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Action plan to reduced water leaks on brazing joints at SOLEIL

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Synchrotron SOLEIL is the 3rd generation French synchrotron light source. It has been in operation since 2007 providing photon beams to 29 beamlines with a maximum intensity of 500 mA, 5000 hours a year.

Since a few years, we are facing at an increasing number of leaks on brazing joints of our LCW cooling circuits. This type of incident impacts deeply the beam availability and may be the sign of an aging facility requiring corrective maintenance. We decided to set up a task force to handle this issue and to define of the strategy to follow. The first step was to make a survey of similar issues in sister facilities. Among the key players are listed a large water flow, the water chemistry, the level of dissolved oxygen coupled with the value of the pH of the deionized water used to cool down the equipment, radiation-induced oxidation chemical reactions, mix of different types of materials (Al, SS, Cu, etc.), mechanical stress or shocks and finally the experience and qualification of the welders and the brazing material. Galvanic corrosion has also been observed producing copper oxide mud and blocking the water flowmeters. Several actions have been undertaken: in the short term, reinforcing visual control of sensitive equipment during all shutdown periods, treating the identified high risk brazing joints, searching for abnormal vibration levels, analysis if any blocking materials and a campaign to clean the flowmeter filters. In the long term diagnostics are progressively installed: pH meters and dissolved oxygen sensors. Expert from the service of corrosion of CEA were also consulted.

If no major incident has been reported recently, very useful knowledge was gathered during these late years for improving the running of the present facility and also to prepare the major upgrade of our accelerator and technical facility.

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