As operational time is accumulated, the overall safety and performance of nuclear power plants (NPPs) will tend to be characterised by those areas in which structures, systems and components (SSCs) have not performed as well, or as reliably, as expected. The reasons for non-availability of equipment in NPPs due to SSC material malfunction or unsatisfactory performance, leading to events or even accidents, are varied and they must be analysed in order to obtain the root causes. Once the root causes are identified, corresponding measures can be applied in order to improve reliability and therefore safety. The root cause information obtained, if brought into user-friendly databanks (DBs), can be used to follow NPP performance trends, to check whether a repair or replacement has been effective, to focus regulatory attention and NPP surveillance on known weak-spots and to serve as an advance indicator where potential problems may arise. Using the DBs, similar occurrences of failures or problems in other NPPs can be identified and generic issues recognised early on and preventative action taken. The following describes the Swiss Federal Nuclear Safety Inspectorate's (HSK) DB concepts for keeping track of NPP safety and lifetime management issues.

Typical sources of data for the Inspectorate's DBs are, for example, the IAEA/NEA Incident Reporting System (IRS) reports, US-NRC Generic Letters, the Swiss NPP's own reports (monthly, annual and normal outage) and, more importantly, the document that these NPPs must issue to the Inspectorate whenever a reportable event takes place. Specifically, the reporting of events in the NPPs is laid down in the Inspectorate's Guideline (R-15 "Reporting Guideline Concerning The Operation of Nuclear Power Plants"). In this Guideline, reportable events are defined and the criteria for assessing the degree of importance or impact on nuclear safety are given. In this manner, a standard and consistent approach to data collection is achieved. The Inspectorate processes these data under the auspices of its own specialist group, and a final decision as to the root cause and the safety importance is made. In this way, any differences in interpretation of importance and safety impact of events between the Inspectorate's own assessment and that of the NPP operators can be analysed, discussed and put into the correct context and perspective. Generally, the reportable event assessments and proposed mitigation or other actions of the operators have been found to be acceptable to the Inspectorate, but, in some cases, differences between the interpretations of the regulator and operator have become apparent.

The Inspectorate has, over the years, collected data concerned with all aspects of safety, backfitting and modifications in the Swiss and also other NPPs. The main DBs of the Inspectorate are: 1) Reportable Events DB, 2) Probabilistic Safety Analysis (PSA) DB and 3)
Damage and Degradation of SSCs DB. The Inspectorate's reportable events DB has been conceived to incorporate a classification of SSCs and failure types according to the IAEA/NEA incident reporting system (IRS). All the DBs enable the user to obtain condensed reports of the incidents, materials and systems or components involved, the assessments of the NPP operators and the finally binding, salient points and lessons-learned summaries with recommendations or requirements to the NPP operator, from the Inspectorate. All of the DBs are updated regularly since they are living documents.

The DBs are so conceived that the Swiss NPPs (Mühleberg/G.E.BWR; Beznau 1 & 2/Westinghouse PWRs; Gösgen/KWU PWR and Leibstadt/G.E. BWR) can be individually analysed and, where applicable, comparisons undertaken. The Inspectorate's DBs have proven to be informative and practical tools to register, monitor and register information on all events concerned with the operation of NPPs.

An overview of the structures of the individual DBs is provided. Focus is made on the type of input required and the necessary quality assurance (QA) for the data. It is shown that record keeping and DBs on reportable incidents, PSA data and material degradation in NPPs have an increasingly important and integral role to play in increasing reliability, safety and maintaining NPP operational and life management goals. Lessons learned provide the foundation for creating vigilant and questioning attitudes, which are essential for maintaining safety. Safe operation of a NPP is clearly a prerequisite for optimum plant performance and life management.