NPP's Safety Development & Improvement

Request of Technical Proposal for Performing Bushehr NPP's Surveillance Specimens Tests

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1 General Description

In order to monitor the behavior of the reactor pressure vessel (RPV) material, some reference specimens called surveillance specimens are placed inside the RPV. They are designed in a way that their status and condition of deployment are completely close to the most critical condition of the RPV. The mechanical characteristic degradation and fracture toughness specifications of base and weld metal due to neutron fluence and temperature effects (irradiated specimens) are analyzed by surveillance specimens placed inside the RPV's wall. Withdrawal of each set of specimens is timely coordinated.

The surveillance specimens are classified into three categories:

- Reference Specimens (1K-3K series)
- Irradiated Specimens (1Л-6Л series)
- Temperature Specimens (1M-6M series)

It is necessary to consider specific safety requirements for testing the irradiated specimens.

Four types of tests shall be carried out for the surveillance specimens:

1- Tensile Testing

The tensile specimens are dumbbell-shaped and the total length of each tensile specimen is 45 mm and its middle part length is 33 mm. The diameter of the specimens' both sides head is 6 mm while the diameter of the middle part is 3 mm. For first time, maximum 72 surveillance specimens will be examined.

2- Impact Bend Test (Charpy Test)

The dimension of each charpy specimen is 10×10×55 mm. The depth of the cracked crater is 2 mm. For first time, maximum 252 specimens will be tested.

3- Crack Resistance Test (Fracture Toughness Test)

Dimension of each fracture toughness specimen is 30×31.2×12.5 mm. For first time, maximum 96 surveillance specimens will be tested.

4- Determination of Chemical Composition

The chemical composition is determined on test reference specimens as well as on irradiated and temperature reference specimens of each discharged set.

2 Required technical and engineering services

TAVANA Company as the BNPP's TSO intends to assign accomplishment of the abovementioned tests to international Hot-Labs in five items as the following:

2.1 Transportation of the surveillance specimens of BNPPs' RPV to the International Hot Labs;

2.2 Performing the surveillance specimens tests (the required tests mentioned in article 1);

2.3 Analysis of the surveillance specimens test results;

2.4 Design and equipping a reactor surveillance specimens test facility for Bushehr Nuclear Power Plant (BNPP)

2.5 Training the BNPPs' Personnel to perform the surveillance specimens' tests and analyze the results.

3 Cost and price

In accordance with the abovementioned services that TAVANA Company demands, your proposal including the price, schedule, etc. should be given for each service separately (in accordance with article 2.1 to 2.5).

4 Required Documents

The following documents should be given by the organization which carried out the tests:

- The licenses and certificates for the laboratory performing the surveillance specimens tests;
- The experiences related to the NPP's surveillance specimens test including NPPs in Germany territory and out of it;
- The equipment list and its operation certificates.