APPENDIX I
GAS PLANNING STANDARD

In its 2003 Least Cost Plan, PSE changed its gas supply peak day planning standard from 55 heating degree days (HDD)[1], which is equivalent to 10ºF or a coldest day on record standard, to 51 HDD, which is equivalent to 14ºF or a coldest day in 20 years standard. The Washington Utilities and Transportation Commission (WUTC) responded to the 2003 plan with an acceptance letter directing PSE to "analyze" the benefits and costs of this change, and to "defend" the new planning standard in the 2005 Least Cost Plan.

PSE has completed a detailed cost-benefit analysis that considers customers' value of reliability of service with the incremental costs of the resources necessary to provide that reliability at various temperatures. Based on the analysis, described below, PSE has determined that it would be appropriate to increase its planning standard from 51 HDD (14ºF) to 52 HDD (13ºF).

A. Overview of Analytical Method

PSE performed a comprehensive cost-benefit analysis, examining the level at which the cost of added reliability exceeds the benefit. To do this, the incremental costs and benefits of planning standards ranging from 47 to 55 HDD were estimated using 20-year model runs from U-Plan-G. These model runs incorporated assumptions from the August 2003 Least Cost Plan update.[2]

B. Estimating Incremental Benefit of Reliability Standards

The benefit of an increased peak day planning standard is outage costs avoided. Outage cost estimates are comprised of the following components:

1. Loss of Consumer Surplus

   Consumer surplus refers to the value that firm customers lose in the event of an outage.[3]

[1] The concept of heating degree days (HDD) was developed by engineers as an index of heating fuel requirements. They found that when the daily mean temperature is lower than 65 degrees, most buildings require heat to maintain an inside temperature of 70 degrees. Thus, an HDD number represents the following equation: 65 – the average daily temperature = HDD.

[2] See *Sensitivities* section at the end of this discussion.

[3] In Washington Natural Gas's (WNG) 1995 Least Cost Plan, the Company reported market research into the value that residential customers place on reliability. This analysis uses the results of that research. See discussion beginning on page IV-41, WNG's 1995 Least Cost Plan.

2. Cost of Re-lights

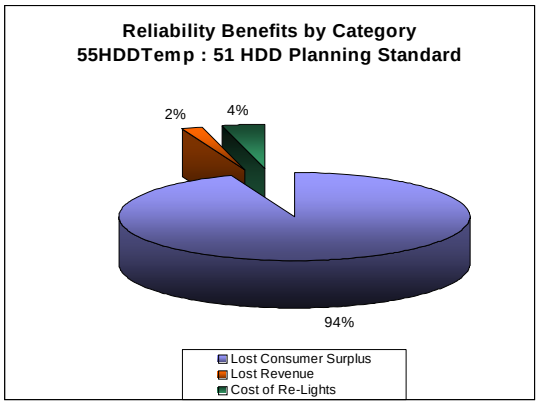
   When service to firm customers is interrupted, the Company is required to dispatch a representative to each customer's location to re-light pilot lights prior to reinstating service. This can increase the duration of an outage.[4]

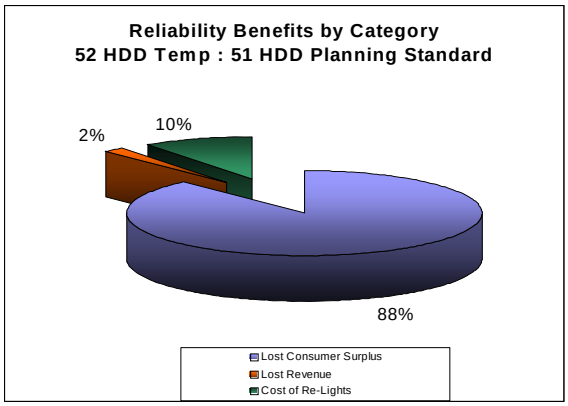
3. Lost Revenue

   When service is curtailed, customers are not paying per-therm charges.

Exhibit I-1 illustrates the makeup of outage costs at 52 and 55 HDD when planning is based on a 51 HDD standard.

Exhibit I-1
Components of Outage Costs





Once expected outage costs have been calculated, the incremental benefit of reliability is obtained by multiplying the expected cost of an outage at each planning standard by the likelihood of its occurrence. The difference in expected cost from one planning level to the next is the incremental benefit of reliability.[5] Exhibit I-2 displays these results.

[4] The cost and rate of re-lights used for this analysis were discussed with and verified by PSE's Operations department.

[5] i.e., the benefit of outage costs avoided

Exhibit I-2
Outage Costs and Incremental Benefit of Reliability

Planning Standard	Levelized Expected Cost of Outages	Levelized Incremental Benefit of Increasing One Planning Level
47 HDD (18° F)	$ 12,404,590	
48 HDD (17° F)	$ 7,208,714	$ 5,195,876
49 HDD (16° F)	$ 3,876,392	$ 3,332,322
50 HDD (15° F)	$ 1,849,700	$ 2,026,693
51 HDD (14° F)	$ 680,449	$ 1,169,251
52 HDD (13° F)	$ 145,373	$ 535,076
53 HDD (12° F)	$ -	$ 145,373
54 HDD (11° F)	$ -	$ -
55 HDD (10° F)	$ -	$ -

C. Estimating Incremental Cost of Reliability Standards

Each planning standard has a corresponding optimal portfolio. The cost of reliability is the combined cost of resources and how they are dispatched within the portfolios needed to meet different planning levels. U-Plan-G was used to estimate optimal, 20-year levelized portfolio costs at each planning criterion. The model ran incrementally using a 47 HDD planning criterion, a 48 HDD planning criterion and so on, through a 55 HDD planning criterion.[6] Exhibit I-3 shows the incremental cost of reliability at each planning standard.

Exhibit I-3
20-Year Portfolio Costs at Different Reliability Levels

	20-Year Levelized Portfolio Cost	Incremental Cost to Increase One Planning Standard
47 HDD (18° F)	$526,212,391	
48 HDD (17° F)	$526,451,036	$238,645
49 HDD (16° F)	$526,711,834	$260,798
50 HDD (15° F)	$527,134,870	$423,036
51 HDD (14° F)	$527,344,659	$209,789
52 HDD (13° F)	$527,799,812	$455,153
53 HDD (12° F)	$529,484,590	$1,684,778
54 HDD (11° F)	$532,016,091	$2,531,502
55 HDD (10° F)	$534,847,249	$2,831,158

[6] Resource and cost assumptions are consistent with PSE's August 2003 LCP Update. Updating market prices would affect the total but would not affect incremental costs.

D. Cost vs. Benefit of Reliability

Comparing incremental benefits with incremental costs at various planning levels reveals that the benefit of increasing PSE's planning standard from 51 (14º F) HDD to 52 (13º F) HDD is greater than the cost. As indicated in Exhibit I-4, the benefit increases by $535,076, while cost increases by $455,153.[7]

Beyond 52 HDD, the added costs would exceed the benefits. Therefore, PSE has elected to adopt a 52 HDD standard.

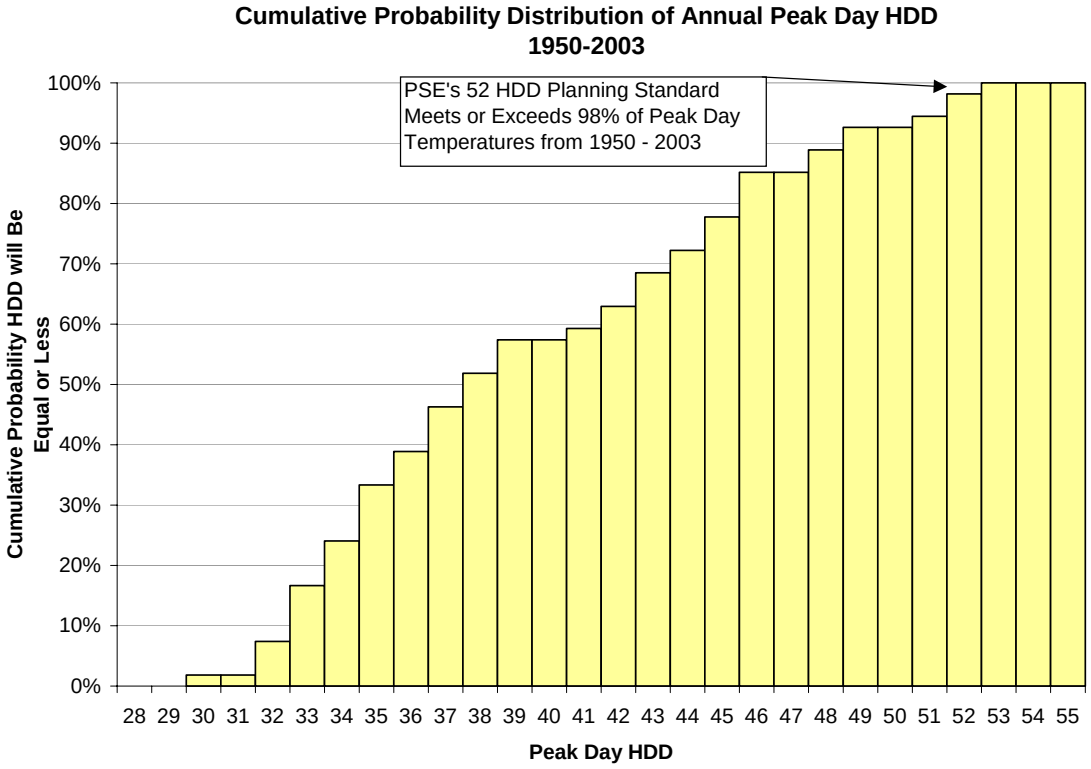
Exhibit I-4
Incremental Benefits and Costs of Reliability

Planning Standard	Incremental Benefit	Incremental Cost	Benefit/Cost Ratio
48 HDD (17° F)	$ 5,195,876	$238,645	21.8
49 HDD (16° F)	$ 3,332,322	$260,798	12.8
50 HDD (15° F)	$ 2,026,693	$423,036	4.8
51 HDD (14° F)	$ 1,169,251	$209,789	5.6
52 HDD (13° F)	$ 535,076	$455,153	1.2
53 HDD (12° F)	$ 145,373	$1,684,778	0.1
54 HDD (11° F)	$ -	$2,531,502	-
55 HDD (10° F)	$ -	$2,831,158	-

The 52 HDD planning standard provides a reasonable degree of planning cushion for firm customers. Exhibit I-5 illustrates that based on temperature data at Seatac from 1950-2003, the 52 HDD planning standard will meet or exceed 98 percent of historic peak day temperatures.

[7] This added cost translates to an increase in consumer rates of approximately $0.50 per customer per year.

Exhibit I-5



E. Sensitivities

PSE tested three variables for sensitivity to ensure that the value of reliability was not overstated.

- Value of reliability to customer (consumer surplus)
- Impact of lost margin
- Effect of the cost and timeliness of re-lights

Exhibit I-6 illustrates the results of this testing, which support a decision to increase PSE's planning standard from 51 to 52 HDD.

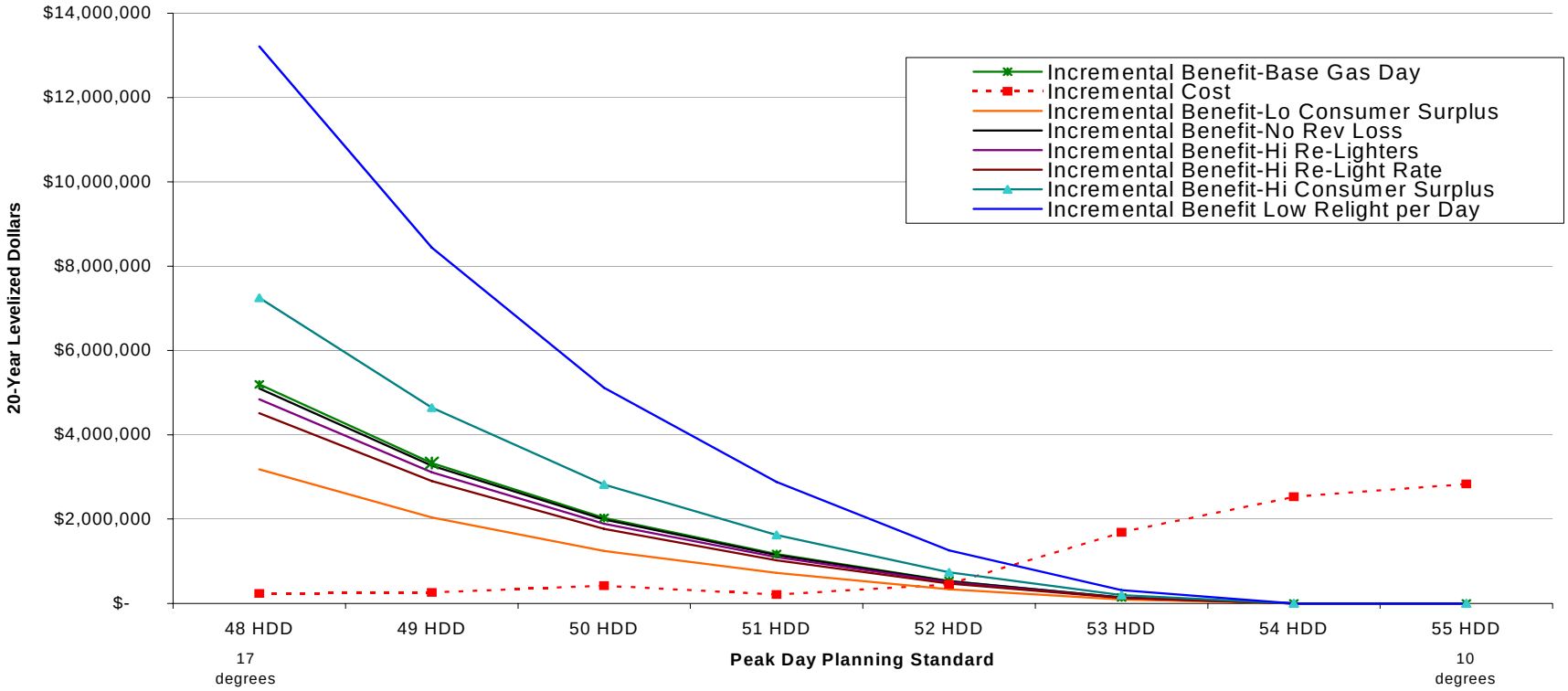
Exhibit I-6
Efficient Standards for Sensitivity Variables

SENSITIVITIES/ASSUMPTIONS	EFFICIENT STANDARD
Base Case	52 HDD
High Consumer Surplus	52 HDD
Low Consumer Surplus	51 HDD
No Lost Revenue	52 HDD
Fast Rate of Re-lights and Low Cost	52 HDD

Only the Low Consumer Surplus variable indicates that the benefit of moving to a 52 HDD standard falls slightly below the cost. Exhibit I-7 is a chart that illustrates the incremental benefits and costs of the various sensitivities. Given that the magnitude of the shortfall in the Low Consumer Surplus is minimal, it did not affect PSE's decision to adopt a 52 HDD planning standard.

Exhibit I-7

Incremental Benefits and Costs of Planning Standards
Scenario Sensitivities
Gas Day Weather



This chart indicates increasing PSE's peak-day planning standard to 52 HDD is supported by all scenarios except the Low Consumer Surplus scenario. The Low Consumer Surplus scenario falls just short of the 52 HDD threshold and supports the current 51 HDD standard.