CORRECTIVE ACTION PROGRAM AT KRŠKO NPP

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ABSTRACT

Krško NPP (NEK) has developed software that enables electronic reporting of various deviations and suggestions for improvements at the plant. All NEK employees and permanent subcontractors have access to the system and can report deviations. NEK has centralised the process for screening and distribution of reported deviations. At this point all direct actions are being electronically tracked.

The immediate advantages of the new tool are:

- The reporting threshold has been lowered.
- The number of people, who report conditions adverse to quality, has increased.
- One unified computer form for reporting various deviations and suggestions.
- The decision on the process, which would solve the deviation, is centralised.
- All types of deviations are in the same environment.
- Our best practice is incorporated in the program.
- Control of work that has been done.
- Archiving is paperless.
- Human resources for administration of the program is optimised.

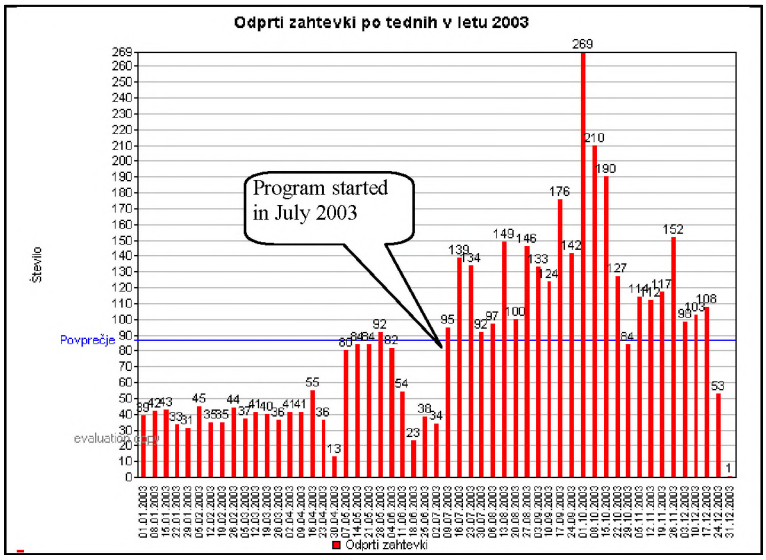

Figure 1: Number of reports in 2003

1 INTRODUCTION

Many different processes have been introduced in 20 years of NEK operation. Each process has introduced a new reporting form as an initiation point for the process.

NEK recognised the administrative burden of the current Corrective Action Program (CAP) and has initiated a project to upgrade the program and the computer technology that supports it. Its purpose is to reduce the administrative burden, make the process more efficient and user-friendly and to reduce the reporting threshold.

Sometimes employees had to initiate several forms for one single problem (e.g. Work Order Request, deviation report and modification request). Employees had to make a choice, which form to fill out and then initiate a specific process for different conditions adverse to quality. As this sometimes caused difficulties they would rather decide not to fill any forms.

These processes developed specific ways of resolving the deviation, however lacking direct communication links among them. A few processes developed their own databases and to look for a specific history or experience at the plant, one had to login to different databases and search differently sorted information in different environment.

Therefore people started to specialise in specific processes, so our resources became less flexible. The same kind of a problem was sometimes solved through a different process, which led us to conclusion that we have to do something about it.

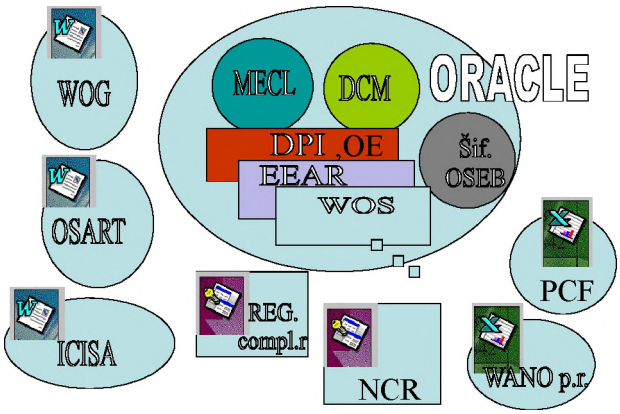

Figure 2: Different databases prior to CAP introduction

2 PURPOSE OF THE PROJECT

2.1 Project Goals

The main goals are as follows:

- Decrease the reporting threshold.
- Decrease response time to fix and analyse the problem.
- One common environment for every deviation. The environment is user friendly and open to all users.
- Tracking the costs and use of resources.

- Review of history and operating experience should be simple, user friendly and helpful to prevent the recurrence of the same deviations.
- Tracking trends for lower level events.
- Prioritisation and classification of a problem should be unified.
- Reduce the number of procedures.

Our goal of this project is to develop a fully computerised process, which would replace most of the main processes that deal with conditions adverse to quality, suggestions and enhancements. The main processes involved, which should be at least partially replaced by a computerised CAP, are as follows:

- *Work request:* This form was used to initiate maintenance activity to fix the problem. Our CAP has already replaced this process.
- *DPI:* Deviation reporting process is used as our corrective and Operating Experience program. The process makes an analysis of deviations and suggests corrective actions to prevent the repetition of the deviation.
- *EEAR:* It stands for Engineering Evaluation Action Request and means a process of analysing suggestions for a system or component improvements proposed by NEK employees.
- *NCR:* This process performs an analysis of non-conformances to develop corrective actions to fix these deviations.
- *PCF:* When a deviation in a procedure is found, the so-called Procedure Change Form has to be completed. We still keep this process for normal reviewing of revised and new procedures but not for the errors found during our everyday work.
- *LRF:* When the labelling deviation of equipment in the field was recognised, a labelling report form had to be issued.

2.2 Basic Idea

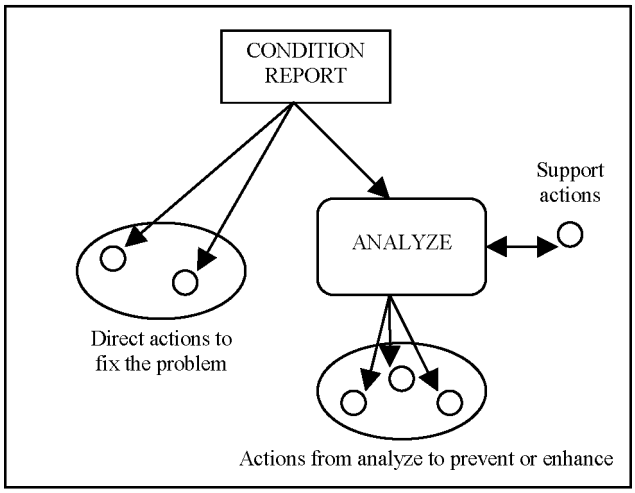

Figure 3: Basic Idea

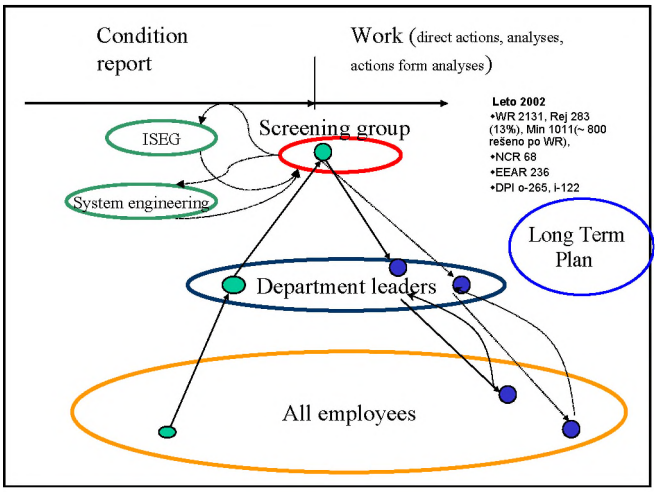

Figure 4: CAP Users

The program consists of different independent activities, which are linked to make the follow-ups easier.

A major organisation change is a new Screening Committee, which meets every morning between 7:10 and 7:30 am. The composition of the Screening Committee is as follows:

- Production Manager
- Maintenance Manager
- Design Change Superintendent
- ISEG Supervisor
- Work Week Supervisor
- or their deputies

For the purpose of analysis, the Screening Committee selects the reports having a potential for significant impact on safety and reliability of the plant. The Screening Committee also assigns appropriate persons or teams for the item resolution.

3 PROJECT EXECUTION

3.1 Project Team

The Project Team consists of representatives from all departments that take part in CAP. The project leader is the only person fully engaged in the project.

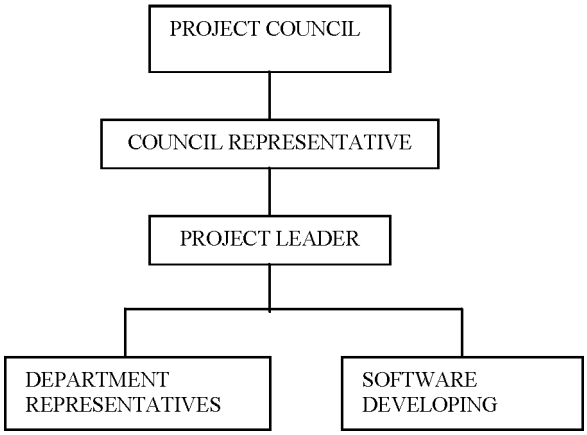

Figure 5: CAP Project Team

3.2 Program Development and Change Management

3.2.1 Phases

We divided the program into three phases of implementation. The first phase was only the introduction of a computerised initiation of Condition Report. The Screening Committee distributed work among the departments in old paper forms by use of the printing process.

The second phase introduced the computerised application for all direct actions. All direct actions to fix the deviations are distributed electronically. Also the close out and approvals of those activities are fully computerised, no sign outs are needed.

The third phase to be introduced in the middle of 2004 is a fully computerised process of analysing the deviations and suggestions in one environment. The approval of these analyses and their action plans are planned to be fully computerised in addition to all the actions, which are a part of these action plans, from the initiation to the close out.

3.2.2 Management involvement

NEK managers were well involved in the introduction of the program. They fully supported the program among the employees. NEK management positively supported solving the problems at the start of the project.

3.2.3 Training

Two weeks before each phase of the CAP had become effective, we organised the task-oriented training for over 200 people. Training materials are available on the Intranet for all the users.

3.2.4 Strip Cartoon

One of our change management tools was the strip cartoon to inform employees. We used s simple two pages strip cartoon to present the main facts in a comic way on how to use the program. It was an excellent promotion among employees.

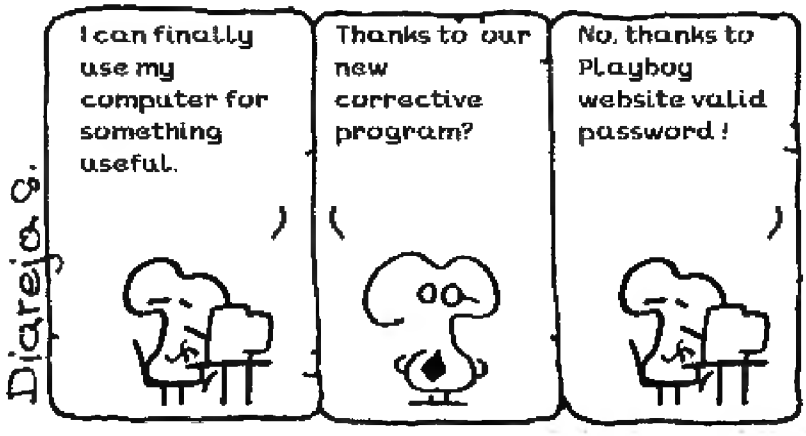

Figure 6: Diareja Strip Cartoon Example

4 PROGRAM DESCRIPTION

4.1 Flow Chart

The Figure represents the basic flow chart of the computerised Corrective Action Program. The CAP request is initiated through computer program only. The paper form can only be used in case the Intranet or the program does not work. Anyone recognising a deviation or having a suggestion/enhancement can initiate a request.

A new request can be approved by either initiator's superintendent or Shift Supervisor. However, if the initiator wishes to remain anonymous, the request can be processed directly to the Screening Committee.

Every morning the Screening Committee processes the approved reports throughout the organisation. It also assigns classification and prioritisation, and decides whether a report needs to be analysed or a direct action is enough.

Simultaneously, the *Independent Safety Engineering Group* (ISEG) performs the basic coding of all Condition Reports for trending purposes.

System engineering determines system / component maintenance rule classification and operability.

Direct actions are needed to fix the deviation. They are co-ordinated by workweek supervisor who approves minor works and close outs of actions.

Analyses are performed to prepare an action plan in order to either prevent repetition or carry out the suggestion. The Condition Report Analyst is responsible to prepare 12 steps of each analysis of the deviation or suggestion and an action plan, which is reviewed. When the action plan is approved, the actions are implemented by responsible person.

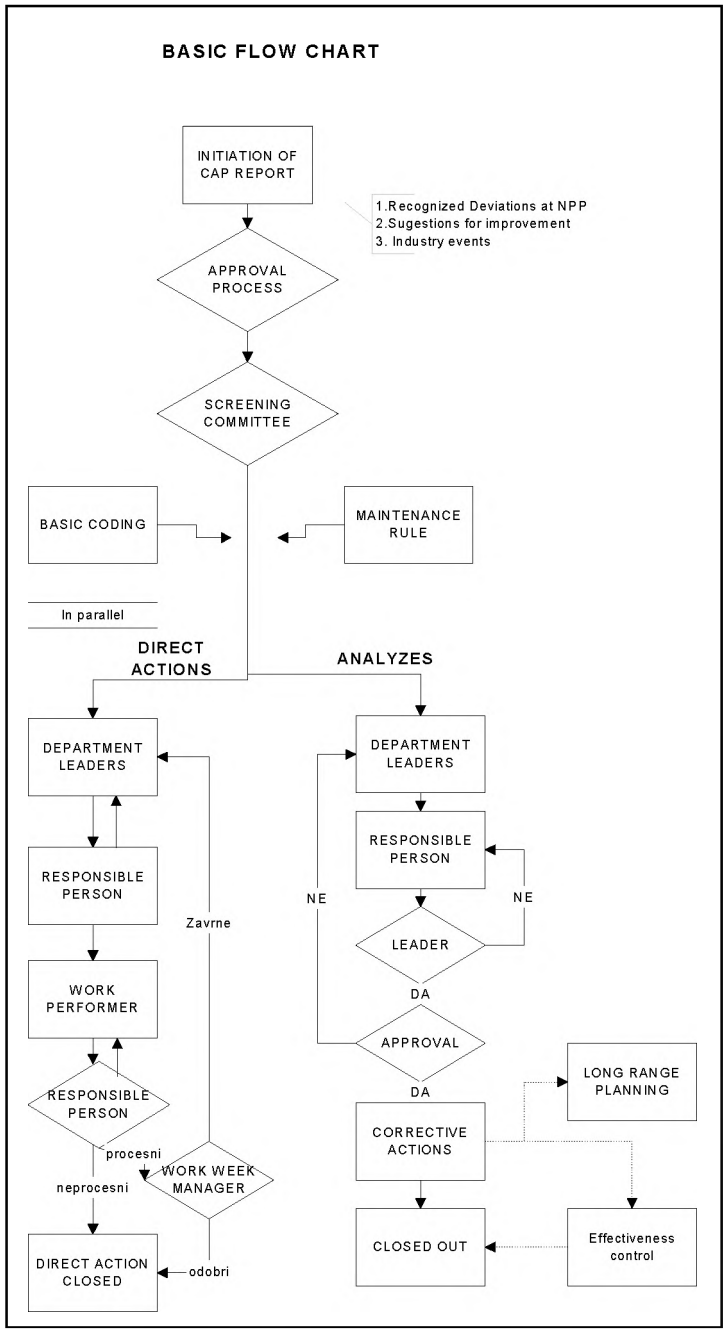

Figure 7: Basic CAP Flow Chart

5 RESULTS

5.1 Usage

Our main concern was that the staff would refuse to use computer instead of paper forms. But we were surprised to see how many of them started to use this tool immediately the next day. Having followed the CAP daily, the results are as follows:

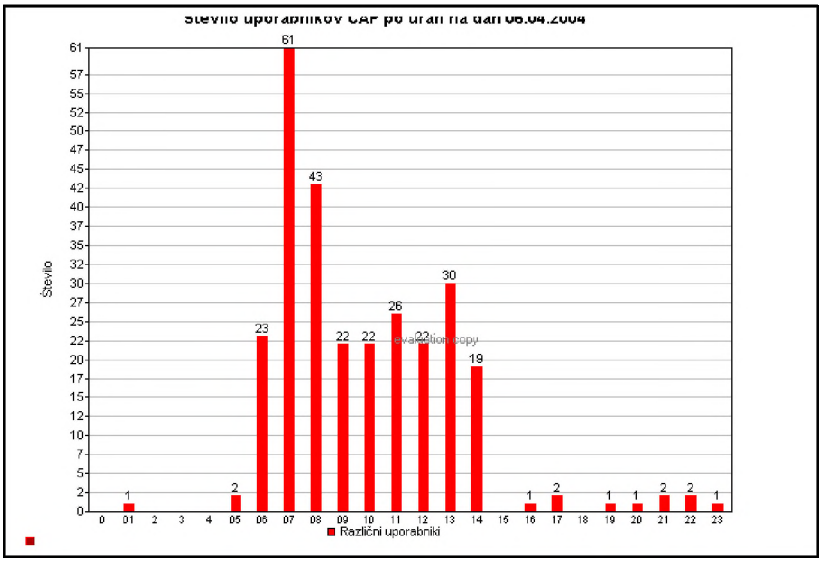

Figure 8: Number of different users per hour on April 6, 2004 (Tuesday)

5.2 The reporting threshold has been lowered

The number of staff reporting adverse conditions and providing suggestions, and the overall number of reports has increased.

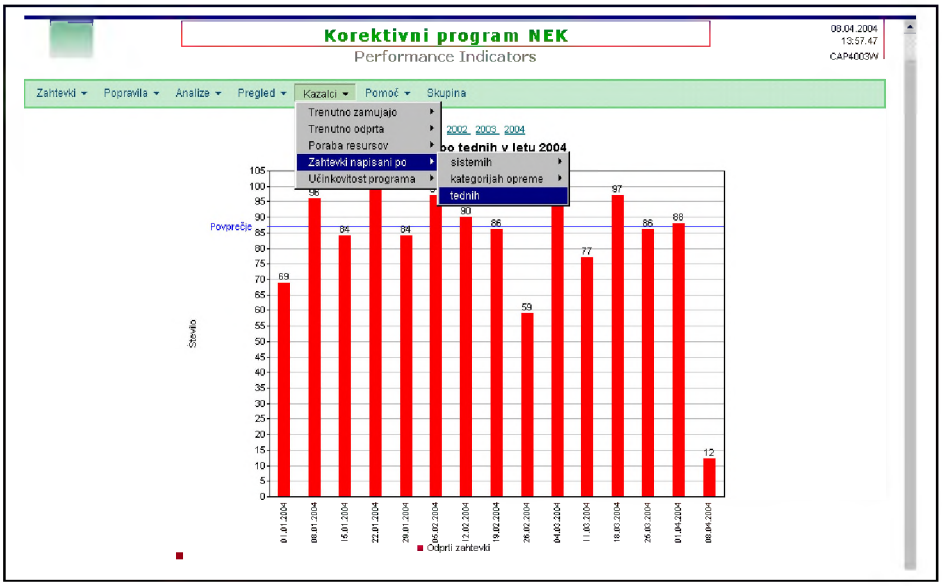

Figure 9: Number of reports per week in 2004

We follow the number of reports per week. The average number of reports per week in the year 2004 amounted to appr. 90, which is 50% more than we got in 2002 due to the lower threshold.

5.3 Tracking Capabilities

With the CAP software it is much easier to track the status of reports. The software uses the e-mail not only to inform the report's author when his or her report has been closed out, but also the Condition Report Analyst when he or she becomes the responsible person for an action or analysis. Department Superintendent can follow which activities are open for his/her department, who is the holder and what status are they. Everyone is able to see which activities are due and why. Postponing of activities' due dates is controlled and reasons for postponing are archived.

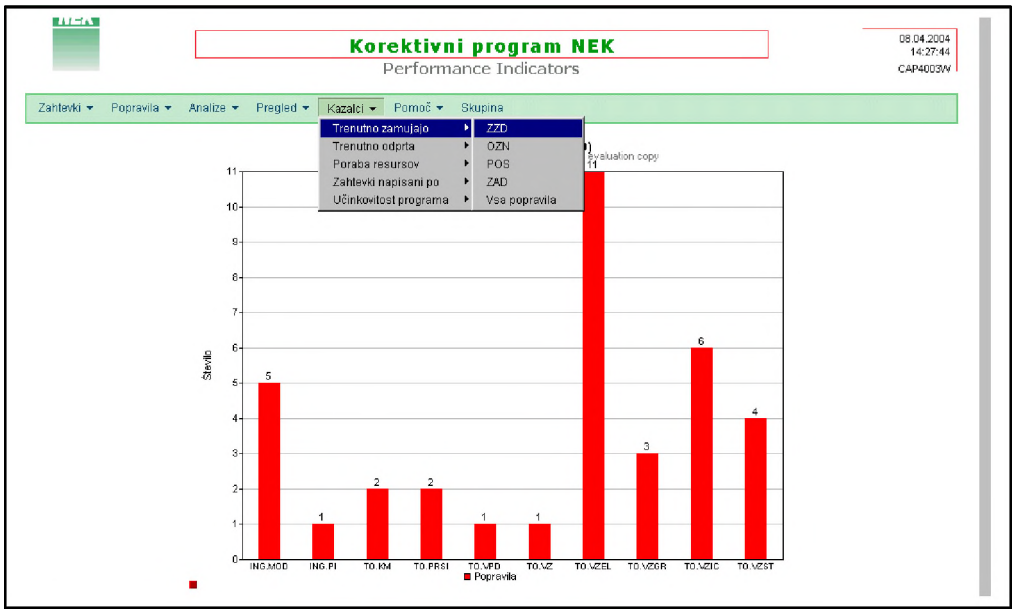

Figure 10: Delayed Work Requests per departments on April 8, 2004

The software uses simple graphs for tracking the action status. The graph above is accessible for all the users. With a mouse click onto the column one can get a list of all counted delayed actions.

Figure 11: List of Action Requests

5.4 Deficiencies

More reports resulted in additional work to process them, to fix the deviations and to analyse them, if needed. We fix the conditions adverse to quality and keep the backlog low, but our analyses' processes for deviations, suggestions and enhancements have started to increase in backlog. Phase 3 of our program shall uniform the process of analyses, reduce administration and increase the number of employees that can become Condition Report Analysts.

6 TECHNICAL DATA OF THE SOFTWARE

6.1 Users Interface

The ***Corrective Action Program*** is a WEB application.

Users access application through PL/SQL gateway on Oracle 9i Application Server 1.0.2. using Microsoft Internet Explorer browsers (Version 5 or later).

Menus are designed by Apycom Java Menus and Buttons v4.23.

Reports are implemented by Oracle Reports 6i.

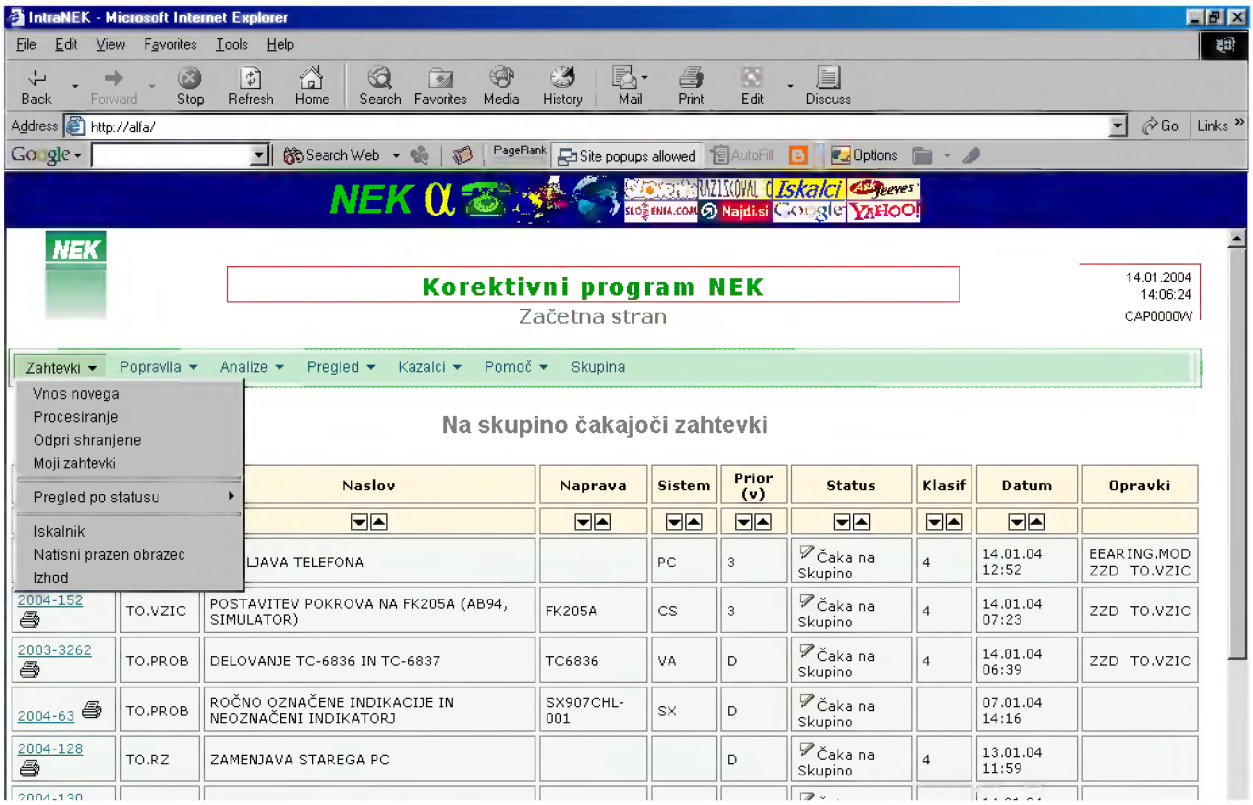

Figure 12: CAP menu and list of Condition Reports waiting for Screening Committee.

6.2 Database

Data is stored in Oracle 8.1.7 i database.

7 CONCLUSION

NEK has successfully implemented the computerised CAP. The main project goals have already been met.

Important lessons learned are as follows:

- Use of internal experience.
- Project leader needs to be 100% engaged in the project.
- Project Team has to be composed of different department's representatives.
- Work with the end in mind.
- Use of other experience and references.
- Top management full support.
- Apply win-win strategy for all parts involved in the program.
- Have a 100% support from IT people.

The project has been developed, built and implemented by NEK resources only, which gives the following benefits:

- The cost of the project is low.
- All enhancements and suggestions can be implemented immediately.
- The other program functions can be added later.
- We learned how to use all the databases more efficiently.
- This project is a pilot project. Lessons learned can be used for other projects, which will make other databases more user friendly.

8 REFERENCES

TR-109626	Strategies for optimising Engineering Effectiveness in Corrective Action Program, EPRI, June 1999
ENN-LI-102	Corrective Action Process, Entergy, rev.2, May 2002
WANO	PO&Cs - Performance Objectives and Criteria, rev.2
INPO AP-928	WORK MANAGEMENT PROCESS, December 2000
NEK internal procedures:	
ADP-1.1.200	OPERATING EXPERIENCE ASSESSMENT PROGRAM
ADP-1.1.201	POROČILO O ODSTOPANJU (DEVIATION REPORT), rev. 2
ADP-1.1.203	ROOT CAUSE ANALYSIS, rev. 1
ESP-2.601	ENGINEERING EVALUATION AND ASSISTANCE REQUEST, rev.3
ADP-1.9.025	POROČILA O NESKLADJIH, rev.0
ADP-1.1.122	IZDAJA DELOVNEGA NALOGA, rev.5