

1 **Q. Please state your name, occupation and business address.**

2 A. My name is John A. Hanson. I am employed by NW Natural (company),
3 as Director of Integrated Resource Planning at One Pacific Square, 220
4 NW Second Avenue, Portland, Oregon 97209-3991. I report to the
5 Manager of Rates and Regulatory Affairs.

6 **Q. Please describe your educational and professional background.**

7 A. I received a B.S. in Financial Management from California State
8 University, Sacramento, in 1967; an M.A. in Economics from the
9 University of Oregon in 1971; and the Ph.D. in Economics from the
10 University of Oregon in 1972. My particular areas of study and expertise
11 are economic theory, urban and regional economics, and monetary theory
12 and policy. I have studied and conducted numerous applications of
13 economic analysis and statistics to urban and regional problems in the
14 Pacific Northwest.

15 Before joining NW Natural in January of 1980, I conducted
16 graduate level seminars in urban and regional economics in the Urban
17 Studies Ph.D. program at Portland State University (1971-79). For NW
18 Natural, I conduct financial and planning studies involving analysis of gas
19 supply and utilization under the range of conditions which, at present or in
20 the future, may confront the company. As Director of Integrated Resource
21 Planning, I am responsible for coordinating and assuring consistency
22 among planning studies, particularly long-term gas requirements and
23 supply analysis affecting future operations which cross divisional lines. I

1 have undertaken numerous evaluations of new customer financial
2 performance, main extension policy, and the incremental cost of serving
3 new customers.

4 **Q. What is the purpose of your testimony on the company's 1995 IRP
5 and Storage Development Strategy?**

6 A. The purpose of this testimony is to support the company's decision to
7 invest in new underground storage and, therefore, the testimony supports
8 inclusion of Phase II and part of Phase III of Mist underground storage
9 facilities and associated O & M in rates. My testimony summarizes the
10 1995 Integrated Resource Plan's (1995 IRP or Plan) favorable findings
11 regarding development of underground storage and provides additional
12 information updating the data and results of the 1995 IRP.

13 **Q. What did the Plan say about underground storage development?**

14 A. The company's 1995 IRP determined that additional capacity was required
15 to meet load growth (firm sales) on the company's system. The Plan
16 evaluated multiple alternatives to underground storage and found that
17 underground storage development was clearly the least cost means of
18 meeting future load growth. Over 110 linear programming (LP) model
19 runs were completed to evaluate resource selections under a variety of
20 assumptions regarding load growth and the cost of alternative supply and
21 demand side resources. In all cases, underground storage development
22 and its related infrastructure investments were less costly than meeting
23 load growth with additional interstate pipeline capacity.

1 The Plan's linear programming results quite strongly favored
2 storage over pipeline contract demand and DSM measures. In 1995, the
3 company tested the "robustness" of the model's storage preference by
4 changing a number of variables such as pipeline contract demand (CD)
5 costs, commodity costs, summer/winter price differentials, and storage
6 development costs. The results were unchanged over a very broad range
7 of test input assumptions. The vigor with which the Linear Programming
8 (LP) model preferred storage provides a broad comfort band with respect
9 to the "least cost" nature of this resource. It also provides a wide band of
10 options within which optimal storage development scenarios can be
11 planned.

12 The company believes that the 1995 IRP contains sufficient
13 information and analysis to support the conclusion that sequential
14 investments in Mist storage facilities are the least cost supply alternative
15 for its customers. Therefore, the 1995 IRP supports the conclusion that
16 the company's investment in Phase II and Phase III facilities is prudent
17 and should be approved by the Commission. The company incorporates
18 the 1995 IRP in this case by this reference.

19 **Q. Have there been any changes in the fundamental assumptions**
20 **underlying the company's storage development strategy?**

21 A. Amazingly, little has changed during a period of time witnessing some of
22 the greatest institutional restructuring, legislative and regulatory changes
23 ever in the energy industry. The cost of storage development relative to

1 acquiring additional pipeline capacity has not changed since completion of
2 the company's 1995 Plan. The cost and time required to obtain Oregon
3 Energy Facility Siting Council and other planning agency approvals for
4 transmission facilities has risen, but not to the point of calling storage
5 development into question. Supporting load growth through additional
6 pipeline capacity would involve the same, if not identical, transmission
7 infrastructure siting issues. Our experience in Oregon suggests that
8 Demand Side Management options are less cost-effective than originally
9 envisaged in the 1995 Plan. All in all, the case for investing in market-
10 area underground storage development is stronger today than it was in
11 1995.

12 **Q. Does the WUTC letter, dated January 16, 1997, accepting the**
13 **company's 1995 IRP in Docket No. UG-96049819 speak to the**
14 **prudence of pursuing an underground storage development**
15 **strategy?**

16 A. The Commissioners speak directly to Mist storage in two places:

17 " ... the Company is very close to being in resource balance
18 between current resources and expected demand; and, expanding
19 storage is the least cost way of adding resources (letter, p. 2).

20 " ... Commission Staff is comfortable that the Company accurately
21 modeled alternative resources (including associated distribution
22 investments), so that expanding storage appears to be a well modeled
23 decision" (letter, p.2).

1 While the acceptance letter does not constitute a determination of
2 the rate-making treatment of any resource acquisition undertaken in
3 accordance with the Plan, the company believes that the acceptance
4 letter's findings support the company's decision to move forward with
5 subsequent phases of Mist storage development.

6 **Q. Please discuss the on-going resource evaluation process used by**
7 **NW Natural to ensure that proposed storage expenditures are**
8 **consistent with the company's IRP and at least cost to consumers**
9 **over time.**

10 A. Following the development and acceptance of the company's 1995 IRP,
11 several reexaminations of storage development cost and resource
12 scheduling were undertaken. The 1995 Plan's approach to underground
13 storage development was "lumpy" and did not fully recognize the
14 divisibility of project elements. The Plan introduced the "just-in-time"
15 concept of scheduling storage development phases at pages C-32 and C-
16 33, where storage development timing was modified from that indicated by
17 LP model solutions. However, the resulting phased capital expenditures
18 were not shown in the Plan. The following table shows how planned
19 capital expenditures change as the planning and phasing process moves
20 forward. The company's planning adheres to the just-in-time concept,
21 consistent with the possibility that legislative, regulatory, or energy market
22 changes could alter the company's current plans.

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Comparison of Capital Expenditure Scenarios (X\$1000)

<i>Calendar Year</i>	<i>1995 IRP (by Heat Season)</i>	<i>KTI Fish Concept Design (10/96)</i>	<i>Acceleration Scenario No. 5 (8/25/97)</i>	<i>Capital Budget (4/3/98)¹</i>	<i>Cash Flow Analysis (1/4/00)²</i>
ONGDC					
Asset Trans		\$2,431	\$2,431	\$2,431	\$2,431
1996		\$2,316	\$2,316	\$2,316	\$2,562
1997	\$66,704	\$16,300	\$16,300	\$17,030	\$17,930
1998	\$32,517	\$6,100	\$6,100	\$13,110	\$8,368
1999		\$18,100	\$26,161	\$34,680	\$32,990
2000		\$17,500	\$37,746	\$3,599	\$10,281
2001		\$16,300	\$8,190	\$11,224	\$1,500
2002		\$20,800	\$3,510	\$28,853	\$43,825
2003		\$9,300	\$9,300	\$6,565	\$500
2004	\$115,575	\$17,900	\$17,900	\$13,988	\$10,900
Totals	\$214,797	\$127,047	\$129,954	\$133,796	\$131,287

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Each phase of the Mist storage development plan is reviewed at the time of chartering to ensure that the underlying need criteria have been met. The project charter lays out the broad parameters of the project, including the scope, schedule, resource requirements, and organization. The project charter becomes the foundation upon which the project team can construct a plan to complete the project within the set parameters.

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Changes to the long-range storage development plan could occur as new information is made available to or is uncovered by the storage development team. For example, the results of a new injection/withdrawal well design might reduce the number of future wells in new storage

1 Includes project administration cost, other years' capital budgets do not.

2 See Exhibit ___ (JAH-Exhibit/1) for further details.

1 reservoirs. These changes are then incorporated into the long-range plan
2 and reflected in the multi-year capital plan for storage development as it is
3 updated annually.

4 **Q. Has NW Natural considered what effect changes in natural gas**
5 **markets or regulatory policy could have on its Mist acquisition**
6 **strategy?**

7 A. Yes. NW Natural is aware that many entities would like to see LDCs such
8 as NW Natural exit the merchant function either partially or fully. It is
9 possible that regulatory or legislative directives to accomplish this could
10 happen. Nevertheless, the company has no indication that it will be
11 required to exit the merchant function now or in the near future. Until such
12 a requirement if any is made, NW Natural will continue to plan and act to
13 serve the supply requirements of its firm sales customers, consistent with
14 the need to act in sufficient time to bring necessary resources on line. The
15 company has done exactly that with each storage project phase.

16 **Q. Based on the testimony of Mr. Friedman [Exhibit 15 (RSF-**
17 **Testimony)] regarding the company's existing firm resource**
18 **capability and further based on the company's best information**
19 **about peak load requirements, does the company need the Phase II**
20 **and III Mist storage facilities to meet the resource needs of its firm**
21 **sales customers?**

1 A. Yes. The Phase II and III facilities are currently required if the company is
2 going to meet the winter-peak gas requirements of its firm sales
3 customers.

4 **Q. Has the company recently examined its firm loads to determine**
5 **whether the facilities are still needed in the 1999/2000 heating**
6 **season?**

7 A. Yes. Exhibit 14 (JAH-Exhibit/2) provides a graphic comparison of recent
8 peak day forecasts. In February of 1997, NW Natural recalibrated the
9 residential and commercial use factor equations used in the 1995 IRP,
10 and found a significant increase in peak day and peak seasonal loads
11 compared to the 1995 IRP analysis. Both near-term and long-term peak
12 requirements had increased. Current requirements increased by
13 approximately 500,000 therms per day, and out-year requirements
14 increased by more than 800,000 therms per day. This analysis indicated
15 that a potential deficit situation existed when new requirements forecasts
16 were compared to the 1995 IRP base case scheduling of capacity
17 additions. Another update of use factor equations followed the 1996/97
18 heating season and continued to show a near-term increase in peak
19 requirements above those shown in the 1995 IRP forecasts (not shown in
20 Exhibit 14 (JAH-Exhibit/2). However, due to reduced estimates of peak
21 use by the residential new construction customer group, out-year
22 requirements appeared lower than in the February 1997 update.

1 Finally, our most recent “from the ground up” forecast revision is
2 shown as the 1998 Forecast Update in Exhibit 14 (JAH-Exhibit/2). This
3 forecast indicates a need for approximately 800,000 therms of capacity
4 beyond that shown in the 1995 IRP for the 1999/2000 heating season.
5 For the 2003/04 heating season, expected peak requirements exceed the
6 1995 forecast by approximately 1,000,000 therms.

7 **Q. Does the forecasting methodology remain the same in all three peak**
8 **day requirements forecasts?**

9 A. Use factor equations are calibrated in a statistically identical manner for all
10 three forecasts presented in Exhibit 14 (JAH-Exhibit/2). However, use
11 factors for new business categories such as residential new construction
12 are now based on several years of consumption history rather than one
13 heating season as was the case in the 1995 IRP and February 1997
14 update. In addition, the 1998 update also includes a true up of customer
15 counts and a near term forecast of customer gains based on a different
16 method than that used in the 1995 IPR. Specifically, customer additions in
17 the 1999-2000 and subsequent heating seasons are based on economic
18 and demographic drivers found in Oregon and Washington Executive
19 Department Revenue Forecasts rather than the Northwest Power
20 Planning Council’s Economic and Demographic Forecast for the 1996
21 Power Plan.

22 **Q. Are preliminary forecast results available from the company’s 2000**
23 **Integrated Resource Plan?**

1 A. Not at this time. An informal update of use factor equations undertaken In
2 the late Fall of 1999 suggests that the 1998 update results still provide
3 reasonable guidance for the evaluation of requirements and supply
4 balances. Of course, the 2000 Plan's forecast results will be available
5 during the pendency of this proceeding and will be shared with WUTC
6 Staff.

7 **Q. Please describe the 1998 updated forecast in relation to NW Natural's**
8 **peak day capacity.**

9 A. The horizontal line in the chart at Exhibit 14 (JAH-Exhibit/2) follows from
10 Mr. Friedman's summary of supply resources presented in Exhibit 16
11 (RSF-Exhibit/5). Total deliverability without Mist is denoted "Non-Mist
12 Supplies". Total Firm Supply is shown as a sequence of upward steps
13 that trace existing and planned deliverability from Mist storage. The 1998
14 updated peak day forecast is denoted with a "square or box" symbol and
15 indicates a deliverability deficit for the 1999/2000 heating season of
16 approximately 100,000 therms. Other deficits are shown for future heating
17 seasons with the largest (over 200,000 therms) occurring in the 2001/02
18 heating season. It should also be noted that the point forecast of peak
19 day requirements has a 90 percent confidence interval of plus, or minus,
20 500,000 therms, based on the February 1989 cold weather event, and
21 would likely be somewhat larger today due to load growth.

22 **Q. Please explain the role of the category of supply resources identified**
23 **as recallable in Mr. Friedman's testimony.**

1 A. Taking advantage of opportunities to acquire flexible access to pipeline
2 capacity allowed the company to bridge the gap between existing supply
3 resources and escalating estimates of peak day requirements. Prices for
4 recallable capacity range between full TF-1 rates for capacity acquisitions
5 reinforcing specific delivery points of strategic importance, to less than one
6 half of maximum TF-1 rates for generic capacity. Mr. Friedman provides
7 details of these short-, medium-, and long-term arrangements Exhibit 16
8 (RSF-Exhibit/4). Had these options not been exercised, the indicated
9 1999/00 heating season deficit would be much larger and the need to
10 accelerate underground storage development much greater.

11 **Q. Has the company considered investments in distributed resources**
12 **for peak shaving purposes?**

13 A. The company is aware of potential infrastructure cost savings from
14 distributed resources strategically located in areas where low distribution
15 system pressures occur during severe weather. These options include
16 propane air systems, trailer based liquefied natural gas (LNG), satellite
17 LNG (with and without liquefaction capability), geographically-targeted
18 DSM, and geographically-targeted rate designs.

19 The company recently conducted an exploratory evaluation of
20 siting, cost, and design requirements for potential distributed resources
21 within the company's distribution system. This evaluation found limited
22 potential in the cases examined, but helped to identify situations where
23 distributed resources may lower costs. However, additional analysis is

1 required. This alternative was, therefore, not a viable or timely alternative
2 to Phase II and III facilities.

3 **Q. How do the company's Washington customers benefit from storage**
4 **investments that are physically situated in Oregon?**

5 A. Washington customers benefit in two principal ways: (1) Lower gas costs
6 as represented by the system Weighted Average Cost of Gas (WACOG),
7 and (2) lower incremental capacity costs through the avoidance of higher
8 pipeline capacity charges. Oregon and Washington customers benefit
9 from the avoidance of high-cost winter gas supplies that command prices
10 substantially above the summer gas prices that are typically paid for gas
11 placed in storage. If Washington customers did not participate in the price
12 arbitrage opportunities provided by underground storage, a Washington
13 gas supply portfolio would have a much larger share of winter priced gas
14 and a smaller share of gas purchased at summer prices. The Washington
15 WACOG would be higher.

16 Washington customers also benefit from capacity cost savings. For
17 planning purposes, NW Natural uses \$0.056 as the cost of an additional
18 therm per day of pipeline capacity utilized at 100 percent load factor
19 (*excluding* associated transmission infrastructure). This represents the
20 demand-weighted cost of capacity on all pipeline systems that would
21 result from a balanced expansion of peak day deliverability. On the other
22 hand, the levelized cost of a 30-year sequence of storage development
23 investments (*including* associated transmission infrastructure) amounts to

1 \$0.029 per therm per day at 100 percent load factor. As system peak
2 day requirements grow, the company intends to increase Washington
3 pipeline gate station Maximum Daily Delivery Volumes with offsetting
4 reductions in MDDV's at Oregon gate stations – reductions made possible
5 by storage development. In effect, Washington customers get increased
6 pipeline capacity at storage development prices.

7 **Q. Does this conclude your testimony?**

8 A. Yes.