Safety Performance Indicators (SPIs) are used for monitoring and assessing the safety performance of operating NPPs in a quantified manner. The Atomic Energy Regulatory Board (AERB) of India developed a methodology for safety performance assessment of operating NPPs based on a comprehensive set of SPIs. This methodology facilitates comparison of safety performance of operating NPPs irrespective of their designs and vintage, thus enabling monitoring, trending & comparison of performance. Further, it provides inputs for regulatory processes & integrated safety assessment of NPPs and serves as a means for effective communication with public, media & technical community in a clear, consistent and coherent manner.

Step 1: Identification of Safety Performance Areas

![Safety Performance Areas Diagram]

Step 2: Selection of Performance Indicators & Attributes

![Performance Indicators & Attributes Diagram]

Benchmarks were derived coherently in a graded manner considering:
- Established regulatory limits & constraints,
- Technical specification requirements & safety reports,
- Safety significance of attributes,
- Industry performance in operating experience,
- etc.

\[ \text{SPI Benchmark} = \sum \left( \frac{W_i}{W_A} \right) \]

Where,
- \( W_i \) = Weightage assigned to attribute \( i \) (based on ‘Graded Approach’)
- \( W_A \) = Total weightage

Step 3: Benchmarking of Attributes

- **Excellent**: Performance better than industry average
- **Good**: Performance within regulatory / established constraint
- **Satisfactory**: Performance better than established constraint
- **Below Industry Average**: Performance below industry average
- **Regulatory / Established Constraint**: Performance below regulatory / established constraint
- **Performance Below Industry Average**: Performance below industry average
- **Performance Well Below Industry Average**: Performance well below industry average
- **Performance Below Industry Average**: Performance below industry average
- **Performance Well Below Industry Average**: Performance well below industry average

Step 4: Data Collection & Assessment

Relevant data for each attribute is collected from submissions made by the utility as part of regulatory oversight. The data is processed using assigned weightages to arrive at quantified results. The results obtained are compared against established benchmarks and presented on a five-level scale.

Conclusion

Implementation of graded approach facilitates determination of the safety significance of regulatory processes & activities and enables risk informed & consistent decision making. Safety performance assessment provides inputs for integrated safety assessment, and for sharing the safety status of operating NPPs with members of public & other stakeholders, to instil trust & credibility regarding the use of nuclear power in India. The implementation of above regulatory tools has rationalized AERB’s regulatory efforts, provided inputs for safety performance improvement, optimized resource utilization and brought effectiveness & efficiency in regulation without compromising safety.