The detailed demonstration that the effects of aging degradation are adequately managed.

The challenge
In the frame of preparation for lifetime extension or license renewal, all the systems, structures and components (SSCs) selected through the scoping and screening process should be subject to long-term operative (LTO) evaluation. Based on the current status of the plant and the multiple aging effects, the assessment should demonstrate that all the effects of aging degradation are adequately managed.

The solution
Based on the expertise developed in aging degradation mechanism through the years combined with its manufacturer’s knowledge of the nuclear plants, AREVA supported many customers in their aging management reviews.

The review demonstrates that the handling of aging mechanisms is compatible with the remaining extended life of the plant. In case aging requirements are not covered, it identifies additional inspection methods, adaptation of maintenance programs or components replacements that may be required. Costs for managing aging are optimized.

The COMSY tool efficiently supports the systematic assessment of the many components subject to LTO. Sophisticated degradation assessment functions that comply with the international state of the knowledge on corrosion and degradation mechanisms for mechanical components, electrical equipment and I&C components are embedded in the software. The systematic collection of data and automatic computing of degradation rate and remaining life allows experts to focus on high-value activities.

Key features
- Systematic assessment of relevant aging mechanisms for all relevant SSCs:
  - Mechanical
  - Thermal
  - Chemical
- Identification of SSCs that require mitigation measures
- Review and adjustment of maintenance and inspection programs
- Detailed Time Limited Aging Analysis for major components
  - Vessel, vessel head, internals
  - Pressurizer, steam generator
- Degradation assessment included in the COMSY tool
- Systematic and structured review supporting team alignment

General corrosion
- uniform corrosion
- shallow pitting

Microbiological corrosion
- MIC

Localized corrosion
- pitting
- crevice corrosion

Stress corrosion cracking
- IGSCC
- TGSCC
- Ni-SCC

Corrosion fatigue
- strain induced corrosion
- crackin

Fatigue
- thermal transient fatigue
- thermal cycling fatigue
- thermal stratification fatigue

Flow-induced corrosion
- FAC-flow-accelerated corrosion
- cavitation erosion
- liquid droplet impingement (LDI)
- solid particle erosion

Tribology
- abrasion and wear

Typical degradation mechanisms
Aging Management Review

Your benefits at a glance

- Accurate evaluation of the aging effects through state-of-the-art models
- Optimized mitigation solutions to cover the aging requirements with maintenance and inspection programs
- Implementation effort reduced through the use of COMSY database
- 30 years of experience in the field of degradation assessment for NPPs
- COMSY tool provides a strong basis for the surveillance of the aging of numerous components for the rest of the plant life and the possibility to integrate easily new aging models.

AREVA References:

Europe
- Biblis A, B
- Grafenrheinfeld
- Brokdorf
- Isar
- Unterweser
- Grohnde
- Khmelnitski
- Krümmel
- Philippsburg
- Beznau
- Gösgen
- Leibstadt
- Borssele
- Paks
- Oskarshamn
- Forsmark
- Lovisa
- Cofrentes
- St. Maria de Garona
- Rowno
- Kozloduy

Asia
- Tomari

South America
- Atucha 1 +2
- Embalse
- Angra 1 + 2 + 3

US
- DC Cook, Calvert Cliff, Oconee, Mc Guire, Catawba, Columbia, Turkey Point, Monticello, Susquehanna, VC Summer

Typical COMSY window supporting efficient aging management review