

Project Description	Total \$ Saved (@ \$1,000/rem)
15. Remote readout near PWR seal table	\$1,700,000
16. PWR steam generator manway tensioner/detensioner and handling device (on critical path 25% of time)	\$1,200,000
17. Photographic technique for PWR steam generator tube plugging inspections	\$960,000
18. PWR steam generator manway tensioner/detensioner	\$820,000
19. Robotic inspection of PWR ice condenser area	\$630,000
20. Solid radioactive waste handling using high integrity containers	\$570,000
21. Robotics system for inspections in BWR moisture separator and feedwater areas (single reactor site)	\$280,000
22. Robotic mechanism for surveillance of BWR high pressure feedwater heater rooms (three reactor site)	\$280,000
23. Portable robotic system for smoke detector inspection (three reactor site)	\$200,000
24. Robotic mechanism for surveillance of BWR high pressure feedwater heater rooms (single reactor site)	\$78,000
25. Portable robotics system for smoke detector inspection (single reactor site)	\$28,000

### 32.2 Cost-Effective Modifications

Forty items with cost-effectiveness values at or below \$1,000/rem based on the BNL discounted rem present-worth model were identified. These were:

Project Description	\$/Rem
1. BWR-CRD scram discharge line flange for hydrolyzing the header	\$35
2. Portable shielding system for the PWR steam generator channel heads	\$86
3. Shielding for CVCS demineralizers (Option B)	\$100
4. Clean seal cooling water supply for BWR recirculation pump	\$110
5. PWR power level monitor using <sup>16</sup> N detectors	\$120

Project Description	\$/Rem
6. Cobalt replacement in PWR reactor coolant pumps (three-loop operating plant, pumps replaced for other reasons)	\$120
7. Shielding for CVCS demineralizers (option A)	\$120
8. Replacement of PWR steam generators with low cobalt (< 0.03%) tubing (three-loop operating plant, replacement needed for other reasons)	\$120
9. Replacement of PWR control-rod-drive mechanisms with low cobalt parts (three-loop operating plant, replacement needed for other reasons)	\$140
10. Replacement of PWR steam generators with those having low-cobalt (0.015%) tubing (three-loop operating plant, replacement needed for other reasons)	\$140
11. Replacement of PWR control-rod-drive mechanisms with low-cobalt parts (four-loop operating plant, replacement needed for other reasons)	\$140
12. Replacement of PWR steam generators using low-cobalt (<0.03%) tubing (four-loop operating plant, replacement needed for other reasons)	\$150
13. Replacement of PWR steam generators with those having low cobalt (0.015%) tubing (four-loop operating plant, replacement needed for other reasons)	\$170
14. Temporary shielding for PWR reactor vessel head	\$180
15. Low-cobalt specifications for PWR fuel assembly nozzles (new plant)	\$190
16. Cobalt replacement in PWR reactor coolant pumps (four-loop plant, pumps replaced for other reasons)	\$200
17. TV robot inspection of PWR vessel head (single-reactor site)	\$210
18. Reduce cobalt impurity in new PWR steam generator tubing (Sizewell 'B' plant)	\$230
19. Handling equipment for PWR steam generator manway covers	\$230
20. Mock-up training for PWR steam generator jobs	\$270
21. Installation of viewing windows in BWR plants	\$290
22. PWR reactor pressure-vessel head laydown shield	\$310
23. BWR control-rod-drive assembly and decontamination tank	\$330

Project Description	\$/Rem
24. Permanent shield for PWR reactor vessel head (three-reactor site)	\$330
25. Electropolishing tank for BWR control rod drives	\$340
26. Relocation of instrument readout at PWR spent-fuel pit heat exchanger	\$350
27. Helium leak detection for BWR condenser tubes	\$350
28. Relocation of fuel shipping cans	\$420
29. Shielding for PWR reactor upper internals (two-reactor site)	\$570
30. Ultrasonic testing of PWR pressurizer surge line (three-reactor site)	\$610
31. PWR reactor vessel head shielding (no critical path expense)	\$620
32. PWR steam generator tube inspection and repair robot	\$630
33. BWR pipe insulation improvements for in-service inspections	\$650
34. TV monitor for BWR cleanup heat exchanger room	\$670
35. BWR control-rod-drive handling tool	\$780
36. PWR reactor vessel head shielding (on critical path)	\$860
37. Acoustic emission instrumentation for ISI of the reactor vessel and reactor coolant piping	\$900
38. Decontamination of a BWR recirculation system	\$910
39. Air-cooled anticontamination suit, radio dosimetry, and radio communications	\$950
40. Shielding for PWR reactor upper internals (single-reactor site)	\$1,000