FORCE is a cooperating forum for sustainable recovery (SR), improved exploration (IE), and energy efficiency & environment (EEE) conducted by oil and gas companies and authorities in Norway.

Guideline for Ensemble Data Sharing

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12/06/2025	This is the second edition of this guideline document. Revisions include expanding the introduction and terminology chapters, adding pro/con sections for each sharing level, and providing additional explanations on documentation/sharing requirements.
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1 Introduction

Ensemble-based reservoir modelling, which leverages multiple models simultaneously to quantify subsurface uncertainty, has been a recognized concept in the oil and gas industry since the late 1980s. Despite its long-standing presence, there remains considerable debate about how ensembles should be constructed and the validity of different methodologies. Each approach comes with its own strengths and limitations. At its core, the use of ensemble modelling is about more than just quantifying uncertainty—it is a tool for risk mitigation, improved decision-making, and better-informed investments in future production operations.

Regardless of how an ensemble is generated, its reliability is fundamentally tied to the underlying assumptions and input data. To ensure that ensemble-based models effectively support business decisions, it is essential that all stakeholders—whether operators, partners, or regulators—have a clear understanding of these assumptions, their justifications, and the associated uncertainties.

What data is shared when ensembles are built currently varies greatly between licenses. Some share very little, others all data available. Both the sharing of too little and the sharing of too much data often leads to licensees being unable to execute their see-to-duty and to constructively participate in the decision-making process. This document aims to provide a structured approach to sharing information about model inputs and outputs, along with guidelines for making this process repeatable and transparent. By fostering a shared understanding among all partners, large and small, we can enhance collaboration and ultimately maximize the value of the field. Collaboration between parties is the key to understanding rather than proscribed sharing and checklists.

A cross-functional group have come together under the FORCE umbrella to set-out guidelines which are agreeable from both an operator as well as a partner perspective. Companies involved have been Aker BP, ConocoPhillips, Equinor, Halliburton, Harbour Energy, INPEX Idemitsu, OKEA, ORLEN Upstream, Petoro, slb, and Vår Energi with facilitation from the Norwegian Petroleum Directorate. PGNiG, Resoptima, TotalEnergies and Wintershall Dea Norge participated additionally in the first edition of this document.

As each field / modelling project has different needs, this document is set out as a guideline rather than a standard. This document is not a best practice guide for building ensembles and hence does not elaborate on this topic. It assumes that standard quality control (QC) products used in model building / history match / prediction are provided and does not list these. As this guideline does not provide an exhaustive list of suggestions, it should not be used as a limitation to what can be shared. Reference is also made to the collaboration agreement which each joint venture (JV) has with regards to what is to be shared in a JV.

One chapter makes general suggestions for partner interaction with regards to ensembles. Progress is often dependant on both parties understanding the capability and needs of the other. This is most easily achieved through ongoing dialog, hence using for a for interaction is encouraged. To facilitate dialog and equal interpretation of this document, terminology used in the document is defined.

Three possible levels of data sharing are presented in this guideline.

Level 1 - results from the ensemble are to be **reviewed**.
Level 2 - results from ensemble are to be **analysed**.

Level 3 - ensembles are to be **run** in-house.

These 3 different levels of data sharing are each outlined in their own chapter. The partnership should aim to agree on one level at the start of the project.

This is the second edition of this guideline document. If you have feedback, please contact a member in the workgroup (listed above) or the FORCE IRM committee. It is also possible to send feedback to postboks@sodir.no with „Feedback – Guideline for ensemble data sharing" in the subject box [1]. The FORCE IRM committee is responsible for keeping this document current. It will be determined in a 2-year interval if the document needs updating. If the need arises the committee can agree to update earlier.

2 Terminology/ Abbreviations

One of the challenges in communication is that several commonly used terms are used with different meanings in traditional and ensemble modelling. The alphabetical list below tries to define the most common of these as a starting point for discussion and specifies how these are meant to be read in the context of this document.

Aggregated results	The outcome obtained by combining data from multiple entities, often across all realisations in an ensemble, to derive statistical summaries or key metrics. This result typically represents measures such as mean values, percentiles, probability distributions, or other statistical indicators that provide insights into the underlying data.
Aggregation	The process of combining data from multiple entities—often across all realisations in an ensemble—to derive statistical representations or summary metrics. This may include computing averages, percentiles, probability distributions, or other statistical measures to support analysis and decision-making.
Simulation case	A specific reservoir model setup, including its input parameters, boundary conditions, and assumptions, used to perform a numerical simulation. A simulation case represents a single realisation within an ensemble or a standalone reference scenario, providing insights into reservoir behaviour under given conditions. Synonyms include: "simulation realisation", "simulation member".
Ensemble	A collection of realisations that belong together and combine to one output. An ensemble is a representation of a conditional distribution given the data, and the core modelling assumptions (i.e., hypothesis / scenario / geological concept) it was built upon.

[1] Please be aware that our correspondence is a case document which will be registered in Norwegian Offshore Directorate (NOD) postale journal. Case documents and journals are public except as otherwise provided by statute or by regulations pursuant thereto. Any person may apply to NOD for access to case documents and journals. Information that is subject to a duty of confidentiality by or pursuant to law is exempted from access.

Geological concept	A mental picture of the reservoir which is converted into a quantitative representation describing structural and stratigraphic elements. (Conceptual models usually incorporate rules about possible geometries and successions of facies that can be included in a geological scenario.) It acts as a starting point/ anchor for the uncertainty inputs
Iteration	Each ensemble generated during conditioning while moving from prior to posterior represents an iteration.
Mean/expected /Std/P90/P50/P10	Statistical estimates describing the characteristics of an empirically estimated probability distribution, calculated across all realisations of an ensemble or all iterations of a case or similar. The arithmetic mean is by definition the empirical estimate of the expected value of a probability distribution Percentiles – the statistical definition: P10: 10% of the outcomes for a given metric will lower than this value, 90 % will be higher. P50: 50% of outcomes for a given metric will be higher than this value, 50% of outcomes will be lower. P90: 90 % of outcomes for a given metric will be lower than this value, 10 % will be higher. NOTE: In oil and gas, please note that different companies apply different definitions of a P10, and a P90, where the majority of companies treat the P90 as the low case (the P10 in the statistical definition above), and the P10 as the high case (the P90 statistical definition).
Modelling setup / prior model	The (prior) model setup/workflow is the mathematical description of the subsurface understanding at any one point in time and must be conditioned to (real) data to produce results. It is the workflows, configuration, input data. (The collaborative product that the team makes and maintains) Synonyms in some contexts: Setup, template project, workflow (≠ grid)
Objective function	The objective function is a quantitative measure used to evaluate the difference between observed data and model predictions. In **history matching**, it represents the misfit between observed and simulated data, often based on statistical criteria such as least-squares error or likelihood estimation. Minimizing this function helps refine model parameters to achieve the best-fit posterior distribution. During **forecasting**, the objective function is applied to optimize decision-making, such as selecting the most effective drainage strategy. This function is designed to maximize a chosen performance metric, such as recovery efficiency or net present value, ensuring optimal reservoir management.

	Often, finding the fitting objective function is an iterative project and the task of the user
Posterior	The posterior describes the state of the input parameter distributions after history matching or other automated conditioning has been performed – it is what is commonly known as “the history match”. (In a probabilistic (Bayesian) framework, the posterior distribution of the unknown (reservoir) properties given the observed data, is proportional to the product of the input prior and the likelihood models, where the likelihood describes the functional relationship between the unknown (reservoir) properties and the output data. In the reservoir modelling context, the likelihood can be the output of the fluid flow simulator, and / or a petro-elastic model.)
Prior	The prior describes the state of the input parameter distributions before history matching or other automated conditioning has been performed.
Realisation / Ensemble member	The individual members of an ensemble. One stochastically generated sample from a probability distribution.
Reference ensemble	One ensemble which captures the most scenario (conditional distribution) that is classified as most likely given the current gathered data. This (reference) ensemble was e.g., used to guide the last major milestone / decision gate during a reservoir development. (≠ best technical case)
Reference Realisation	A specific realisation/member used as a reference point for other realisations. (≠ best technical case, not a most likely case). A reference realisation can be selected based on different (functional) criteria, e.g., realisation of the ensemble that represents the P50 / P10 / P90 of e.g., in-place volume or estimated reserves at the end of production for a reservoir. Note, however, that when this realisation is tied to a specific statistic (e.g. P50 of the in-place), it will not be representative for the P50 statistic of another quantify e.g., net-present value or P50 porosity in the topmost reservoir zone.
Geological Scenario	A specific set of input assumptions and/or constraints represented by a single ensemble realisation / group of realisation / a full ensemble. In experimental design approaches, different scenarios used to represent deterministic values for parameters or sets of parameters, typically with assigned (prior) probabilities attached to them, therefore being realisations from a discrete probability distribution.
Monte Carlo sampling / estimation	A statistical technique that generates realisations through random sampling from a defined probability distribution to approximate its statistical properties. This method is used to estimate key quantities such as mean, variance, and percentiles, providing insights into the underlying distribution when direct analytical solutions are impractical.
Sensitivity	A systematically designed simulation to assess the impact of varying one or multiple reservoir modelling parameters (e.g., structural depth, facies fractions, permeability, porosity, or fluid contacts) on key output metrics (e.g., in-place volumes, well water cut, or field net present value).

	Sensitivity analyses can be conducted using a full ensemble generated through Monte Carlo sampling, experimental design methods, or manually defined parameter variations.

3 Collaboration in the partnership

When initiating new modelling projects—whether building new models or updating existing ones—it is highly recommended that the partnership aligns on collaboration practices and the deliverables to be provided. These discussions should start as early as possible to set clear expectations and ensure effective participation from all parties during the build process. Regular follow-ups are essential, and initial plans should be revisited and adjusted as needed throughout the project.

3.1 Key Topics for Discussion

To foster effective collaboration, the partnership should discuss and align on:

- **Collaboration formats** – e.g., regular meetings, workshops, workstation sessions, status reports.
- **Feedback loops** – ensuring timely and constructive input from all parties.
- **Deliverables from the operator** – defining what products and insights will be shared.
- **Partner requirements** – clarifying what data or products partners need and how they will use them.
- **Terminology standardization** – ensuring a shared understanding to avoid miscommunication.

These discussions should lead to an agreement on the appropriate level of data sharing for the project (see Levels 1, 2, and 3 in this document) and, ideally, a defined list of expected deliverables. This list should remain dynamic and be updated as needed to reflect any relevant changes if the build process changes considerably.

Establishing collaboration expectations early enables better planning for both operators and license partners. Active participation and regular follow-ups strengthen trust, encourage meaningful discussions, and ensure partners have opportunities to provide input and feedback throughout the modelling process.

The goal of any modelling project is to enhance the partnership's understanding of the reservoir, identify key opportunities, and assess uncertainties and risks—ultimately increasing the field's value. Transparency regarding data processing, interpretation assumptions, core modelling scenarios, and associated uncertainties is crucial. This openness on the operator side together with the active participation from the partnership side, help mitigate common risks in reservoir modelling, including cognitive biases and the impact of subjective noise.

4 LEVEL 1 - Review

4.1 Aim of Level 1

At this level results from the ensemble are to be **reviewed** only. Summaries / overviews / maps of input data of the ensemble input are provided together with the main results and the operators "digested" analysis.

Level 1 is a very common scenario where a partner company is able to make decisions based on the provided and documentation.

Documentation can be a written report, but also presentation material from formal or informal JV meetings or other data visualisation tools (e.g. webviz) which are accessible to the JV companies. A section below is dedicated to what data should be shared as data (rather than a visualisation). These are data normally covered under the JV collaboration agreement.

4.1.1 Pros / cons of level 1 sharing

Pros:

- Increased level of trust within the partnership through a standardised description of model inputs and outputs.
- Reduced time spent by partners doing ad hoc analysis of full ensembles of models (level 2 or 3) when they have limited resources to do so.
- Ability to systematically screen multiple assets to help optimize the complete portfolio regardless of tools / companies that generate the ensembles of models.
- Simplifies presenting the models / projects to nun-subsurface personnel

Cons:

- Difficult to actively contribute towards the modelling, by delivering your own analysis / ensembles that potentially test alternative modelling hypothesis considering the currently available data.
- If there is not a high level of collaboration during the ensemble build it can be challenging for both the operator and partnership to detect potential inconsistencies between the different model building blocks, as aggregated statistics can hide logical flaws in the modelling workflows and derived outputs.
- If there is not a high level of collaboration during the ensemble build, there is a potential risk that the partnership gets anchored on a few possibilities rather than fully exploring the full range of possibilities as the modelling / analysis activities.
- The see-to-duty of the partnership can become challenging if there is not a high level of collaboration during the ensemble build

4.2 Common documentation practice

The following should be included in the documentation (but not limited to):

- Description of the modelling scenario / hypothesis used as a basis for this ensemble of models representing the conditional distribution of the unknown model parameters given the data and these core sets of assumptions. This can include, but is not limited to:
  - Description of the core assumptions around the depositional environment / facies model.
  - Assumptions made while interpreting gathered (seismic / well log) data.

  - Assumptions around fluid models (PVT, relative permeability etc.)
  - Assumptions around the choice of (fluid flow simulator) initialization technique.
  - Reasoning behind the choice of gridding technique.
  - What and how are modelling inputs etc used in the modelling and why?
  - Which inputs are not included as part of this modelling hypothesis? Why?

- Description of what decision this ensemble of models can potentially be used to support (i.e., when is it appropriate to leverage this ensemble to support future business decisions, and what are potential limiting factors?)
- Description of (prior) modelling inputs and parameter distributions, and key assumptions around these choices. This includes, but is not limited to:
  - Well data (interpreted logs, trajectories, completion events, production data, well tests, formation/production logging tests, zone logs, horizon picks)
  - Seismic depth conversion technique
  - Concept model description with a description of the uncertainties associated with this model
  - Relative permeability (SCAL) data description
  - Interpreted contacts
  - PVT model description
  - Description of the facies model with associated uncertainties (spatial connectedness, facies association, etc.)
  - Description of the assumptions used in the petrophysical modelling (variogram ranges, log upscaling technique)
  - Description around use of seismic data (attributes) as input to facies / petrophysical modelling (if applicable)
- Description of the (prior) model assumptions used for the unknown model parameters. This includes, but is not limited to the estimated or given statistics of these input distributions (range, mean, min, max, etc.), sampling distributions used to initialise the prior ensemble, correlations (spatial or otherwise) between different parameters, etc. The context / description of these parameters should be provided in a format that can be understood by third parties that lack direct access to the engines that were used to generate them. Furthermore, the company delivering the ensemble of models should:
  - Demonstrate how the geological concept(s) is represented in the model/workflow
  - Specify the main assumptions used while performing fluid flow simulation, this can include:
    - A description of the constraints or guiding mode used for the fluid flow simulator
    - Choice of fluid flow initialisation technique within the simulator itself and demonstrate how the simulation model is initialized and if it is dynamically stable.
    - Description of changes made to model parameters within the flow simulator itself that might not be modelled directly as part of the model input parameters. Examples include
      - Introduction of numerical aquifers and the description of the core assumptions behind these

      - Description of lift curves used
      - Use of skin / productivity index multipliers and the (physical) reasoning behind the use of these in the simulation model.
      - Introduction of non-neighbour connections and the reasoning for these
      - Use of transmissibility barriers that are not directly linked to structural elements (e.g., transmissibility multipliers), and the (physical) reasoning behind these assumptions.

  - Deliver a high-level overview (report) giving a high level (statistical) description of the main reservoir model building blocks including, but not limited to:
    - Description of model parameters statistics (mean, P10, P50, P90, std.dev, min, max) for the key reservoir properties per modelled zone (isochores / bulk volume, facies fractions, permeability, porosity, saturation, net volume, pore volume, hydrocarbon pore volume, in-place volume)

  - Present which parameters have most impact on the ensemble results when applicable, focus on PRIOR results (e.g. GIIP/STOIIP/FOPT/FGPT/FWPT/Pressure @start/end simulation per field or per well, depending on the decision, associated uncertainties and potential risk mitigating actions.
- Description of simulation deck – both history and prediction if used
  - Ranges of operational uncertainties, such as uptime, constraints, drilling schedule should be specified.
  - Definition of the fluid in-place regions defined in the simulation model
  - Definition of which zone each grid block belongs to as a 3D property in a format agreed upon by the partnership (e.g., .grdecl format)
- Description of core assumptions made in the data conditioning step. This includes, but is not limited to:
  - Approach / algorithm used in the data conditioning (history matching) phase with a description along with a description of algorithm input (hyper) parameters.
  - Describe the assumptions which data has been actively used in the data assimilation step to generate the posterior distribution. This includes, but is not limited to:
    - Which data has been included, and the associated level of model / measurement error (tolerance / standard deviation / weighting level) used for these measurements. Examples of dynamic data include, production data, formation test data, production logging data, drill-stem test data, repeated seismic (4D) / gravimetric data.
    - Description of the petro-elastic model used during dynamic data conditioning (if applicable)
    - Contribution per well and data type
    - Impact of the input parameters and their sensitivities
    - Model error (input errors) (for the simulation runs)
  - Describe the evolution of Objective function with the distinct ensemble iterations
- Description of the objective function used to e.g., optimize future reservoir management decision including number of wells, injection / production strategies, completion design, well design, etc.(if applicable)

    - Describe the objective function set-up, give a list of the parameters used and their reasoning
        - Type of data used (e.g. Field cumulative oil, least water volume, number of wells)
        - Weighting on the different type of data (if used)
        - Describe the methodology behind the set-up (e.g. localization)
        - Contribution per well and data type
        - Impact of the input parameters and their sensitivities towards the defined objective function.
        - Assumptions around the expected model error (for the simulation runs)
    - Describe the evolution of the objective function with the distinct ensemble iterations
- Description of changes made to model input parameters during dynamic data conditioning, i.e., describing the differences between the prior and posterior distributions as represented by the (prior and posterior) ensembles of models.
    - Selected standard QC plots static and dynamic responses as agreed in JV – prior vs. posterior (specifics should be agreed on in the partnership as early as possible. This should be available without investment in software) such as:
        - Selected cross -sections along the major axis describing the structural framework of the model, average maps (e.g poro-perm-facies, thickness, depth surfaces, field/contacts outline) per reservoir zone (prior, posterior, delta)
        - Overview of the statistical estimate of 3D parameters describing the simulation model inputs and outputs - static and dynamic (e.g. saturation, pressure, porosity, permeability) per reservoir zone.
        - Images displaying the field / group / well performance over time as reported by the fluid flow simulator including, rates, bottom hole / tubing head, gas-oil ratio, water cut, etc. The image should display the
            - Observed data vs model realisations / ensemble statistics
        - A quantification of the predictive power (in history and future setup) through use of e.g., “blind test” / cross-validation approaches
        - Quantification of the mismatch between observed and simulated, highlighting areas where the mismatch is large, or where the ensemble of models fails to capture the observed data.
            - Relevant levels (e.g. well, field) to be agreed in JV
            - (seismic / gravimetry/ tracers…)
    - Description of the observed relationships between the input parameters and the output properties (e.g. OWC vs. FOPT), and trends seen in data / model parameters resulting from static and dynamic data conditioning (prior to posterior distribution). This includes:
        - What observation impacted the parameters the most (where and why)?
        - Where do we see a significant change in the prior vs. posterior distributions and why?
    - Description of areas where you see a significant reduction of uncertainty in model parameters from prior to posterior distribution, and a reasoning behind the validity of this reduction.

  - Description of the key changes made to this generation of ensemble(s) against previous generations of ensemble(s). How has the core modelling assumptions been adjusted, how have the inputs been adjusted (additional data alone, or re-interpretation of input data, etc.), and how have changes affected the outcome (posterior) ensemble(s).
- Include agreed QC products used in model building / history match / prediction to provide “sanity” check for the ensemble (e.g. material balance, transition to prediction period, distribution of input (log) data vs. resulting model parameters),
- Explain presented and documented aggregated results. Present and share the profiles that are input to the decisions.
- Selection of ensemble subsets (if applicable):
  - If there has been any selection within the ensemble, it should be clearly stated how the samples have been selected. (e.g., subset of 50 realisations from an ensemble of 500 realisations, or subset selections of multiple ensembles derived from different conditional distributions).
  - Specify if it is a subset or a new ensemble

4.3 To be provided as data

The following should be provided as (raw) data in tabulated format:

- Initial inplace volumes per segment/sand/ etc (to be decided in JV discussion) for each realisation for prior and posterior (if relevant)
- Cumulative well /group/field production all phases (yearly)

5 LEVEL 2 - Analysis

5.1 Aim of Level 2

At this level results from the ensemble are to be **analysed** independently. Underlying (raw) data is provided to be able to cross-check inputs and do their own analysis of the results. Companies can perform in-house filtering of the ensemble realisations (clustering). Individual companies can in this way use mean/P50 or another measure for decision making if preferred.

The expectation is that if a level 2 is requested that there is active feedback to the operator on own analysis done by partners.

The data shared is in machine readable format which the receiver can adapt to use in standardized workflows like webviz/IRMA/others to visualize/analyse ensembles.

The common decision basis should be explained and documented for transparency. This includes aggregated results. Present and share the profiles that are input to the decisions.

5.1.1 Pros / cons of level 2 sharing

Pros:

- Each member of the partnership can perform their own analysis of the field using the available data and ensembles, lowering the burden on the operator to screen potential future field development alternatives.
- Each member of the partnership can actively contribute towards identifying key risks associated with the modelling choices made by the operator and help provide input towards mitigating these risks.
- Increased transparency within the partnership potentially helps reduce friction in current and future reservoir management decisions
- Increased level of standardisation on inputs and outputs shared within the partnership helps reduce time spent by partners on their own analysis.

Cons:

- Puts a larger responsibility on each company in the partnership to be able to leverage / utilise the information found in the ensemble of models delivered by the operator. Poor understanding of the value of ensemble within a company and/or lacking best-practices and/or tools for analysing a full ensemble of models can limit the value gained from receiving a full ensemble of models. This can increase the level of distrust between the partners.
- Lack of tools and best practices for ensemble-based decision making at individual companies, can lead to a state of analysis paralysis within the partnership where the operator spends more time needing to defend their reasoning.
- Lack of industry standards in terms of file formats can make it challenging to share ensembles across companies using different reservoir modelling tools

5.2 To be provided as data

Until a standard form of sharing metadata exits, in addition to the usual interpretations / modelling descriptions / reports which are shared, a brief (1 to 2 pages) describing the data provided and how they were used in the modelling setup should be provided. Examples include, name of the horizons used to define the grid zones, faults included in the modelling, names of the well logs used in the modelling, names of the wells used in facies and petrophysical modelling, etc.

The following should be provided as (raw) data in tabulated format:

- Input / Parameterization matrix (variable spreadsheet) including seeds where appropriate.
- volumes per segment/sand/ etc (to be decided in JV discussion) for each realisation for prior and posterior (if relevant)
- Cumulative well /group/field production all phases (monthly suggested as baseline, but frequency to be agreed within JV)
- Ensemble of 1D (scalar variables) used in the modelling, with associated metadata describing the (physical) interpretation of these variables.
- Ensemble of 2D (surface) parameters used in the modelling, with associated metadata description the (physical) interpretation of these parameters
- Ensemble 3D grid with parameters used in the (geological) modelling, with associated metadata describing the (physical) interpretation of these parameters.
- Grid zone definitions and number of layers per zone for each realisation (if this changes between different realisations)

- Ensemble of 3D static parameters derived by the fluid flow simulator on initialisation (e.g., transmissibility in X, Y, Z direction per grid cell, initial water saturation, porosity, permeability, connate water saturation, etc.
- Ensemble of 3D dynamic parameters derived by the fluid flow simulator at the start of simulation and at the end of history / prediction (as a minimum). Parameters include, but is not limited to; fluid in place at reservoir and surface condition, saturation, pressure.
  - Assets with very long histories and or 4D data can consider more frequent timesteps.
- Simulation model files (data deck + include files) in a format that is agreed upon by the partnership, in a format where the simulation model can be run directly by any member of the partnership without any additional pre-processing of the simulation model input files.
- Specific agreed grid properties that are not exported as standard to the simulation deck (This includes, but is not limited to; flow regions, facies/rock type or fracture density, facies modelling inputs (e.g. facies probability cubes), permeability, porosity conditioned to each facies type, etc.)
- Results of sensitivity runs (if applicable) - sorted systematically to make it clear which parameter was perturbed, (base) values used for other parameters, and including all results considered relevant for sensitivity analysis, e.g. volumes, rates, (partial) objective function values, etc.
- Well paths used in simulations in each realisation
- Completion events (relevant for each realisation?)

6 LEVEL 3 – Run in-house

At this level, the aim is to be able to **run ensembles in-house** - either as delivered by the operator or reconstructed based on the same assumptions as the operator has used if different software is being used[2]. The receiver may choose to modify the ensemble to create their own using their own interpretations, running with different ranges on input parameters, or performing sensitivities not originally prioritized by the operator.

This topic is fraught with both technical complexity as well as possible legal issues and has for these reasons not been included in this first edition. The intention is that the guidelines for this will be worked up and published at a later date.

[2] Due to different behaviours of software packages as well as versions of operating platforms, it will be near impossible to create 100% identical ensembles generating identical outputs using different software – both on the geomodelling and on the simulation side.