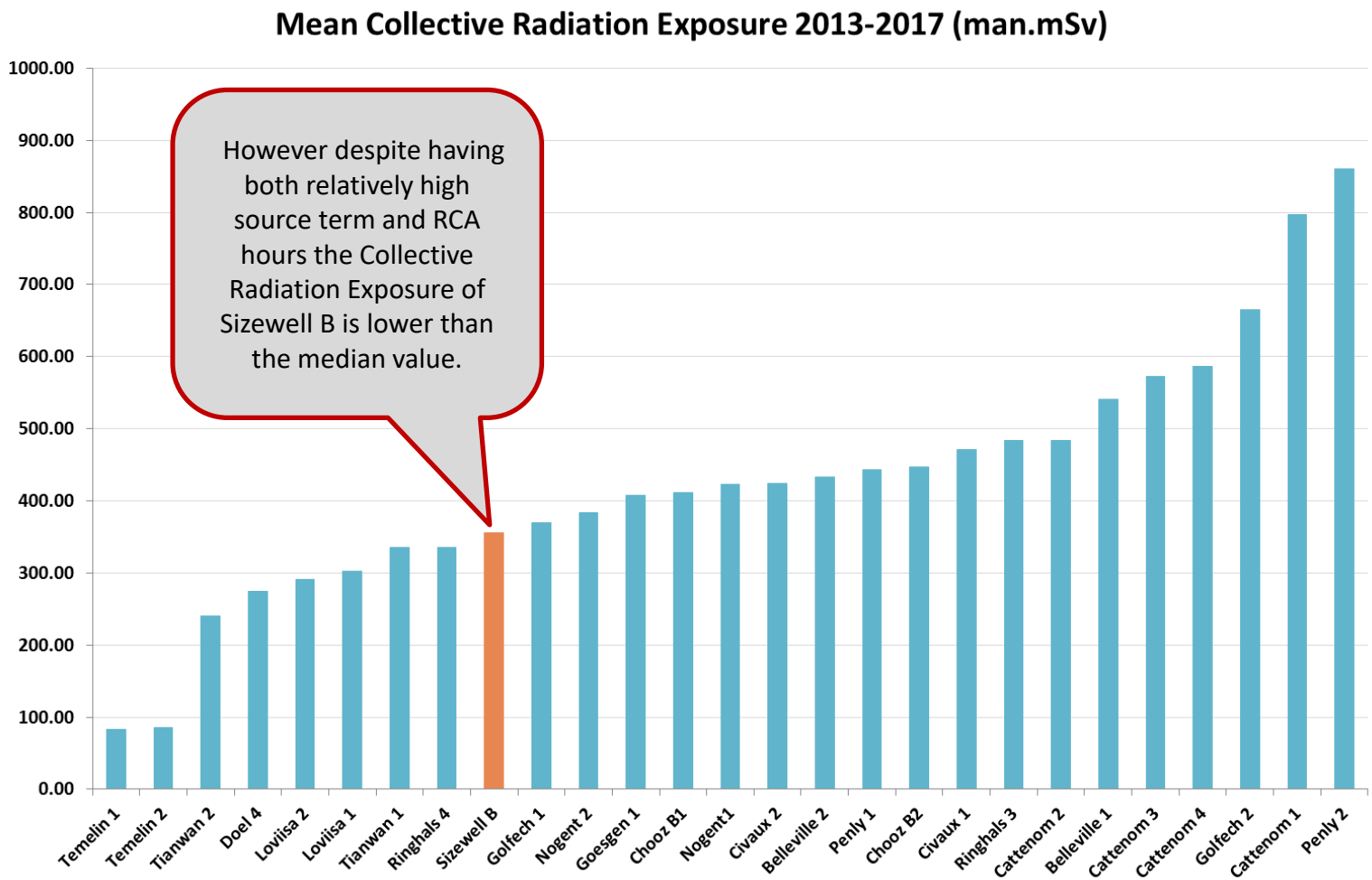
Source Term (RCS Index)



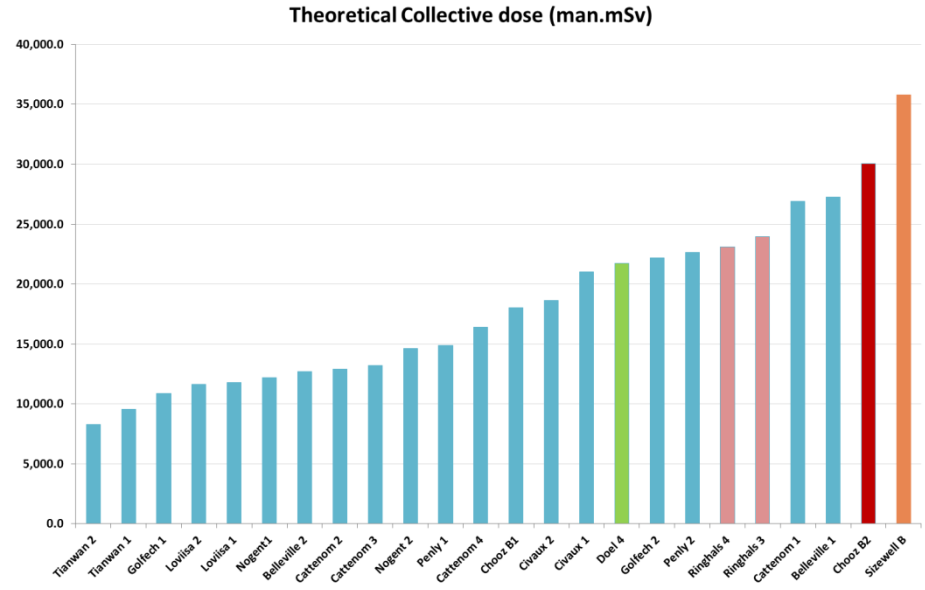
RCA Hours Worked



Collective Radiation Exposure

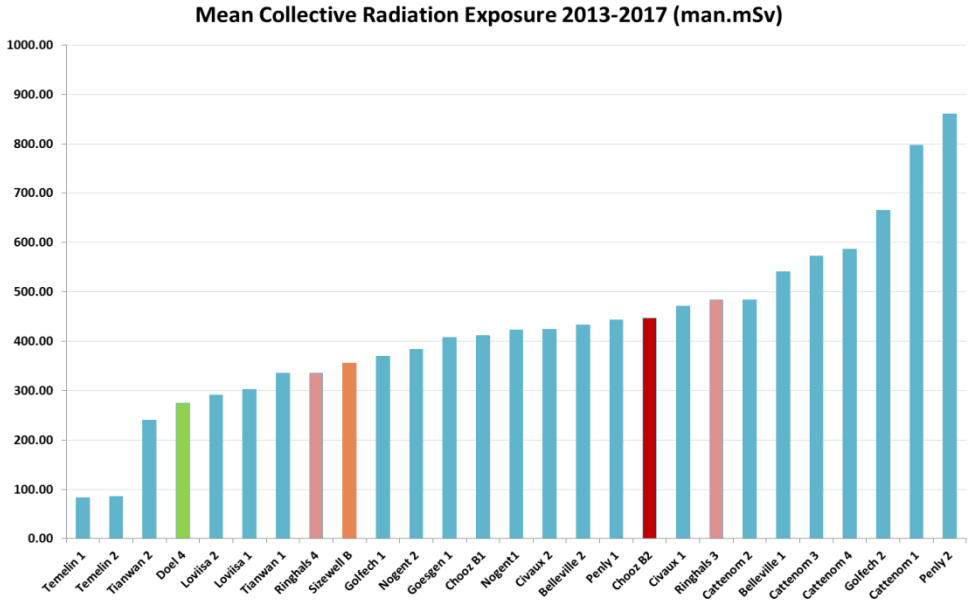


Actual vs Theoretical CRE



We calculated a theoretical CRE by multiplying average outage hours by average RCS index

When compared to theoretical CRE one can see that some NPP's relative performance is quite different.



Conclusions 1

- The analysed data often did not accord with our long-held assumptions about our NPPs and our relative indicators.
- Some NPPs are delivering strong CRE performance, despite a high source term, because these NPPs work a relatively low number of RCA hours.
- Similarly the importance of RCA hours depends not just upon its value but also upon the RCA work sites where the hours are being recorded.
- It appears that dose per RCA hour is not necessarily a useful comparative indicator. It has to be reviewed in the context of an NPP's operational practices.

Conclusions 2

- Our analysis is weaker because not all sites record RCA hours and the US data, in particular, is very limited.
- RCS index may not be a reliable indicator of source term so may distort the data and therefore any conclusions.
- Do RCA hours work reflect an inherent national culture or a conscious work management philosophy?
- This study might serve as an example of how existing data can be better analysed for the ISOE programme, using the new generation of RP professionals .

Thank You

