



Information Manager-Modern EDP as a Tool for Safety-Related Plant Evaluation

Christian Dirmeier and Karl Götz

TÜV Süddeutschland Bau und Betrieb GmbH, Germany

ABSTRACT

The safety of nuclear power plants is determined by a variety of parameters. In Bavaria, all the data required to monitor a plant is collected in an information system. This makes it possible to evaluate individual measures and malfunctions. In order to present complex interactions and to evaluate dangerous occurrences information assistants have been integrated into the system which collate data from different plants. The information assistants enable plant data to be linked with unstructured information and results of probabilistic analyses, thus facilitating safety analysis. Apart from plant-specific data, information on fuel-element transport, which is becoming increasingly important, is now being incorporated in the system, too.

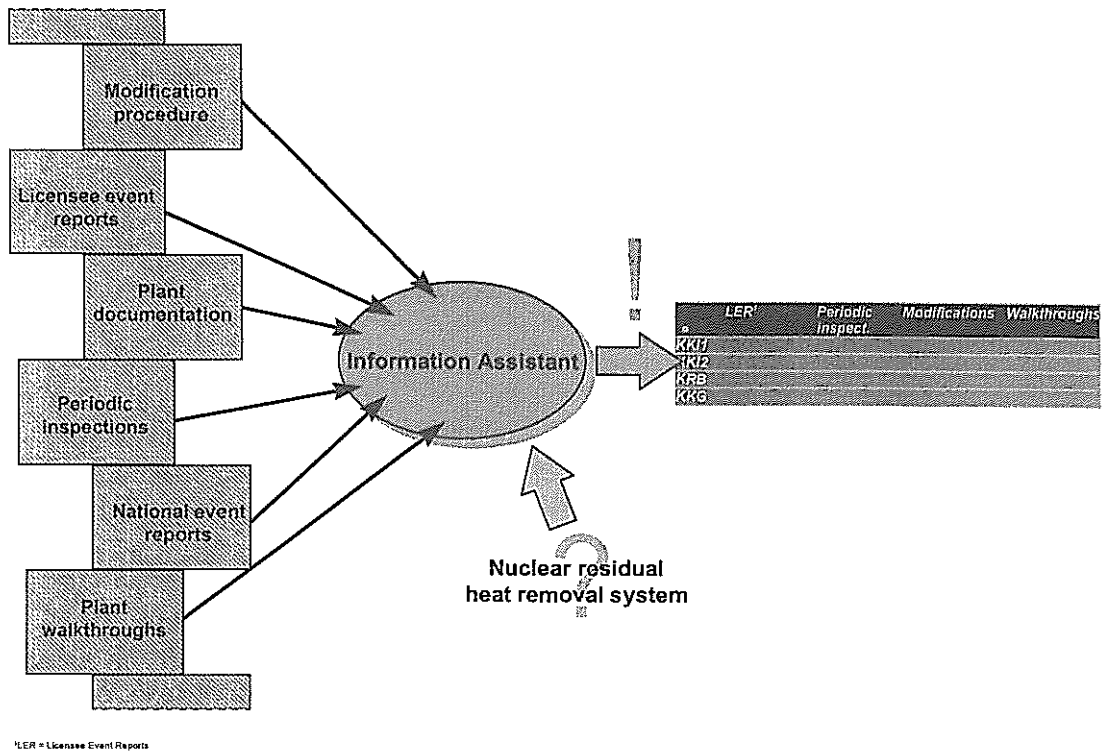
1 INTRODUCTION

The safety of nuclear power plants is determined by a variety of parameters. At the same time, due to plant complexity, the results of individual measures and malfunctions can no longer be calculated and evaluated without special tools. In order to coordinate the findings gained in probabilistic safety analyses, as well as in supervising and licensing procedures, we have developed an information system which supports systematic data collection and evaluation across several plants. All data required for integral plant supervision is collected at all Bavarian nuclear power stations, evaluated and presented in a well-structured manner in order to ensure effective use of such information.

2 INFORMATION ASSISTANTS

These computer-aided plant information systems are suitable tools with which complex interactions in plants can be presented in a clear and comprehensible manner. The functionality of these systems is increasingly becoming a critical factor where routine processes need to be handled efficiently and fast responses to dangerous occurrences are called for. Dangerous occurrences, in particular, require the provision of specific and comprehensive information that describes the current safety status at all times. To this end, we have developed information managers which compile data from the entire information system and prepare the information for the users in a well-structured manner. This also allows data from several plants to be collected and compared.

The information assistant searches data in terms of events, periods, keywords or components and supplies the data and all links known to the system in a hierarchical structure.(Fig. 1).



¹ LER = Licensee Event Reports

Fig. 1: Processing of the structured data by the information assistant

3 PROVISION OF UNSTRUCTURED INFORMATION

In addition, the availability and evaluation of unstructured information, such as technical publications, video sequences, recorded discussions etc. is becoming increasingly important for the safety-related evaluation of measures and malfunctions. Such information often includes important background knowledge which frequently has a major influence on how a situation is evaluated. The integration of an object-oriented component in the information system means that any type and quantity of multimedia data can be incorporated into the system. Such data can either be filed and classified generally or else assigned to certain plants and processes. It has thus become possible for the first time to save any type of information in the system, to make such information accessible to all users and, in as far as appropriate methods have been implemented in the system, to search for such information. By means of the search methods and the classification carried out by the user, the information assistant produces complex links between this information and plant-related data (Fig. 2).

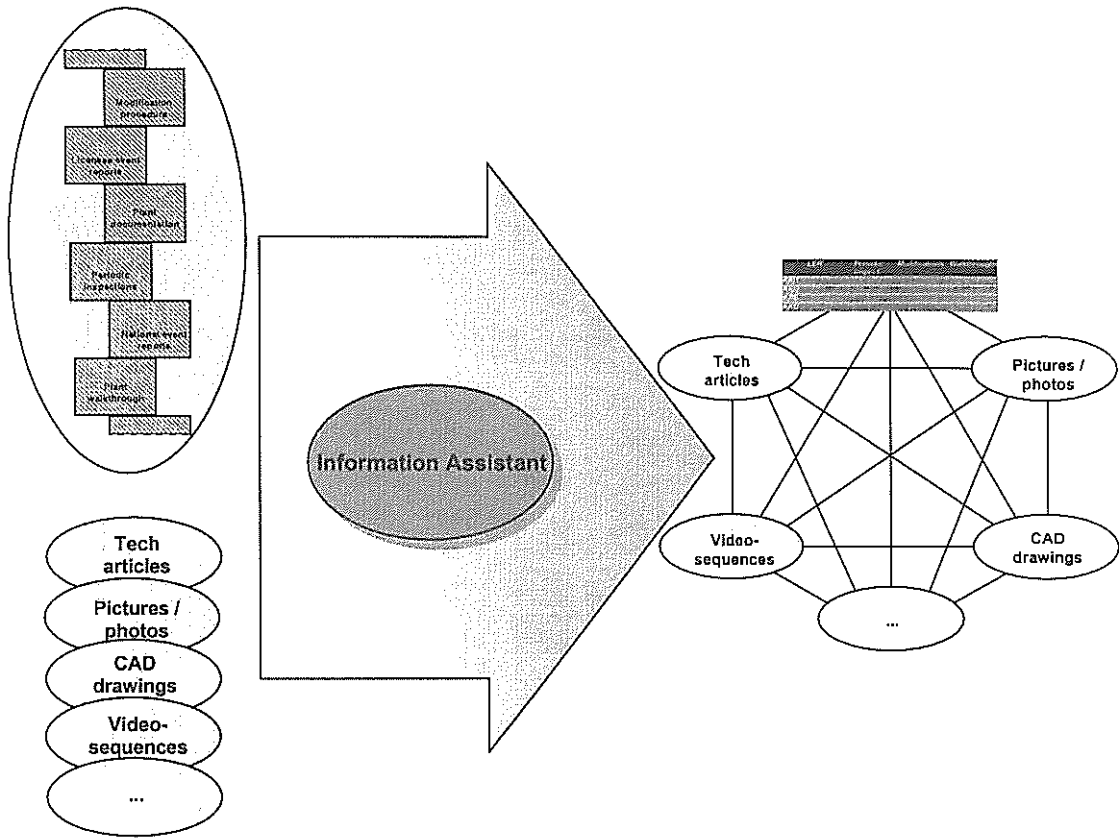


Figure 2: Linking of structured and unstructured data stocks

4 PROBABILISTIC EVALUATION OF EVENTS

With the help of the findings gained within the scope of probabilistic safety analyses together with so-called "importance lists", the information assistant enables a plant's current safety status to be determined at all times as far as plant-related events are concerned. Changes in plant safety due to modifications to the plant or malfunctions can always be represented by a comparable figure. In this context, aging and the service life of plant components are also taken into consideration. The determined aging symptoms (e.g. load cycles), the evaluation thereof, as well as maintenance and counter-measures are recorded. The reliability of individual components can thus be determined for the respective point in time (Fig. 3).

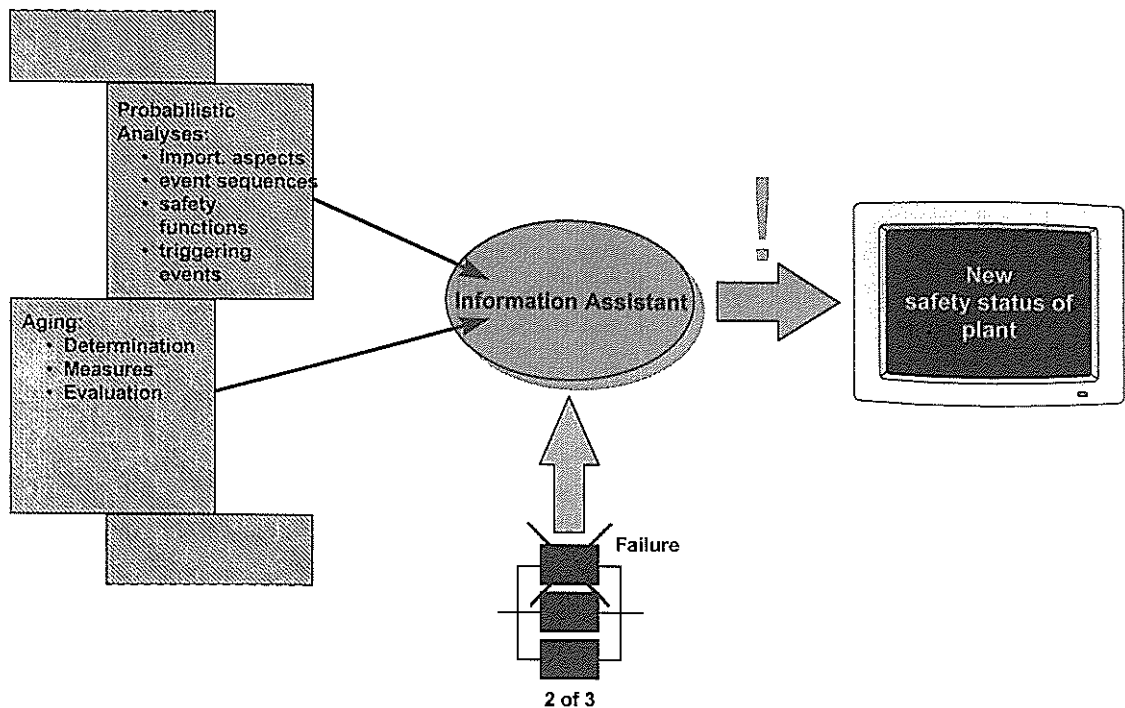


Fig. 3: Determination of a plant's current safety status for measures and events

5 PROCESSES OUTSIDE THE PLANT

In addition to purely plant-related data, processes outside the plant for which the operator is at least partially responsible, are now being integrated in the information system as well.

Because it is a topic of immediate interest, the transport of fuel elements from the plant to the reprocessing facility, and then to the ultimate storage facility is receiving special attention.

This will lend transparency to processes which have only an indirect but nevertheless lasting influence on plant operation, e.g. exposure of the public to radiation. Thus it will always be possible to locate a fuel element and to monitor its processing.

Bibliography

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