Minutes of Meeting

VGB-Technical Committee:	**Generation and Technology**
VGB-Working Panel:	**PGMON**
	Power Generation Maintenance Optimisation Network
	35th Meeting on 11./12. 10. 2007 in Birmingham

Agenda

Welcome (Paul Thame)

Technology

TOP 1: “Boilermax”, Start Up Optimization for Steam Boilers
Dr. Rüdiger Franke, ABB

TOP 2: Indicators to control how the
integrity of low temperature pressurized equipment is managed
Antoine Despujols, EDF

TOP 3: Fire Analysis
Henk Wels, NRG

TOP 4: Maintaining effective protection against
fuel storage tank overflow
Ian Roberts, Paul Thame, EON UK

Plant ageing and maintenance expenditure

TOP 5: Life extension for “older” plants
Henk Wels, NRG

TOP 6: “Return to service” risk following plant outage
Alan Joslin, RWE npower

Afternoon group discussion
Life management, decision making process, indicators
Henk Wels and Antoine Despujols

Maintenance Quality

TOP 7: Training for maintenance staff in NPS, E-Learning
Heinrich Grimmelt, VGB

TOP 8: The implementation of Asset Management in ESB Power Generation
Richard Sheehan, ESB

TOP 9: Corrosion fatigue tube rupture
Jo Dalton, ESB

Miscellaneous

TOP 10: Place and date of next venue

TOP 1: “Boilermax”, Start Up Optimization for Steam Boilers
Dr. Rüdiger Franke, ABB

ABB supply a startup optimiser called Boilermax for steam boilers that minimises start time, cost and emissions and improves start predictability whilst ensuring that thermal stress limits are not exceeded on critical plant components. Boilermax measures temperatures and pressures at many positions in the boiler and controls fuel and steam flows in either closed loop or advisory modes to achieve optimised startup.

The presentation can be found in the closed user group.

TOP 2: Indicators to control how the integrity of low temperature pressurized equipment is managed
Antoine Despujols, EDF

Risks related to pressurized equipment are covered by national regulations based on European Directives. In each EDF Nuclear Power Plant, Inspection Branches were created to manage activities needed to control these risks. According to the regulations, these Branches can be approved by Authorities which permit them to define and to manage inspection procedures. By the end of 2007, 17 sites, out of 19, passed the certification and the last 2 sites expect to be approved in 2008.

A study was carried out to identify a limited list of indicators covering essential functions needed to control risks due to pressurized equipment. For this purpose, a function analysis of the process was undertaken considering it involves both Management of the sites and Inspection Branches whose mission is:
to determine equipment to be inspected and criticality of sensitive areas;
to find out examinations to be performed;
to ensure that resources are available;
to supervise and to control the tasks;
to treat the deviations;
to authorize equipment to start;
to collect experience;
to inform about important events.

Based on this analysis, discussions with NPP led to a list of 13 indicators relative to:
competences of Inspection Branches;
supervision and implementation of recommendations made by Inspection Branches;
treatment of deviations and the number of significant events;
collection of in service experience;
periodic evaluation of Inspection Branches;
how pressure risk is considered by people working on the site.

These indicators will serve the plants to follow their performances and to compare their results to each others as well as to provide overall information to the corporate level about pressurized risk management on NPP. A decision has been taken this year to test this set of PI on site and to appraise the results by the end of 2008.

The presentation can be found in the closed user group.

TOP 3: Fire Analysis
Henk Wels, NRG

NRG is in the process of carrying out internal fire analyses to update the QRAS of a nuclear power plant. This update had to be state of the art taking NUREG/CR-6850 guidelines into account. Special emphasis was placed on modelling multi compartment fires. Based on a full PRA for the plant and detailed plant information (location of components & cables, combustible load, ventilation, fire resistance, fire suppression capabilities, etc.) quantitative fire accident sequences were modelled. Backdraft, failure of penetration seals, flashover and collapse of walls were taken into account.

The presentation can be found in the closed user group.

TOP 4 Maintaining effective protection against fuel storage tank overflow
Ian Roberts, Paul Thame, EON UK

In light of the 2005 explosion at the Buncefield Oil Storage facility, attention has been focused on the possibility of a similar event at some other site where large quantities of fuel are stored. E.ON has carried out a review of one such facility, in the course of which an opportunity to manage test and maintenance strategies to demonstrate required levels of safety while controlling maintenance burden was identified. Frequent historic testing can provide a dataset which can be used to set test intervals such that the probability of failure on demand can be controlled (or at least an upper limit defined). This is not routinely considered.

The presentation can be found in the closed user group.

TOP 5: Life extension for “older” plants
Henk Wels, NRG

In the Netherlands experience with operating fossil power plants older than 25 years is growing. NRG & KEMA started a study to analyse ageing (increased forced unavailability) to decide on inspection frequency, maintenance optimisation and life extension programs. Based on intermediate observations, it was found that little quantitative data exist. Data can however be distilled from a mix of plant personnel knowledge, failure information (for instance trending analysis), measurements (for instance thickness of boiler tubing), etc. It was found that, without a detailed condition analyse, not taking a risk with certain equipment is a valid reason for replacement during life extension. Surprises with unexpected failure after a life extension project do exist. Managing ageing is not only about managing equipment but also managing knowledge of specialists that retire.

The presentation can be found in the closed user group.

TOP 6: “Return to service” risk following plant outage
Alan Joslin, RWE npower

All plant maintenance activities incur risk of over-run and consequential commercial losses on late return to service. Determination of the risk becomes more difficult when dealing with overhauls

and retrofits of older plant, because of the greater uncertainty about the extent of work that will be called for after initial inspections have been undertaken.

Analysis presented here of recent overhauls of coal-fired units commissioned around 40 years ago demonstrates that the risk of over-run correlates with the scope of inspection and overhaul work planned. Using this data, a model of the over-run risk in each plant area has been developed which can be combined stochastically to produce an over-run risk profile for each planned outage.

This high-level approach, whilst useful to illustrate the issue, does not recognise the influence that good outage management has to address potential over-run risks as they arise, and thereby to control the overall level of risk, thus the approach does not take into account the knowledge and experience of those managing the outage when determining the risk profile. Because of this, another model is being developed which puts ownership of the risk-determination process with the overhaul management teams at the power stations. This will provide, with greater confidence, return-to-service risk profiles that can be applied commercially to optimise the trading positions around planned return to service dates. The model will use data provided by local management of each plant overhaul area. In each area a number of straightforward questions will be asked about risks of over-run, and the answers combined to produce risk profiles for each major activity. These will be combined stochastically to produce an overall return to service risk profile. The model will be easily updatable, so that it can be applied before the outage starts, and updated during the outage as work progresses.

The presentation includes a demonstration of the model being developed and can be found in the closed user group.

TOP 7: Training for maintenance staff in NPS, E-Learning
Heinrich Grimmelt, VGB

The training of maintenance staff generally includes the technical training on components. The maintenance managers of the German Power Stations started some years ago a project to improve the behaviour of the maintenance staff during executing a maintenance job. Different approaches were made. One was a workshop in Hungarians training center in Paks. A group of ten maintainers were send there to find ideas how to minimize the problems which might occur during maintenance. The results were memory cards which each dealed with another important theme of professional behaviour. This behaviour will be trained in the decommissioned power station of Obrigheim.
The never commissioned nuclear power station in Zwentendorf in Austria was used for the training of nuclear floor personnel in boiling water reactors. The same personnel of pressure water reactors will be trained in Chalon sur Soane and Bugey in France.
A moduled training program for nuclear floor personnel was worked out together with AREVA.

E-Learning allows to do a training course independent from time and location. A working group tried to find out if it makes sense to make use of this medium. Two pilot projects were started. The first draft of “Avoiding the entry of foreign objects” was shown to the members.

The presentation can be found in the closed user group.

TOP 8: The implementation of Asset Management in ESB Power Generation
Richard Sheehan, ESB

ESB Power Generation has recently adopted an Asset Management business model and has re-aligned its structure to facilitate its effective implementation. This approach was adopted to manage the challenges facing ESBPG such as ageing plant portfolio, changing operating regimes and the need to deliver greater overall portfolio plant performance.

The structural changes in the main consist of three main elements:-

Production (i.e. Station level O&M)

Asset Management (i.e. sponsor and approver) and

Commercial Group (responsible for delivery of larger overhauls on behalf of Production).

The definition of asset management in ESBPG is closely aligned with the PAS55 definition, which is primarily around co-ordination and integration of activities and achieving an optimum balance of risk, cost and performance.

Each Station has a new appointee, the Station Asset Manager, whose responsibility is to develop a Life Time Asset Plan (LTAP) against all those Station assets deemed to be critical (critical to availability, cost and risk). Once the technical LTAP has been challenged and signed-off it can be used to inform the workscope and costs within Overhaul PIDs or Project Briefs. The LTAP for a given unit must be aligned with the corporate strategy for that unit. The Strategy is determined by market rules, CO2 and fuel costs, level of penetration into the market of new entrants, environmental constraints and so on.

While the first phase of LTAP roll-out is focussed on plant condition, the second phase of the roll-out will look at systems/processes (e.g. O&M management systems) and with People issues (Training, competences etc).

Further development of the phase 1 LTAP is on-going, to include a more rigorous failure mode analysis and a more structured approach to technical risk assessment.

The presentation can be found in the closed user group.

TOP 9: Corrosion fatigue tube rupture
Jo Dalton, ESB

This presentation reports on a boiler evaporator tube rupture incident that occurred on one of the ESB once-through oil fired units in Ireland. The presentation reports initial findings, risk assessment approach taken to permit operation in the short/medium term, the approach taken to resolve the issues involved, and the outcome to-date.

The presentation indicates some of the measures taken to identify the extent of plant damage, and its causes. The presentation highlights the usefulness of on-line recording of strain and temperatures, and subsequent data analysis to identify causal factors.

Ultimately, the presentation highlights the need for a systematic approach to the identification of critical assets, their condition, potential failure modes and work alternatives prior to significant investment.

The presentation can be found in the closed user group.