EUROPEAN COMMISSION
5th EURATOM FRAMEWORK PROGRAMME 1998-2002
KEY ACTION : NUCLEAR FISSION

LearnSafe

LEARNING ORGANISATIONS FOR NUCLEAR SAFETY
CONTRACT N° FIKS-CT-2001-00162

FEEDBACK AND ANALYSIS OF OPERATIONAL EXPERIENCE IN THE NUCLEAR INDUSTRY

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29.9.2003

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1 INTRODUCTION

The LearnSafe project has been divided into two major phases of theoretical and empirical investigations. The first phase is devoted to *management of change* in the belief that the adaptation to changed environmental conditions provides one of the major challenges to nuclear power plants today. The second phase is devoted to *organisational learning,* which is seen as an important process in the pursuit of continued improvements in performance measured in terms of both safety and efficiency.

The present report has been written as a part of the workpackage WP3 to describe approaches and methodologies that are utilised during the collection, analysis and use of operational experience within the nuclear power plants participating in the LearnSafe project. The interest in these activities stems from the fact that the formal methods in use at the nuclear power plants can be seen as one important part of organisational learning loops in place.

The present report focuses on the five LearnSafe countries in one report as the systems that are utilised within each of the countries do not deviate much from each other. Some aspects connected to the approaches and methodologies in use in the five LearnSafe countries are briefly described in the appendices to serve as more specific examples. In describing the formal systems for operational experience collection, analysis and use within nuclear power plants the current report is also intended to give guidance for further data collection activities within LearnSafe.

2 EXPERIENCE FEEDBACK PATHS

2.1 Activity planning and follow up

Nuclear power plants, like many other organisations, undertake yearly cycles of activity planning. During activity planning a distinction is usually made between strategic and annual plans. The strategic plans have an outlook of at least 3-5 years, but many nuclear power plants have extended their plans to consider the end of their facilities life. The annual plans typically cover the fiscal year of the company.

Activity planning is typically carried out as a comprehensive effort in which different pieces of information are collected and assembled. The planning contains activities of goal setting, prioritisation and detailed planning. Outcomes collected from the previous planning period, are incorporated into the plan in terms of the lessons that have been learned.

Activity planning and follow up is a process that flows throughout the entire organisation. It typically starts by collecting information on a fairly low level. This information collection proceeds upwards in the organisation and the information is assembled and put into context for the organisational units. In this process reasons for deviations are collected and used as input for the planning. Some nuclear power plants have introduced balanced score cards as a formalised method to support this process.

2.2 Regulatory oversight

The regulatory oversight provides another loop in which operational experience is collected, analysed and used within the organisation. Several different reporting systems are typically used, which are generally defined in regulatory guides or in site license conditions. From these more general requirements actual practices are typically described in the management system or specialised instructions.

Reporting of incidents to the regulator can be divided into two parts. One is connected to the regular reporting, which typically takes place on a daily, weekly, monthly and annual level. The second is connected to the reporting of unusual events[1]. Appendix 1 lays out a typical example of how the reporting is defined.

Another component in the regulatory oversight is connected to periodic safety reviews[2]. A periodic safety review is supposed to reflect the operational experience from a period of about ten years detailing the most important lessons to be learned. Preparing a periodic safety review requires a large effort, but gives the organisation an opportunity to reflect on performance and place different findings into context. When a periodic safety review has been completed it is submitted to the regulator for approval.

2.3 Incident analysis

Nuclear power plants have systems in place for analysing incidents occurring at their plants. The aim of the analysis is to find root cause of the incidents. The analysis of incidents is typically carried out by specialised groups, who have expertise in specific areas. The groups typically also have the responsibility to put the experience gained from other nuclear power plants into the context of their own plants. In the analysis of abnormal events it is common practice to select different routes depending on the safety importance of the event.

The methodology utilised for analysing incident should consider the dynamic interaction between various technical, human and organisational subsystems and their contribution to events. Most events have multiple causes that should be pursued during event investigation and analysis. One typical methodology for incident analysis is described in Appendix 2.

Sometimes plants have, in addition to the formally required incident reporting activities, also set up a reporting system for the collection of minor events that can be used for improvements of normal day-to-day practices. These systems are often seen to complement suggestion schemes in use.

2.4 Quality audits

Nuclear power plants use quality systems as a general method to ensure that the quality of work is fit-for-purpose. One important part of the quality systems is the audits, which are used to ensure compliance with the quality systems. These audits are typically performed by small teams, which include subject matter experts, peer reviewers and quality managers. During an audit, the audit team will assess a specific part of the organisation or a specific work processes in detail to produce a report on its findings and recommendations. The quality audits provide important feedback of activities and a combination of several audit reports can give valuable indications of problems on a higher level in the organisation.

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[1] IAEA (1989). Systems for Reporting Unusual Events in Nuclear Power Plants, Safety Series No. 93, ISBN 92-0-123389-2

[2] IAEA (1994). Periodic Safety Reviews of Operational Nuclear Power Plants, Safety Series No. 50-SG-O12, ISBN 92-0-103894-1.

2.5 Performance indicators

Performance indicators are one way of summarising performance collected from different sources. Nuclear power plants collect and report WANO performance indicators continuously and they also serve as a tool for benchmarking their own performance with the performance of other plants. A distinction has been made between leading and lagging performance indicators; lagging indicators give an indication of past performance while leading indicators can also be used as predictors for future performance[3]. Some nuclear power plants use very comprehensive systems of performance indicators to help their senior managers set priorities and allocate resources. These indicators are usually presented with a colour coded overview making it easy to identify trends and needs for action.

2.6 Performance appraisals

Performance appraisals are used at many nuclear power plants as a systematic tool to assess performance and set personal goals for individuals. Appraisals are a formal discussion between the jobholder and line manager and they are performed as part of an overall agreed appraisal scheme. During the appraisal, both the jobholder and line manager discuss performance since the last appraisal and agree on what needs to be accomplished during the next period. In the appraisals the jobholders are also supposed to give feedback to their line manages on various improvements they would like to see. The appraisals are often used also to discuss remunerations.

2.7 Peer reviews

Most nuclear power plants have been involved in peer reviews. IAEA, for example, offers peer reviews in their so called OSART programme. WANO and INPO also offer peer reviews to their members. A peer review is carried out in a similar way as a quality audit, but the scope of the assessment is far broader. A peer review may involve up to 15 people for a period of three weeks. Much of the learning effect comes when the organisation prepares itself for the peer review.

2.8 Organisational surveys

Many nuclear power plants use questionnaires to assess their organisational climate or safety culture. When surveys are applied at regular intervals it is possible to assess also changes in how certain issues are seen. One important aspect of the survey is that they should identify the organisational level of the respondents to make it possible to do inter-organisational comparisons. The translation of the results into improvement actions has sometimes proved difficult, but the method gives general indications of issues that should be acted upon.

2.9 Experience feedback and use

The learning potential of the collected operational experience will take place only if it is successfully fed back and improvements in organisational practices are made. Some general guidance on this experience feedback can be found in the literature[4], but a common

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[3] IAEA (2000). Operational Safety Performance Indicators for Nuclear Power Plants, TECDOC-1141.
IAEA (1991). Reviewing operational experience feedback, TECDOC-596

observation is that the observations often are recurring. One reason for this observation could be that there is a rather large organisational distance between persons who see the problems and people who can do something about them. Another reason may be that it is difficult to describe the problems and assess consequences tat may arise if they are not corrected.

The different systems that are used to collect information on performance and operational experience will create a huge amount of semi-structured recommendations. These recommendations will in time appear on the agenda of senior managers within the organisation. In reacting on the recommendations managers have to assess their importance, realism, possible side-effects, etc. before taking decisions for improvements. Sometimes large investments may be necessary for a permanent improvement to be achieved.

3 SUPPORT FROM INTERNATIONAL ORGANISATIONS

3.1 IAEA and OECD/NEA

The International Atomic Energy Agency and the Nuclear Energy Agency of OECD provide many services that support organisational learning within the nuclear industry. Some of these services are directed towards the regulatory bodies in the member countries, but most of the material seems quite generic. In an assessment of how this information is used it is easy to see that there sometimes are large differences between countries and nuclear power plants.

Perhaps the most important activity of IAEA, in relation to organisational learning within the nuclear community is the Nuclear Safety Convention. According to the convention all Signatories have agreed to rapidly report serious incidents at their nuclear power plants. This reporting is supported by a classification of the severity of the event on the so called INES scale.

The IAEA and OECD/NEA also operates a joint incident reporting system[5], which already includes an analysis of the event and a set of lessons learned. Reports are stored in a database that can be accessed using different search methods.

On a more practical level both IAEA and OECD/NEA have various projects and programs that take up generic issues of experience, which may need a larger group of experts to be resolved. Within IAEA these activities are taken care of through the regular programmes, which are supported by standing and ad hoc working groups. Within OECD/NEA it is especially the Committee on the Safety of Nuclear Installations (CSNI), which co-ordinates activities to collect and analyse the operational experience from the nuclear power plants in their member states. Based on the collected information experts are assembled at regular intervals to agree on recommendations to be given.

3.2 WANO

The World Association of Nuclear Operators was established after the Chernobyl accident and all nuclear power plants are members in the organisation. WANO operates through four regional centres in Atlanta, Paris, Moscow and Tokyo and through one co-ordinating office in London. WANO maintains several programmes that are very important from an organisational learning point of view. Within their operating experience programme

[5] IAEA, OECD/NEA (1998). IAEA/NEA Incident Reporting System (IRS) Reporting Guidelines, IAEA/NEA-IRS.

significant events from all plants are collected. The peer reviews typically cover the areas of organisation and administration, operations, maintenance, engineering support, radiological protection and operating experience. Finally the technical support and exchange programme is involved in activities such as good practices, performance indicators, operator exchanges and technical support missions. In addition WANO also arranges seminars and workshops for its members. WANO has established a world-wide electronic contact network, which gives members on-line access to databases of information collected from their programmes.

4 SOME REFLECTIONS

The formal arrangements for experience collection, analysis and use represent an important part of the activities that support organisational learning at the nuclear power plants. These are further supported by various informal contacts and systems within the organisation, which may be equally important for an efficient learning to take place. One important issue however is how efficiently these formal systems are working within certain nuclear power plants. If a system is not known or judged to be of no value its impact on organisational learning will be negligible.

The informal paths of organisational learning can be seen to be mediated through the organisational culture. Organisational culture is commonly associated with the deeply held assumptions and beliefs that prevail within an organisation. Organisational culture is thought to govern many of the activities that are found in an organisation on an unconscious level. Organisational culture can sometimes be observed through espoused values, a common history and language, myths, heroes, etc. In looking at the organisational culture it is important to note that there actually may be several sub-cultures associated to the type of work people do.

It is evident that the data collection requires many types of specialists and it may therefore be difficult to put their findings in a context that can be understood and assessed by senior managers at the plants. Senior managers may also have a bias in their solutions to problems, because the most common strategy for problem solving is to use solutions that have worked in the past. One problem is that it may be difficult for senior managers to make a reliable assessment of possible consequences for proposed actions.

If an organisational climate is performance oriented, this may lead to unwillingness to report problems. Similarly an organisation that searches for scapegoats when problems occur may create an atmosphere where it is difficult to get a true picture of problems and events. In some organisations a high self-confidence may make it difficult to listen to external advice, but on the other hand a low self-confidence may cause the organisation to view external consultants as the experts on all important issues.

5 CONCLUSIONS

In assessing the facilitators and hindrances of organisational learning it is important to have some models of both the formal and the informal feedback paths that are functioning within nuclear power plants. This report has briefly described the formal part of the collection, analysis and use of experience that takes place at the nuclear power plants, at the national regulators and at the international organisations. These systems have played an important role in achieving the present level of safety within the nuclear industry. One question the LearnSafe project could pose is whether or not the best use of these systems is being made.

APPENDIX 1. REQUIREMENTS ON REGULATORY REPORTING IN FINLAND

In the Finnish regulation there are basically two YVL-guides that apply. YVL 1.5 on *Reporting nuclear power plant operation to the Finnish Centre for Radiation and Nuclear Safety* gives the general principles for reporting and YVL 1.11 on *Nuclear power plant operational experience feedback* gives the general principles to be applied in collecting, analysing and using operational experience.

The reporting can according to the guide YVL 1.5 be divided into regular and event reporting. The regular reporting consists of

1. Daily reports (actual operating information, inoperability of structure, systems and components, breaking of pressure vessels, releases of radioactive substances, exceptional events),
2. Quarterly reports (descriptions of most significant events, plant operational information, summaries of power redactions larger than 5%, reactor operation and the use of fuel, description of failures, list of modifications in structures, systems and components, highest weekly activities of radionucleides measured from the primary and secondary circuits and from the fuel ponds),
3. Annual reports (operating data of the plant, events with safety significance, pressure and temperature transients in different parts of the primary circuit, reactor operation and the use of fuel, water chemistry, storage of liquid waste, storage and transport of solid waste, releases, personnel dosimetry, plant modifications considered to have a safety significance, changes in the organisation, changes in the general part of the Final Safety Analysis Report),
4. Outage reports (overview of the outage, modifications made, realisation of the outage as compared with plans, significant deficiencies and defects detected, realisation of dose estimates, significant events and observations),
5. Environmental radiation safety reports (annual reporting),
6. Reports on individual doses (monthly reporting),
7. Report on the utilisation of operational experience (report every six months on descriptions of significant operational events, recommendation based on root cause analysis and corrective measures taken or decided).

Event reporting consists of the following reports

1. Special reports giving an account on special situations such as emergencies, special situation related to the Safety Technical Specifications, incident launching safety functions, defects and degradations of systems and components, incidents related to radiation safety, external incidents and other incidents (the report should contain an event description, safety assessments, causes of the incident an measures to avoid recurrence),
2. Reports on reactor scrams (to be submitted within one month after the scram),
3. Reports on operational transients (operational disturbances that have led to forced power decreases should be submitted within one month after the transient),
4. In the case of reportable events the regulator should be informed by telephone and the information should be included in the daily report. Events should be classified on the INES scale and all events classified at the Level 1 or higher should be reported immediately.

The guide YVL 1.11 gives the general criteria and requirements for organising operational experience feedback, for actions relating to operational experience feedback and for assessment of operational experience feedback. It gives more specific guidance on how operational events should be handled and more specifically on the following subjects

1. Monitoring of operational events (independent observation and control of own work performance, personnel is encouraged to pay attention to unusual phenomena and to report them, case specific data should recorded),
2. Assessment and screening of operational events (transfer of knowledge within the organisation, attention should be paid to frequency and possibility for recurrence, actions are proposed, causes are removed from safety significant events),
3. Root cause analyses are done for all special situations (sequence of events, safety significance, availability of redundant systems, actions by the personnel, rate of recurrence, barrier analysis, root causes and other factors contributing to the event, corrective actions),
4. Other analyses (if the root cause is obvious the licensee can be exempted from doing a full root cause analysis),
5. Utilisation of failure statistics (the collection and storage of necessary failure data, failure data should be used in planning operation and maintenance, failure data should be used to update the PSA, analysis and actions should be described in written procedures),
6. Processing and implementation of recommendations (distribution of root cause reports, implementation of corrective actions),
7. Documentation of actions relating to operational experience feedback (filing of operating events and recommendations, processing of the recommendations).

It also gives guidance on how events at other nuclear facilities should be handled in terms of

1. Monitoring of event reports,
2. Screening of event reports,
3. Analysis of selected events,
4. Implementation of recommendations,
5. Document processing control.

The guide also stresses the importance of keeping own personnel informed on the lessons learnt to avoid recurrence of events. Activities within the operational experience feedback are inspected by the regulator regularly and when special needs occur.

A comprehensive description of the incident analysis practices in use in Finland can be found in a recent report.[6]

[6] J. Kettunen, K. Laakso, (1999). Evaluation of incident analysis practices in the Finnish nuclear power industry. Report No. STUK-YTO-TR 16, Radiation and Nuclear Safety Authority, Helsinki.

APPENDIX 2. THE USE OF THE SOL-METHOD IN GERMANY

In the German nuclear power plants since 2003 a procedure for an integrated event analysis is recommended. The VGB (Technical Association of Large Power Plant Operators) published a guideline for an integrative method, which is illustrated schematically in Figure 1.

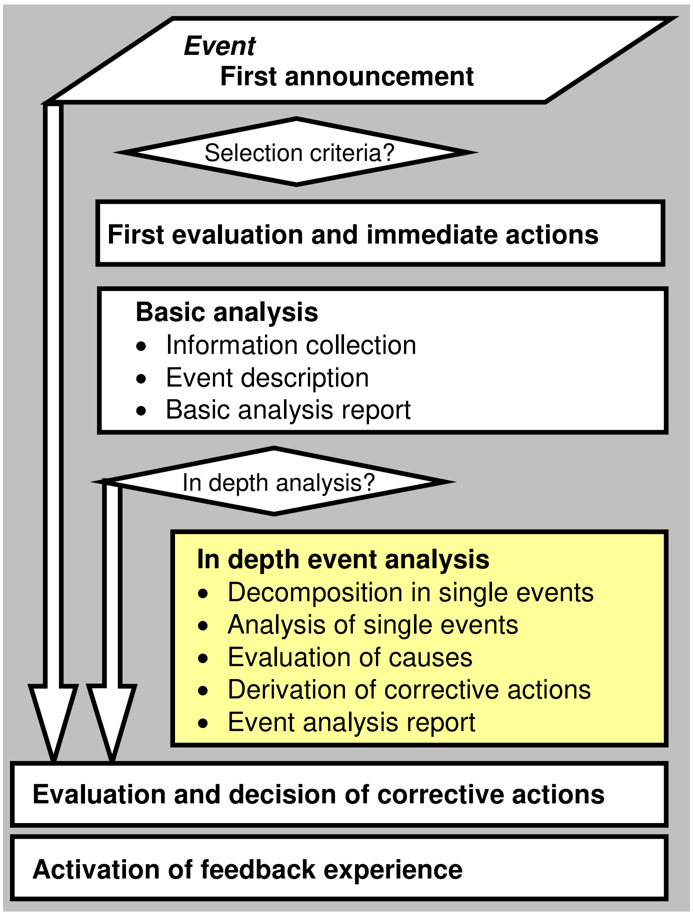

Figure 1. Schematic course of integrated event analysis

The objective of the integrative method is to record events and near misses systematically, to analyse and to assess them, and to derivate suitable countermeasures for them. Within this the event course is to reconstruct and all contributing factors are to identify. The user has to consider the interplay of technical aspects, human behaviour, and administrative/organisational aspects.

The method is a staggered concept covering routine events, simple events, and complex events.

After the first announcement of an event (incident, malfunction, near miss, voluntary report, external report) a list of criteria is used to decide whether a further inspection of the event is necessary. This list contents items like significant material damage, significant personal injury, release of radioactivity, contamination, human factor related events, or accumulation of similar events.

If an event has no concern with the list, no further analysis is necessary (routine event). Otherwise the next steps are a first evaluation regarding the specified normal plant condition, identification of causes triggering the event, and the judgement of reporting obligation.

Then a basic analysis result in a decision whether the event should analysed in depth. This package consists of further data collection, hearing of evidence, event documentation and description, assessment of contribution of human behaviour, and a basic analysis report.

If in the basic analysis the causes can be identified sufficiently and suitable corrective actions can be fixed, an in-depth-analysis can be skipped (simple event). Or else if undesirable interactions between technical, organisational and human factors are discovered (complex event), a further investigation with the SOL methodology (Safety through organisational learning) should be done.

The SOL methodology is based on the socio-technical event causation model, on the event causation model of Reason[7] and on an organisational learning approach. Five subsystems of the whole system are considered: Technology, individual, working group, organisation and the extra-organisational environment.

The event analysis with SOL is operationalized as a set of standardized process steps. Firstly, the whole event has to be broken down into a sequence of single actions of different actors (persons or technical components). Every so called event building block shows one action of one actor at one point in time. For graphically charting the course of actions the event building blocks are ordered in a time-actor-diagram for an overview.

In a second step, each of the single actions is to scrutinize for contributing factors by why-questions. An identification aid was developed by deriving contributing factors from a theoretical viewpoint and by gathering empirical data. In SOL directly contributing factors are differentiated from indirectly contributing factors. Six factors are deemed to be directly contributing in terms of their direct and immediate contribution to the genesis of an event:

A Representation of information
B Communication
C Working conditions
D Personal performance
E Violations
F Technical components

Indirectly contributing factors are seen to be factors which are temporally and spatially somewhat more distant from the actual event evolution but nevertheless often crucial for the event. A list of 19 indirectly contributing factors was collated to assist the search:

1 Representation of information
2 Communication
3 Working conditions
4 Personal performance
5 Violations
6 Operation scheduling
7 Responsibility
8 Control and supervision
9 Group influence
10 Rules, procedures and documents
11 Qualification
12 Training
13 Organisation and management
14 Feedback of experience
15 Safety principles
16 Quality management
17 Maintenance
18 Regulatory and consulting bodies
19 Environmental influence

The identification aid also contains illustrative examples of the potential influence of contributing factors with the aim to stimulate the creative problem solving process of analysts.

[7] J. Reason (1990), Human error. Cambridge: Cambridge University Press.

The SOL-VE software (SOL versio electronica) implemented and used in all German and Swiss nuclear power plants covers and supports the whole procedure of integrative event analysis portrayed above. A lot of additional functions support the users and analysts – from classification, event description, generation of the basic analysis report, over the decomposition of the event into single actions, graphical charting of the event, the in depth analysis with automatically generated initiating why-questions, weighting of contributing factors, support of derivation of corrective actions, documentation of the event, to administration of events and corrective actions, following up of corrective actions and miscellaneous statistics (graphs and tables).

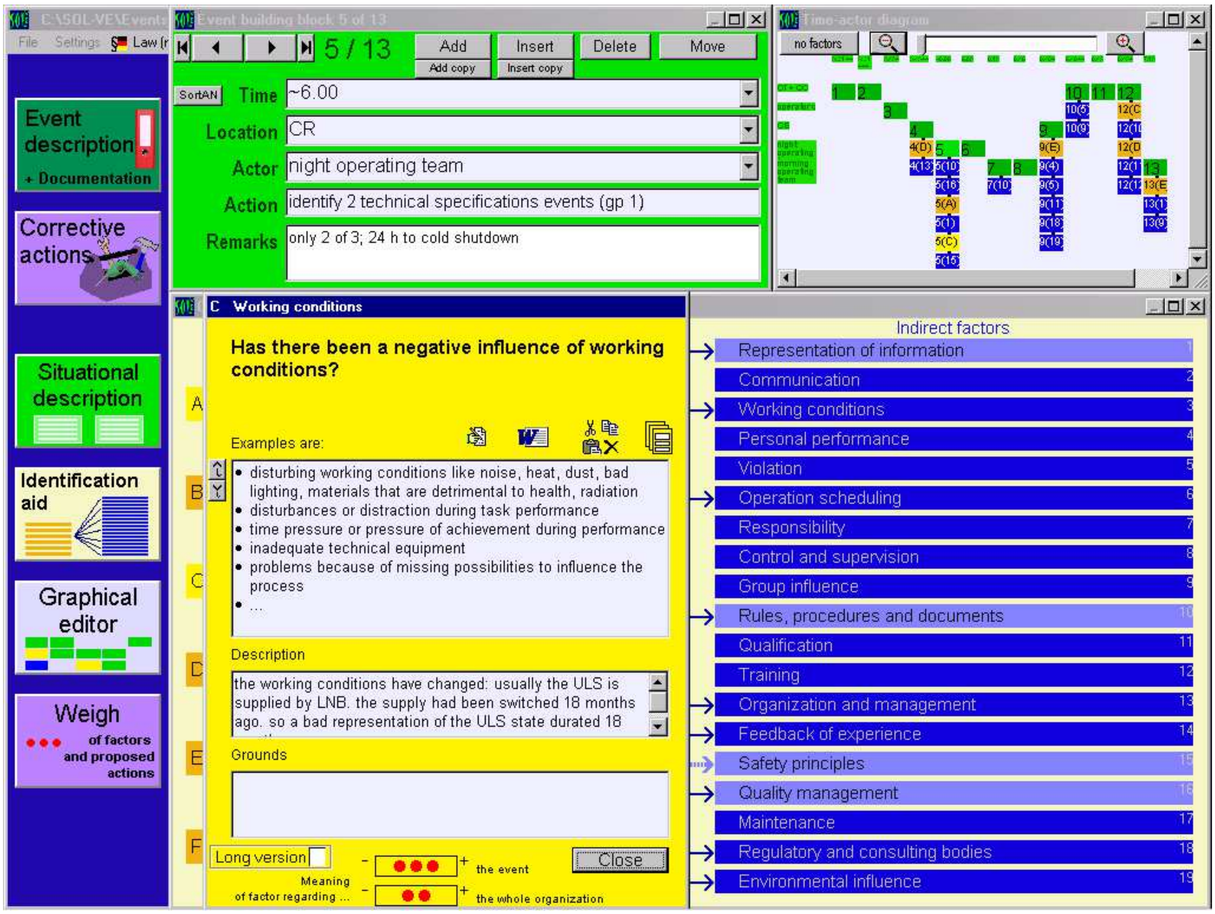

Figure 2. Screenshot of SOL-VE software

Experimental and practical experience show that SOL and SOL-VE represent an efficient, economical and valid event analysis methodology which is readily accepted as a standard operating procedure especially in the nuclear industry. The method helps to avoid generally known biasing tendencies in event analyses. Based in sound socio-technical systems theory it guarantees a comprehensive analytic scope leading to contributing factors from the wide range of possible sub-systems of the focal organisation. Thus SOL-VE enforces systemic thinking because the whole network of contributors and their interaction are taken into account in leading to an event. Since event analyses with SOL and SOL-VE are always carried out in teams of analysts, including staff involved in the event itself, it fosters an attitude of critical reflection of the whole system performance. The various modules of SOL-VE are aids to the establishment of a complete organisational learning cycle.

APPENDIX 3. REGULATORY REQUIREMENTS ON THE USE OF EXPERIENCE IN SWEDEN

The regulation in Sweden is given in the Swedish Nuclear Power Inspectorate Regulatory Codes of which SKIFS 1998:1, The Swedish Nuclear Power Inspectorate's Regulations Concerning Safety in Certain Nuclear Facilities sets requirements on reporting, event analysis and experience feedback. The code is divided into two parts of which the later is to consider as recommendations and clarifications to the legally binding requirements as given in the first part.

In the Chapter 2 on Basic Safety Provisions it is stated that the licensee of a nuclear facility shall

- Any deficiency in a barrier or in the defence-in-depth system shall be evaluated and classified taking into account its importance for safety and be investigated without delay. Any safety-related measures considered necessary shall subsequently be implemented without delay (§2).
- ensure that experience from the facility's own and from similar activities is continuously utilized and communicated to the personnel concerned (§3 point 7),

Furthermore in the Chapter 4 on assessment and reporting of the safety of facilities provisions for the periodic safety review of facilities are given to be

- At least once in every ten years, a new, integrated analysis and assessment of the safety of a facility shall be made (§5).

In the Chapter 5 on operation of facilities it is required that

- The maintenance programmes shall be updated on a continuous basis, in the light of experience gained, at the facility in question as well as at other similar facilities (§3).
- Events which have occurred and conditions which are detected and are important to safety shall be investigated in a systematic manner in order to determine sequences and causes as well as in order to establish the measures required to restore the safety margins and to prevent recurrence. The results of the investigations shall be disseminated within the organisation as well as shall contribute to the development of safety at the facility (§6).

In the Chapter 7 on reporting to the Swedish Nuclear Power Inspectorate it is required that

- Events which have occurred and conditions which are detected which have an essential impact on the safety of a facility shall be reported without delay, other events and detected conditions shall be reported swiftly to the Swedish Nuclear Power Inspectorate according to provisions defined in the Appendix of the code (§1).

In the Appendix a classification of events in three categories is give as follows

- Category 1: Observed severe deficiency in one or several barriers or in the defence-in-depth system as well as a well-founded suspicion that safety is severely threatened.
- Category 2: Observed deficiency in one barrier or in the defence-in-depth system which is less severe than that which is referred to in Category 1 as well as a well-founded suspicion that safety is threatened.
- Category 3: Temporary deficiency in the defence-in-depth system which arises when such an event or condition is corrected and which, without measures, could lead to a more severe condition, and which is documented in the Technical Specifications.

The second part of the code gives more detailed guidance on the interpretations of the requirements as follows

- *Reporting*. An overall report of activities at the facility, which shall contain a factual report as well as a report of experience gained and of the conclusions reached with regard to safety. Events or conditions which have been assigned to Categories 1, 2 or 3 or which have resulted in the activation of the reactor protection system leading to reactor scram shall also be included in the report. Conditions which have been assigned to Category 3 shall also be described with respect to the purpose of the measures and the time utilized to implement the measures (prevention time).
- *Feedback of experience*. Efficient procedures should exist for continuous experience feedback within all of the parts of the organisation carrying out tasks which are of importance for safety. In the light of experience gained, it should be continuously investigated whether the facility and its activities comply with the applicable conditions and regulations.
- *Safety programmes*. Technical and organisational experience from the facility's own activities, experience from similar facilities, results from ongoing safety assessment, research results which may be important for safety assessment as well as the development of such norms and standards which are used in connection with the construction or operation of the facility should be particularly taken into account.
- *Periodic safety review*. The periodic safety review should be based on the current safety report, additional analyses of the technical and organisational experiences of the past ten years as well as evaluations of the safety improvement measures which have been implemented during the period covered in the review. Assessments should be made of the safety status of the facility, in relation to developments which have occurred within the applicable part of the nuclear industry, with respect to knowledge, technology and methods as well as in relation to the development of norms, standards and safety requirements. The knowledge base for the safety work should also be evaluated so that any research and development needs can be identified within different areas which are of importance in order to maintain and develop safety.
- *Event reporting*. Events which fall within the scope of INES level 2 or higher must be reported within 16 hours, to enable to establish the classification and report to the IAEA within 24 hours after the event has occurred. A preliminary report concerning events and conditions of importance for safety which are assigned to Category 2 should mainly contain an informative description of the event sequence and of the operational consequences, a preliminary assessment of the importance for safety and of the underlying causes as well as a description of measures implemented and planned in order to restore the safety margins and to prevent a recurrence. The report should further contain information on the experience which has been gained on the basis of what has occurred as well as the conclusions of the safety review of the investigation which has been carried out at the facility.
- *Annual report*. The annual report should contain summaries of operational experience and events, production data, core and fuel conditions, hydrochemical conditions, planned and unplanned outages, completed refuelling outage, repairs carried out on equipment which is of importance for safety, modifications to the facility's design as well as to the organisation, management and control of the activity, changes in competence requirements and training programmes, implemented and planned training for personnel with duties which are of importance for safety, investigations and analyses that are expected to affect the conditions specified in the safety report, generation, storage, transport from and final disposal within the facility of nuclear waste.

APPENDIX 4. LEARNING FROM EXPERIENCE IN THE UNITED KINGDOM

LICENCE CONDITION 7: INCIDENTS ON THE SITE

7.1 The licensee shall make and implement adequate arrangements for the notification, recording, investigation and recording of such incidents occurring on the site:

   a. As is required by any other condition attached to this licence;

   b. As the Executive may specify; and Reports of events and subsequent investigations are made in accordance with the classification of the event

   c. As the licensee considers necessary.

7.2 The licensee shall submit to the Executive for approval such part or parts of the aforesaid arrangements as the Executive may specify.

7.3 The licensee shall ensure that once approved no alteration or amendment is made to the approved arrangements unless the Executive has approved such alteration or amendment.

Within the UK a database has been set up to encourage plants to learn from the experience of others. The goal of the operating experience system (NUPER) is to allow individuals to effectively and efficiently use the lessons learned from industry and station experience to improve plant safety and reliability. Employees are encouraged to make learning and applying the lessons from operating experience an integral part of the company's culture. The aim of the system is thus to provide users with relevant operating experience in time for it to make a difference to an individuals daily work. The NUPER database provides a variety of operating experience from British Energy, BNFL, INPO, WANO and other international organisations. Everyone is encouraged to pass identified operating experience to their local operating experience feedback engineer or to the central feedback unit so that the database can be kept up to date.

The system has a number of benefits in that it allows individuals to view recent events (an archive of pre-1995 events is also available), good practices, training materials, publications and other documents of interest. The NUPER database also provides individuals with details of the operating experience program, news on the latest developments and a facility that allows individuals to search the database of events. Using the databases search facility individuals can view UK events, international events, WANO SERs, WANO SOERs, major non-nuclear events and abnormal events. The system also enables employees to view a catalogue of 'Just in Time' material which can be viewed alphabetically, by station or in terms of area of activity (chemistry, engineering, maintenance, etc). Individual searches can also be made of the 'Just in Time' material.

Magnox Electric also utilise the WANO event reporting facility. When an event occurs the plant management team analyse the event and complete an event report, which is sent to the WANO Paris Centre if appropriate. The WANO members secure web site is regularly monitored for significant events that could have an impact on sites within the UK. The WANO reports and training materials are then used to take the appropriate actions and relay important information back to employees at the plants.