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|  | **World Association of Nuclear Operators**  **Moscow Centre**  **WANO – MC**  25 Ferganskaya st, Moscow, 109507, Russia  Phone. +7 495 376 15 87  Fax: +7 495 376 08 97  [info@wanomc.ru](mailto:info@wanomc.ru) |

**REQUEST**

**to provide technical and organizational information**

**via WANO**

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| 1. **NPP/Organization:** Smolensk NPP JSC «Rosenergoatom» branch |
| 1. **Information request topic: T**urbine generator gas coolers tube leakage testing methods description |
| 1. **Information request objective:** Information gathering for use in practice |
| 1. **Problem description:** The method used at the Smolensk NPP for testing the tightness of gas coolers does not allow assessing the development of defects before they display themselves in the form of a leak and, accordingly, the failure of the generator cooling gas cooler during operation.   During the inspection of the dismantled gas cooler of the ГО-1100/2940-НУ4-2 type, manufactured by Power Machines JSC (АО «Силовые машины»), during hydrotesting, a leak was found around ​​the tube plate of the lower water chamber. Hydro tests were also carried out during repairs 6 months before the failure of the gas cooler and did not indicate its malfunction.  In accordance with the guidelines for the overhaul of the TG, it is supposed to determine the presence of leaks in the cooler tubes because of pressure testing with a pressure of 8 kgf / cm² for 60 minutes. The identified leakage is eliminated by “plugging” the defective tube on both sides with a brass plug. It is allowed to plug up to 10% of the tubes of one gas cooler pass. There are no other methods of non-destructive testing described by the maintenance and repair documentation. |
| 1. **Specific questions:**   1. What methods, besides high-pressure hydraulic tests of a certain duration, are used at your nuclear power plants to monitor the condition and degradation of heat exchanger tubes, and what experience has been gained in the application of these methods (high-sensitivity thermal imaging systems, electromagnetic scanning, ultrasonic, refractometric methods, etc.). Which of these methods you’ve found most reliable allowing you to determine the leaks of the specified and other types and how they expressed themselves in practical implementation.  2. Methods known and used at the station that allow predicting or determining the development of leaks in places where they are embedded in tube sheets.  3. Do your nuclear power plants use heat exchangers other than shell-and-tube designs, both initially and those used, incl. because of the upgrades and refurbishments carried out (for example, with a pipe-in-pipe system, lamellar ones, or with some design features for compensating thermal expansions, designs of embedding tubes in tube sheets). |
| 1. **Organizations proposed for distribution of this request:**   All WANO centers wellcome |
| 1. **Department – request initiator:** Electrical dept |
| 1. **Contact details of the requester:**   Evgenii Kirilenko WANO OSR at Smolensk NPP |
| 1. **Request date:** 10/10/2020 |