



Observations and Findings in the Area of ALARA

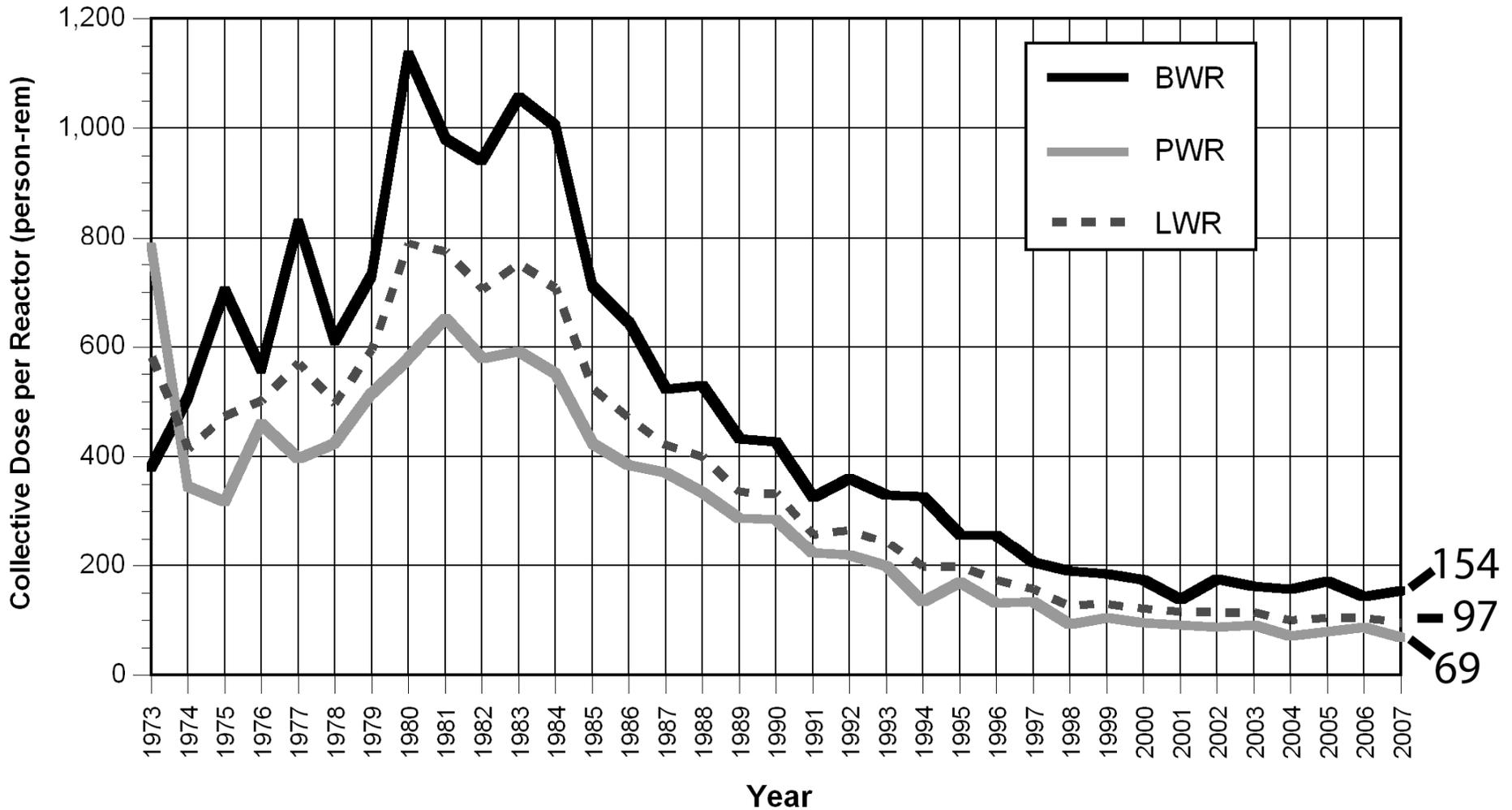
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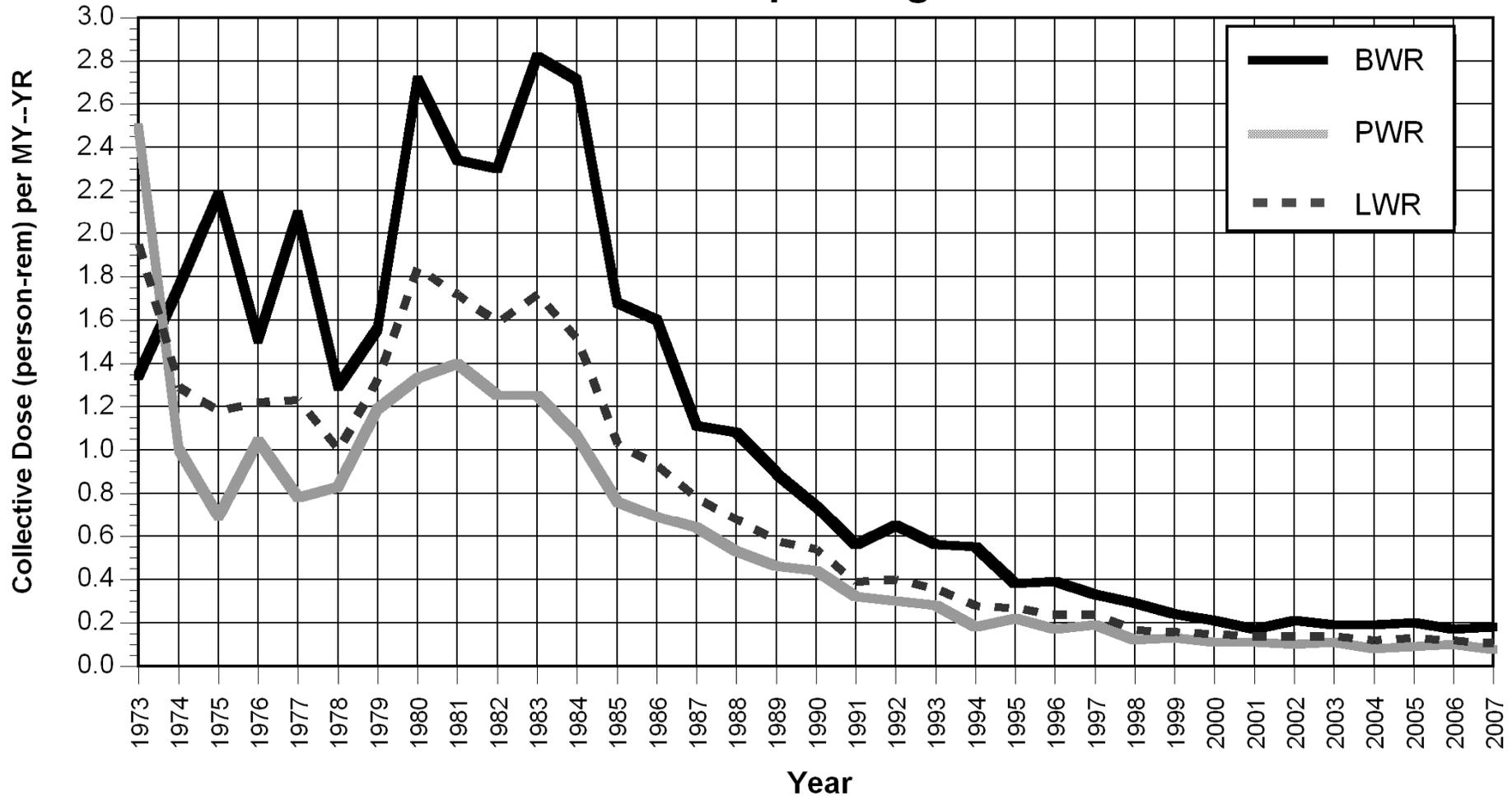
Purpose

- Highlight current ALARA Performance
- Discuss NRC ALARA inspection findings and observations over the past 3 years
- Discuss Areas for Focus and Opportunity.

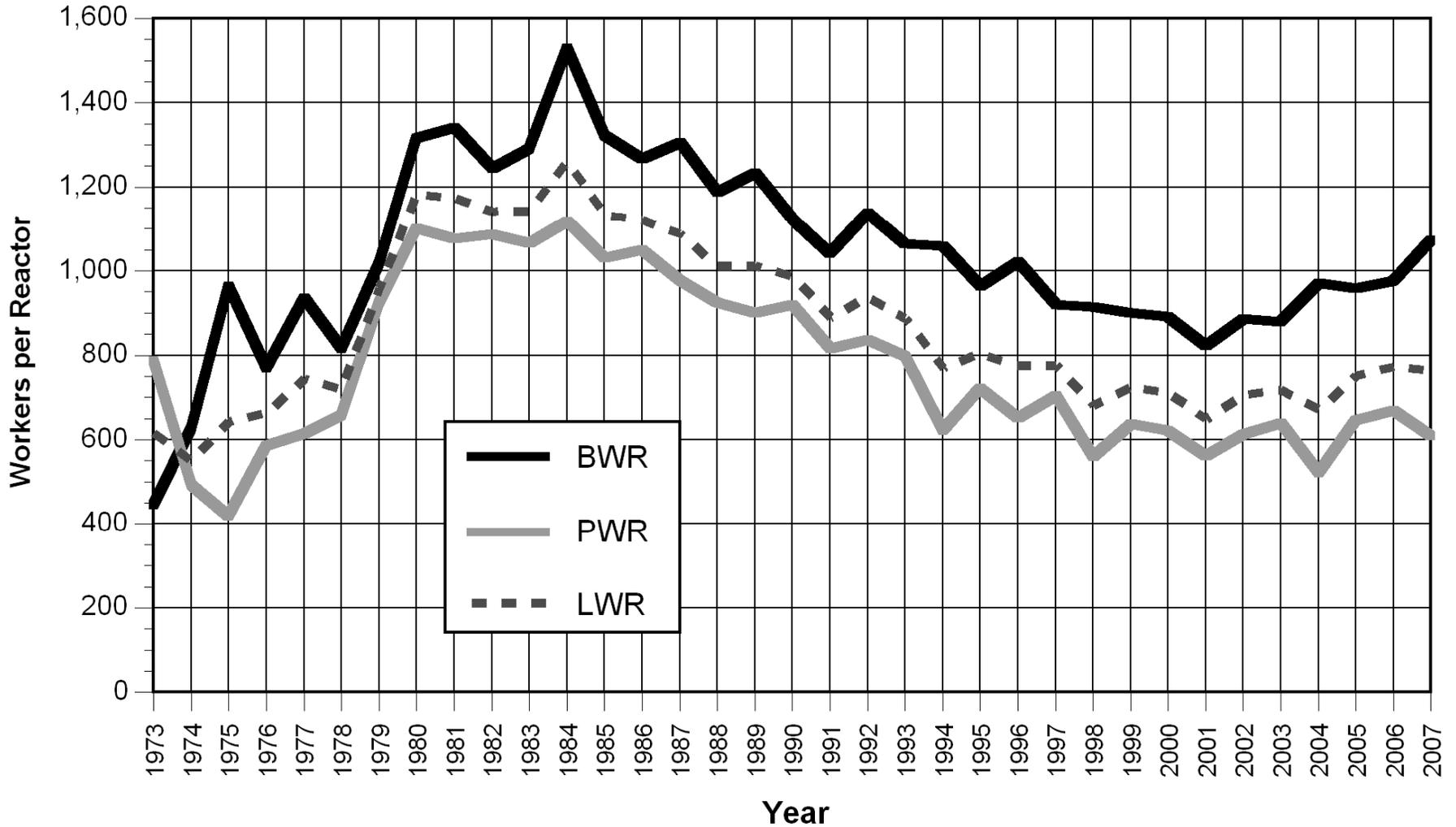
Average Annual Collective Dose



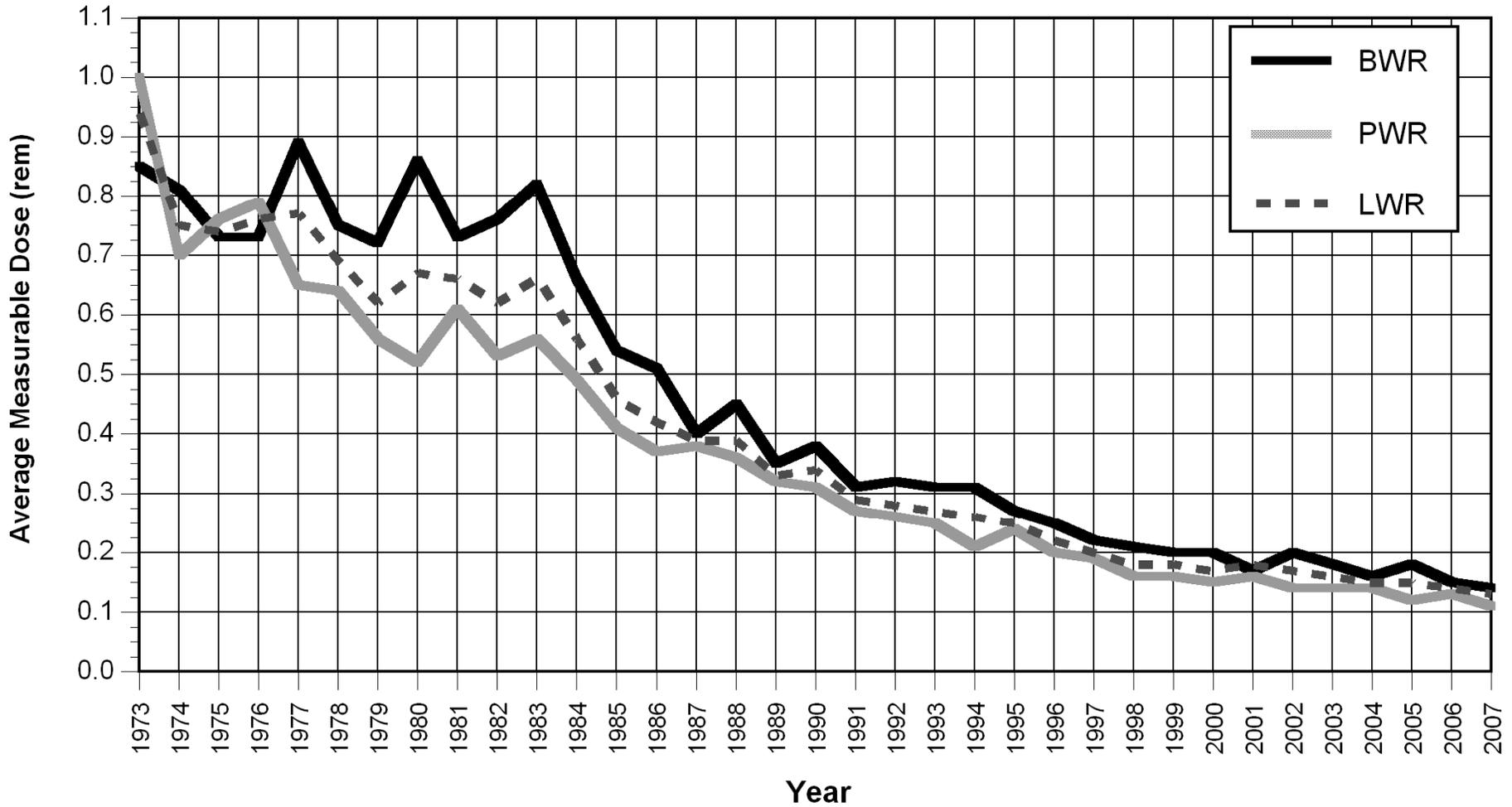
Collective Dose per Megawatt-Year**



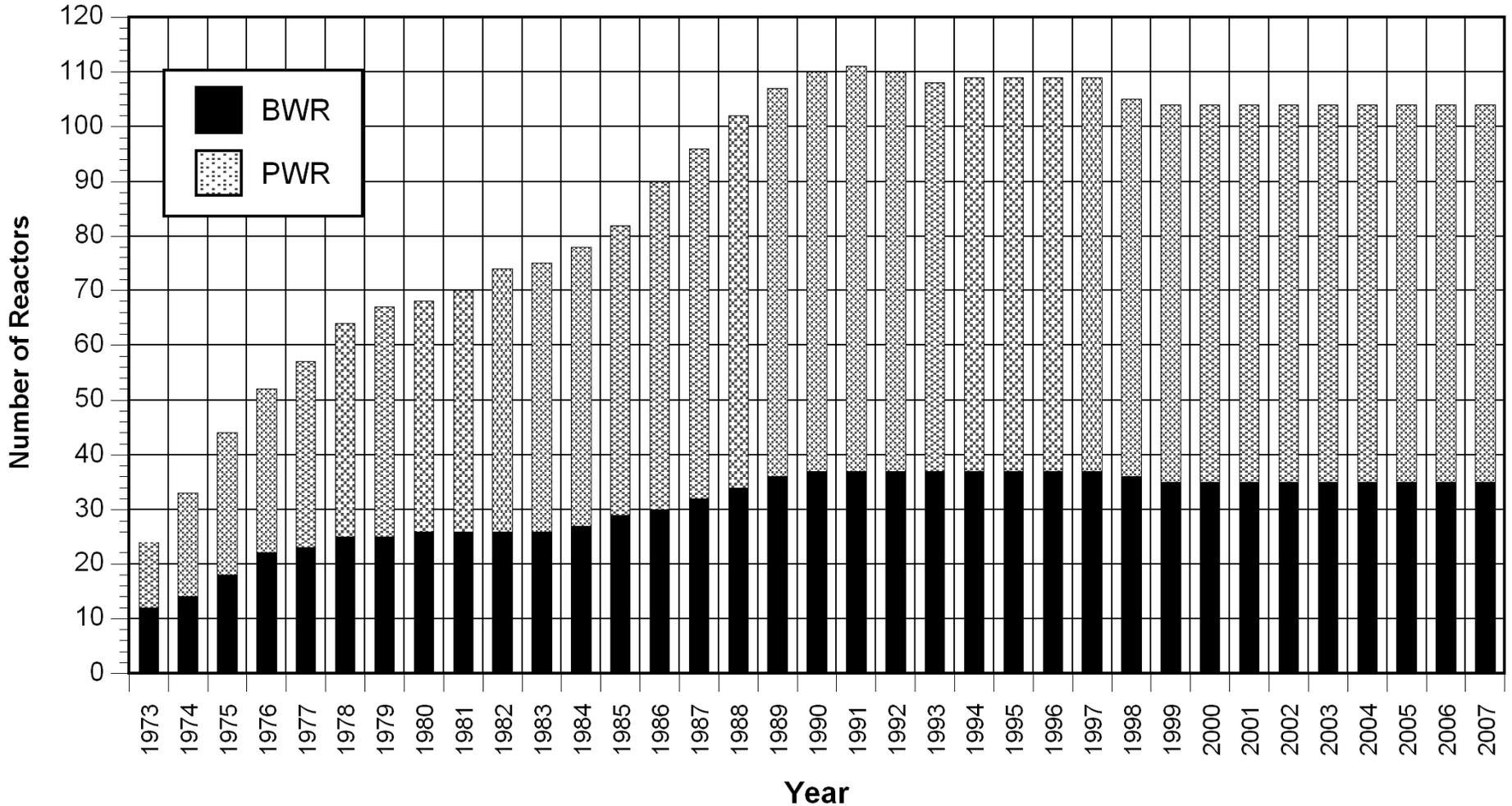
Average Annual Number of Workers with Measurable Dose



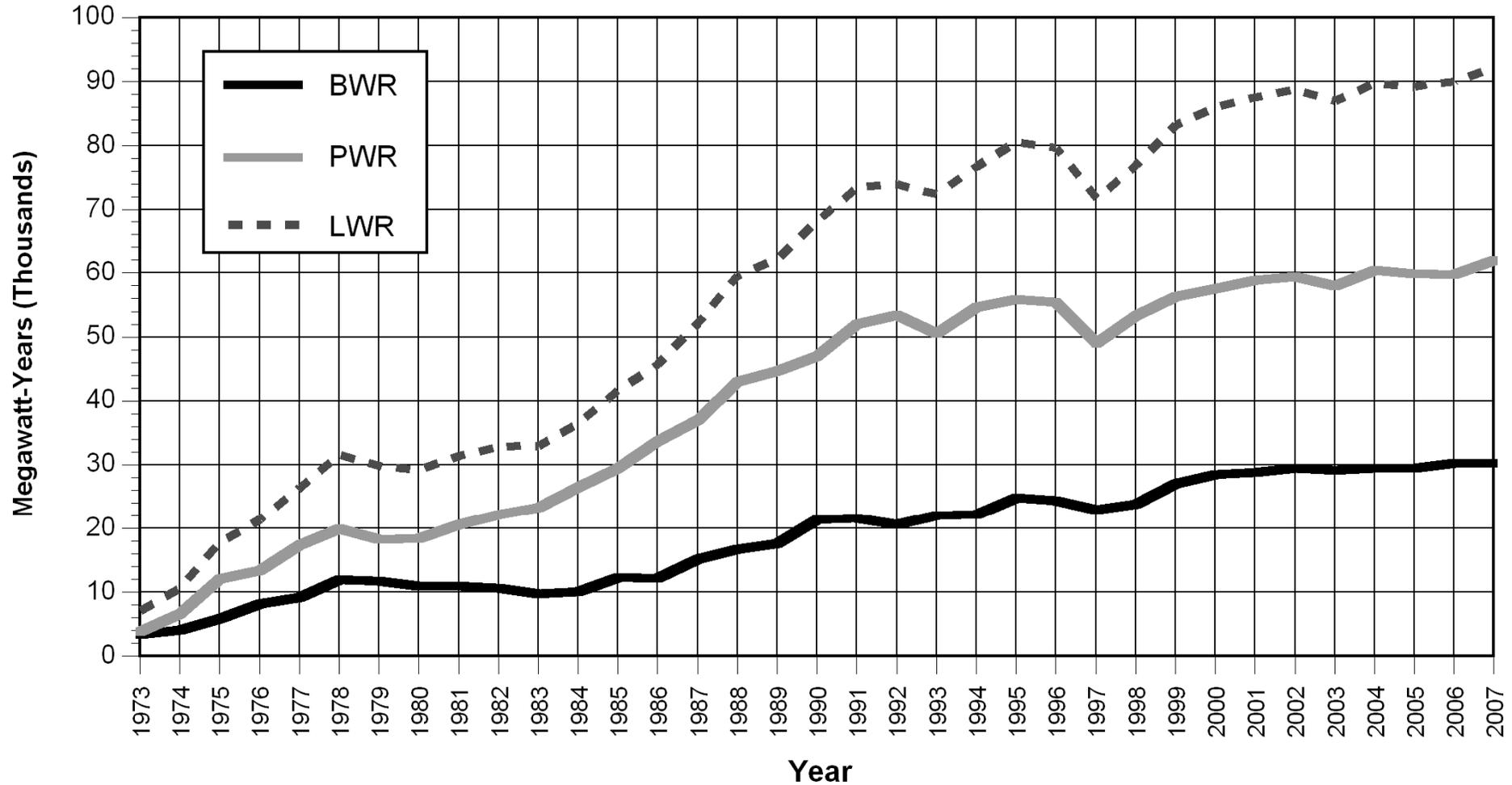
Average Measurable Dose per Worker*



Number of Operating Reactors



Electricity Generated*



ALARA Findings:

- **2006 - 4 Green Findings, 2 Non-cited Violations**
- **2007 - 8 Green Findings**
- **2008 – 4 Green Findings (through Sept 30th)**

ALARA Findings

- **Work not adequately planned and executed for purposes of exposure reduction (four examples- refueling, pump work, vessel head work, corrosion control)**
- **Work not properly planned in the area of person-hours for sump modification**
- **Work planning issues for insulation work caused worker inefficiency and additional dose**

ALARA Findings

- **Work not effectively controlled or planned for refuel floor work, person- hours exceeded planned estimates**
- **Violation - Failure to use engineering controls for steam generator work caused unplanned dose**
- **Violation - Failure to use engineering controls for reactor cavity work caused unplanned dose**

ALARA Findings

- **Re-work caused increased work hours and dose.**
- **Inexperienced workforce caused significant increased work hours and dose.**
- **Inexperienced work force using poor ALARA practices, and extensive rework resulted in additional dose.**

ALARA Findings

- **Failure to provide detailed work package instructions to isolate transmitter before opening drain valve, causing unplanned and unintended exposure**
- **ALARA work planning was less than adequate resulting in rework, and dose > 5 rem and > 50% criteria**
- **Rework caused by planning errors and craft errors resulted in dose > 5 rem and > 50% criteria**
- **3 different work activities resulted in > 150% of original planned dose**

ALARA Findings

- **Failure to effectively implement radiological and engineering controls (organizational and programmatic deficiencies) resulted in > 5 rem and > 50% criteria**
- **Failure to manage source term and work activities resulted in > 5 rem and > 50% criteria**
- **20.1501 survey requirements were not met in that respirators were issued without an evaluation for the need for respirators**
- **Failure to implement dose controls by ineffective ALARA planning and controls**

Areas of Focus/Opportunities

- **Use best pre-job assumptions for ALARA analysis (work scope, person-hours, radiation dose rates)**
- **Consider experience levels, provide additional Supervision/oversight when less experienced crews**
- **Oversight - Validate ALARA planning assumptions early in work activity (dose rates, hours, shielding)**
- **Track on-going job performance, re-evaluate, revise dose estimates**
- **Off-track dose estimates - Modify analysis, re-establish ALARA actions, re-approve ALARA goals**

Areas of Focus/Opportunities

- **Rework - Re-evaluate, verify or modify ALARA planning and document your evaluation**
- **Expanded work or rework – Recognize, acknowledge and document why work was expanded or rework was needed**
- **Mistakes – Do stand-downs, discuss and correct mistakes with crews, and document immediately in corrective action programs**
- **Do apparent cause analysis and find the real problems**

Areas of Focus/Opportunities

- **Long term ALARA planning**
 - **Chemical controls**
 - **fuel cleaning**
 - **Partial system chemical decon**
 - **High Pressure decontamination of hot spots**
 - **Component replacement**