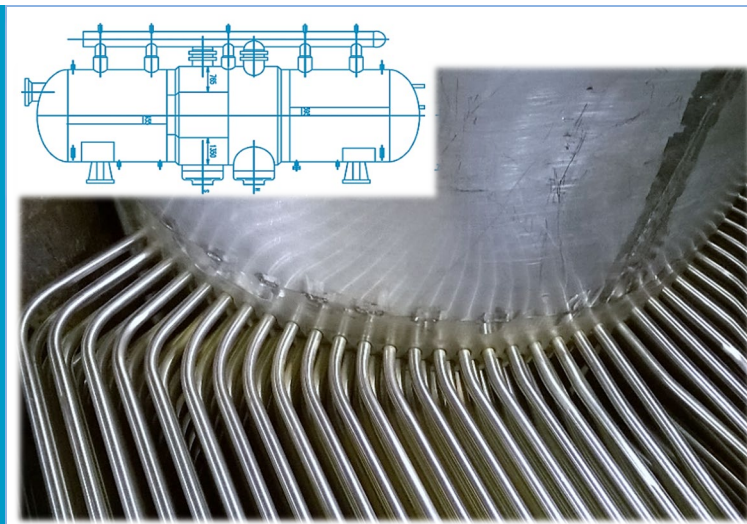




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## Operational Support of Power Facilities Department Integrity and Technical Engineering Division



# EVALUATION OF SECONDARY CIRCUIT WATER CHEMISTRY EFFECT ON SG LIFETIME

Steam generator PGV-440 - a connection of tubes to the primary collector

### Value for customers

- Evaluating of the chemical and thermodynamic data needed for the assessment of the secondary circuit water chemical regime. Subsequent overall evaluation of the operation history and shutdown scheme to understand the condition of the entire secondary circuit.
- Evaluating of the SG tube surfaces, morphology of deposits, SG crevice environment and NDT results for understanding of the entire SG condition in relation to the LTO.

### Applications

- Calculation of crevice environment composition from secondary circuit chemistry data during the shutdown of the unit.
- Determination of initiation and propagation mechanisms of cracks/ tube damages for operational conditions.
- Data storage and backup for steam generator (SG) life cycle evaluation.

### What we offer

- Detailed knowledge of SG chemistry, construction and manufacture technology.
- Acquisition of secondary circuit chemistry operational data in shared „Database of Secondary Circuit Regimes and SG Tube Damages“, its archiving, analysis and search for correlations.

### Contact details

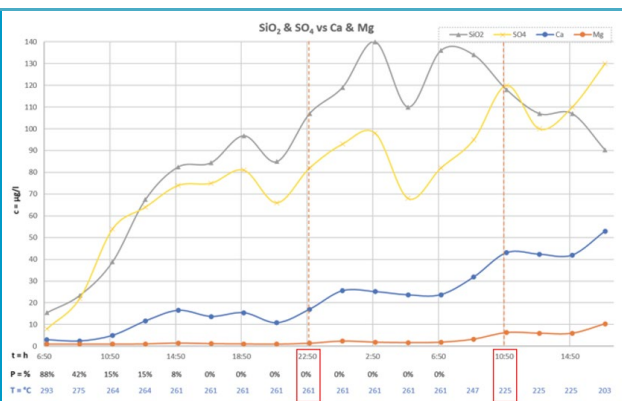
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- Statistical data evaluation and prediction of heat exchange tube damage rate including support for licence renewal.
- Calculation of chemical composition of media inside the SG crevices.
- Evaluation of SG chemistry from a point of view of heat exchange tube and other SG component damaging.
- Complete material and qualification assurance.
- Test laboratory accredited by Czech Accreditation Institute, p.s.c.
- Work under Quality assurance system according to ČSN EN ISO/IE C 17025 in agreement with ISO 9001.
- Transfer of operational experience from other VVER NPPs.

### Our references

- Integrity and Technical Engineering Division manages a joint international project „Database of Secondary Circuit Regimes and SG Tube Damage“. Participants of the project are power plants with VVER 440 units – NPP Dukovany (CZ), NPP Jaslovské Bohunice (SK), NPP Mochovce (SK), NPP Paks (HU), NPP Loviisa (FI) and VVER 1000 units – NPP Temelín (CZ), NPP Tianwan (CN) and NPP Zaporozhe (UA; partial participation)
  - Participation at Regional Project IAEA focused on „Improvement of primary circuit component integrity“ (RER/4/024) in Ukraine
  - HOR (Hide-Out-Return) analyses – impurity inventory inside SG crevices – for NPP Dukovany (CZ)
  - Analyses of deposit layers removed from heat exchange tube surface (NPP Dukovany, NPP Jaslovské Bohunice, NPP Greifswald)
  - SG maintenance of all Czech and Slovak SGs, feed water collector modifications, blowdown modification
- Integrity and Technical Engineering Division authored normative-technical document „Secondary circuit water chemistry for VVER 440 and VVER 1000“



Concentration profiles of HOR species for SG VVER440, 2021



Sampling of tube deposits using aluminium targets with the carbon adhesive tape