

The Medtronic microelectronics qualification world view is founded upon two over-riding concerns:

1. Reliability

- Devices must be feature-rich, but operate in a fail-safe manner

2. Power Consumption

- Technology must be capable of ultra-low standby current

- **However, if asked, IC designers will always give the latter consideration the first priority**

- Older technologies had sufficient margin that reliability was a given
- If a design met all required design rules, no field issues were expected

Discussions with leaders in the field and published literature indicates that a shift is required for advanced technologies

- **Design for Manufacturability rules, which were non-existent in older technologies, are essential in new technologies**
 - Many of these rules are still not implemented in a rigorous fashion within foundry suppliers
 - The list of critical-to-reliability is not well defined
 - Medtronic has no experience with industry lessons learned for very deep submicron geometries
- **Qualification paradigms require much deeper understanding of design/process interaction**
 - New design practices
 - New failure modes
 - New test methodologies
 - New screening processes

All of these elements are conspiring to reduce the effectiveness of our current qualification methodologies

- **The need to meet real and perceived regulatory requirements makes it difficult to change existing systems**
 - Many interacting specifications
 - Regulatory body submission for changes
 - Institutional inertia
 - Past successes breed resistance to change

The \$64,000,000 question is: what are the changes necessary to Medtronic qualification methods for new technologies?

- **That's why we're here**
- **Ongoing dialog with other industries and markets will yield insights into the answers**