Dose per RCA Hour – a useful RP indicator?
Guy Renn, EDF Energy Sizewell B NPP & Pauline Putteman, EdF Penly NPP
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.
As seen previously, Sizewell B has the lowest dose/RCA hour of any European NPP in its benchmark group.
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.
Sizewell has a relatively high source term compared to most French NPPs but much less than similar output Westinghouse reactors in Europe.
When we compare hours worked Sizewell has a relatively high value which helps to explain our low dose/RCA hour value.
Collective Radiation Exposure

Mean Collective Radiation Exposure 2013-2017 (man.mSv)

However despite having both relatively high source term and RCA hours the Collective Radiation Exposure of Sizewell B is lower than the median value.
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