METIS

Seismic Risk Assessment
for Nuclear Safety

METIS FOR DUMMIES: GLOSSARY

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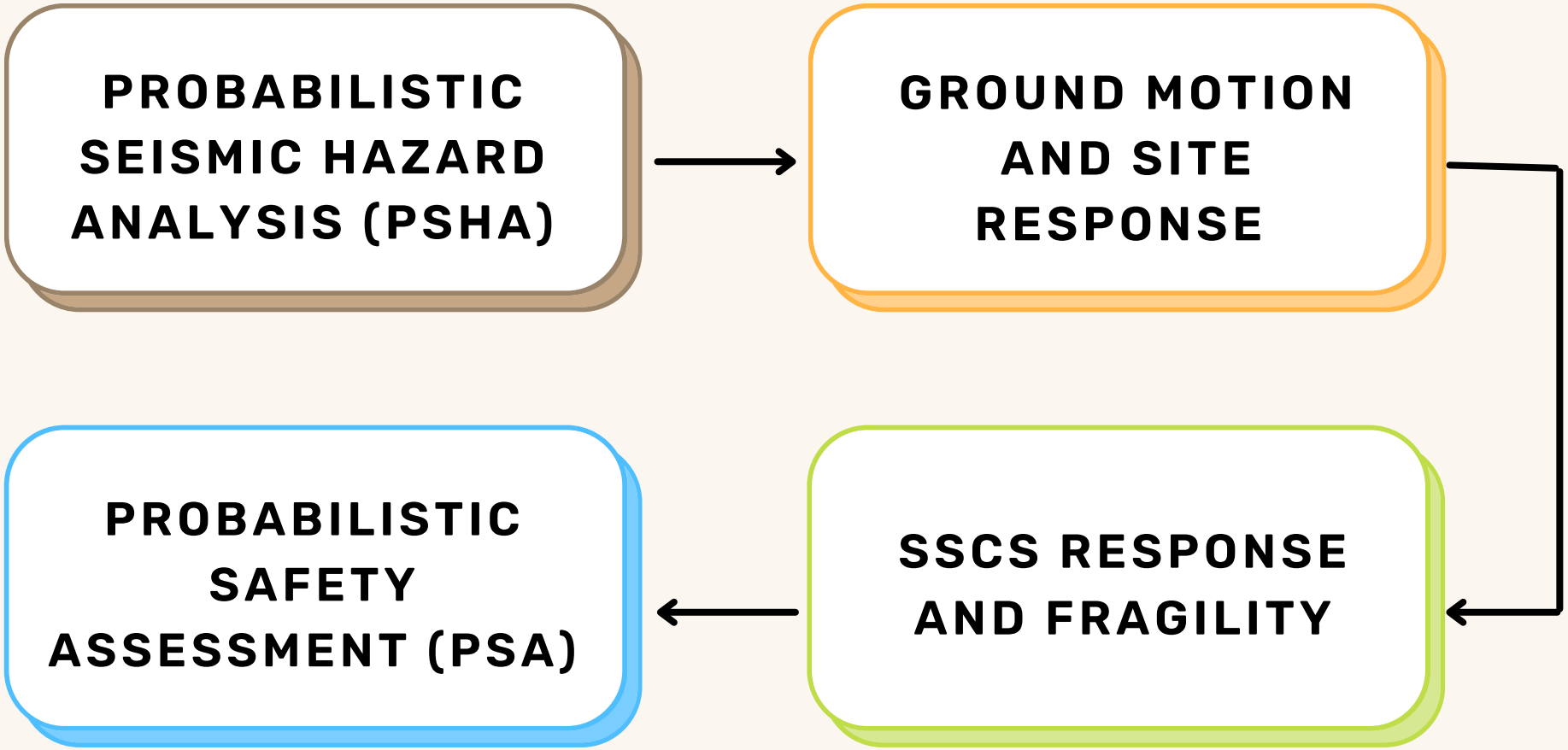

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PROBABILISTIC SEISMIC HAZARD ANALYSIS (PSHA)

The seismic hazard analysis evaluates the frequencies of occurrence of different levels of earthquake ground motions at the site. This includes a probabilistic evaluation of significant ground motions that could occur at the site as well as their probability of occurrence earthquakes. The output of PSHA are the Seismic Hazard Curves and Seismic Probabilistic Safety Assessment (PSA).

Work Package 4.

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SEISMIC HAZARD CURVE

A seismic hazard curve presents the annual frequency (or rate) of exceedance for different values of a selected ground motion parameter (acceleration, velocity, and so on). Hazard curves, which are used as input data in a Seismic Probabilistic Safety Assessment (PSA), are the final output of a Probabilistic Seismic Hazard Analysis (PSHA) representing the mean annual rate of exceedance for the selected motion parameter and the associated uncertainty of this rate at a particular site.

Work Package 4 (output of PSHA)

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GROUND MOTION AND SITE RESPONSE

The ground motion represents the input seismic motion obtained by seismic hazard curve, which may be represented either by a spectral acceleration or by time-histories in accordance to seismic hazard.

Site response is the modification of ground motion from rock to soil sites linked to the geological history of the site (soil layering, basins, topography) and soil nonlinear mechanical behaviour.

Work Package 5

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SSCS RESPONSE AND FRAGILITY

Fragility evaluation is to estimate the probability of damage or failure of a given component or structure as a function of ground motion intensity defined by an intensity measure (IM) such as the Peak Ground Acceleration (PGA).

For this purpose seismic response analysis are performed and uncertainties related to load and SSCs are quantified and propagated.

Work Package 6

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WALKDOWN

A physical inspection of relevant areas of the nuclear power plant site (and its surroundings, as necessary) to obtain or confirm information such that the seismic Probabilistic Safety Assessment (PSA) model represents the as-built, as-operated plant.

This is the preliminary step to Seismic PSA and System Analysis (see next).

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SEISMIC PROBABILISTIC SAFETY ASSESSMENT (PSA)

A systematic method for assessing three questions that define "risk" due to postulated seismic events at a site; (1) what can go wrong, (2) how likely it is, and (3) what the consequences might be. These questions help inform likely outcomes, sensitivities, areas of importance, system interactions, and areas of uncertainty, used to identify seismic risk-significant scenarios.

Work Package 7 (output of Probabilistic seismic hazard analysis (PSHA)).

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SYSTEM ANALYSIS

Fault Tree Analysis or System Analysis can be used in accident investigation. The fault tree is a logic diagram based on the principle of multi-causality, which traces all branches of events which could contribute to an accident or failure.

This is part of Seismic PSA.

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