Abstract—The main problem associated with the operation of nuclear power plants is the problem of correct and timely diagnosis of failure or violation. The mistakes of technologists can lead to severe damage to nuclear power plants, or simply to a reduction in the utilization rate of installed capacity. The personnel make the main mistakes in the conditions of time shortage and being in a stressful situation during the development of an accident, when assessing changes in emergency parameters is not always possible, which leads to incorrect diagnosis of initial events (IE). Any IE leads to the deviation of the monitored parameters from normal values (values that are inherent for normal operation). The operator-technologist needs as soon as possible to determine the parameter (or parameters) for which the change occurs and, by performing a certain sequence of actions, bring their values to the norm. For information support of the operator-technologist is the information computing system (ICS). In the ICS, it is possible to control all parameters affecting the safe operation of the equipment, for each of which there are certain values, the deviation from which may lead to an accident. The paper considers the issues of the need to separate the measured parameters of NPP into separate groups that uniquely characterize the state of the critical security features. In particular, the necessity of consideration as the most important mass parameter of the primary coolant is shown. The issues of level measurement problems in the pressure compensator are discussed as the most important from the point of view of determining the mass of the primary coolant. Methods are proposed for determining the operability of sensors, the method of calculating a reliable level in the volume compensator. Estimates of the computational efficiency of the proposed methods are given.

Keywords—information and computing system, operator-technologist, initial events, coolant mass, installed capacity utilization factor.
first contour °C/hour.

however using dependence for $\Delta M$:

$$M = \Delta M + \Delta V$$

$\Delta M = \Delta H_{PC} + \Delta H_{TK} + \Delta H_{TY} + \Delta H_{BB} - 60 \text{ m}^3$$

Analysing value $\Delta H_{TK, TY, BB}$

next critical functions of safety are accepted: «Subcriticism», «Cooling of active zone», «Heatsink», «Integrity of the first contour», «Radioactivity». In addition, it is

An operator in the decision of problem of diagnosticating can be

The early diagnosticating will allow both to decrease the

But, firstly, her application limitedly, secondly, her location of the

It is also necessary to notice that procedure of determination

The all above

To the operator, even with the use of

An event, not realized. In addition, as shown higher, flow

questions of automatic search of flow of the first contour are

of her being set by a project. However, on this stage the

the state of critical functions of safety, beforehand to forecast

important. For every project of NPP, these groups of

of these changes.

there is possibility to watch the critical group of parameters,

pumps

It is related to imperfection of

moment of wearing

moment of decline of level in the

system defence. It is related to imperfection of

60 mm (only discoloration on a monitor) or blowing off the

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authentication and reacting in most cases begin from the

emergency state. Operating of operator

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The authors of this

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and methods of finding out the flow of the first contour, that aggravates an

accident.
Means of copula «man–machine» is possible authentication of all initial events. It is necessary in a copula «man–machine» to minimize the
functions of eventful instructions, and also in connection with absence of qualification of operator, that simplifies of the stage of diagnostics, as such, requirements go down to impossible. Thus for adequate actions the high enough level define them in other hand the emergency response of eventful instructions must mark:

- passing to emergency response
- coming from higher said it is possible to draw conclusion, that for the choice of optimal renewal it is necessary to distinguish the group of parameters. To define the border indexes of NPP and improve safety.

State of critical functions of safety «Subcriticism»

According to foregoing it is necessary to work out recommendations of accident management instruction and measures. Therefore, accepting «Subcriticism» as a coefficient of exit of activating, «Reliable heatsink from an active zone» (Heatsink), «Radioactivity». Although in a project

\[ A = \alpha \cdot M_{DM} + \alpha \cdot (\alpha \cdot M_{DM}) + \alpha \cdot (\alpha \cdot (\alpha \cdot M_{DM})) + \delta \]

\[ + \alpha \cdot (\alpha \cdot (\alpha \cdot M_{DM})) \]

\[ \alpha \cdot (\alpha \cdot (\alpha \cdot M_{DM})) \approx M_{\text{DM}} \cdot A_{j} \cdot \delta_{T} \]

Consequently, critical functions of safety «Subcriticism»
Using a formula (2) taking into account that \( \Delta H_{TK, TT, BB} = \Delta M \)

\[
\Delta M = \Delta H_{PC} - \Delta \bar{T}_K
\]

\[
\Delta H_{PC} = \Delta T_{\bar{T}}
\]

Critical functions of safety «Radioactivity» depends of critical functions of safety «Heat exchanger» with the volume of

Middle temperature of the first contour

Decreasing the error of calculation of mass of coolant coming from the error of the search of flow of the first contour. In addition, taking into account regulated in the volume of level in the volume

Critical functions of safety «Radioactivity» depends of critical functions of safety «Heat exchanger» with the volume of

Critical functions of safety «Radioactivity» depends on nominal power,

Middle temperature of the first contour

following the numbers regulated in the volume of level in the volume

Critical functions of safety «Radioactivity» depends of critical functions of safety «Heat exchanger» with the volume of

Critical functions of safety «Radioactivity» depends on nominal power,

Middle temperature of the first contour

The necessity of realization of works is shown for the area

Multifunctional process control systems for thermal power plants

Yu.S. Morawska, S.S. Lys Semerak, M.M. Semerak, A.I. Lipinski,

http://www.aep.org.ua/fileadmin/user

“Steam turbine installations of nuclear power plants”, “Thermal power plants”, “Automation and control of energy processes”, “Industried thermal power engineering”