Q. Please state your name, business address, and title.

A. My name is Charles E. Stinson. My business address is 220 NW Second Avenue, Portland, Oregon, 97209. I am General Manager of the Engineering Services & Storage Development Department for NW Natural (company). I am a registered Petroleum Engineer in the state of Oregon and have been employed by NW Natural and its affiliates continuously since 1978.

Q. Have you ever testified before?

A. Yes, I have testified before the Oregon Energy Facility Siting Council and the Oregon Public Utility Commission, but I have never testified before the WUTC.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe the additions NW Natural has made to the company's underground storage facilities at Mist, Oregon since 1997. For convenience, I will refer to the new facilities as "Phase II" and "Phase III." The existing facilities that went into service in 1989 I will simply call "Mist."

Q. Please describe the Phase II Mist facilities.

A. Attached to my testimony as Exhibit 12 (CES-Exhibit/1) is a site map of the Mist area. The site map identifies the Mist storage facilities currently in service, including the Phase II and III facilities that were installed in 1998 and 1999 that are the primary focus of this testimony.

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Phase II facilities, which went into service in November, 1998, include all of the following:

1. One new reservoir (Al's Pool in the Calvin Creek Storage Area) fully developed with three injection/withdrawal wells and two observation wells. This new reservoir and associated wells provide incremental capacity of approximately 2.0 Bcf of working gas and 100 MMcfd of design day deliverability.

2. Miller Station capacity, upgraded to 150 MMcfd maximum throughput. This upgrade was achieved by the following:

- replacing two existing 550 BHP reciprocating compressors with a new centrifugal compressor rated at 5,035 BHP (rated per site conditions);
- updating the control system for increased capacity and reliability;
- increasing header capacity within the station to accommodate the increased throughput.

Note: Additional minor improvements to Miller Station scheduled for completion during 2000 will improve the total station capacity to approximately 235 MMcfd.

3. A new gathering system (parallel 16” pipelines), including electrical service and a communication link to the Calvin Creek Storage area.

Q. Please describe the Phase III Mist facilities.

A. The Phase III facilities that were put into service in December, 1999 (there are additional Phase III improvements scheduled to be completed during 2000), consist of 27.5 miles of 24" pipeline, sometimes called the South Mist Feeder Loop (SMFL). The SMFL parallels the 16" South Mist Feeder for most of its route. The SMFL serves two key functions related to underground storage at Mist:

1. This pipeline's sole operating function is to deliver gas from the storage field to the existing distribution system. Together with the existing 16" South Mist Feeder, It improves the capacity of the storage delivery system to 192 MMcfd.

2. The SMFL is the first leg of a pipeline expansion plan that will have the capability of delivering increased quantities of Mist storage gas to populated areas west and south of Portland. NW Natural's Phase IV & V Mist expansion projects include an additional 52 miles of 24" pipeline to be built from the terminus of the Phase III pipeline to the Molalla gate station where NW Natural's facilities connect with Williams Pipeline - West. Once completed, the combined delivery capacity of this pipeline system from Mist into the distribution system serving the Portland Metropolitan and Salem areas will be approximately 390 MMcfd.

Q. Will the company make further additions to the Mist facilities in addition to Phases II & III?

A. Yes. Phase II, completed in 1998, was the first of several Mist expansion projects designed to increase the ultimate deliverability of Mist storage to 425 MMcfd by year 2008. This phased development plan, Exhibit 12 (CES-Exhibit/2), is the least cost alternative for providing adequate gas supplies to NW Natural's rapidly growing customer base. The phased development plan includes not only the actual development of additional storage resources at Mist, but also improvements to the delivery system that will transport the storage gas into the Portland load centers discussed

earlier. The phasing of this project corresponds with anticipated load growth forecasted in the company's Integrated Resource Planning, which is described in more detail in Exhibit 13 (JAH-Testimony). The timing of subsequent phases can be compressed or extended in response to actual customer growth.

Q. Are any of these additional facilities included in the company's filing?

A. No. The next phases are described only because the company has a "phased" strategy for storage development. These facilities are not part of this rate filing.

Q. In anticipation of the next phases of Mist expansion, did the company pre-build any facilities?

A. Yes. The company's chief goal in "phasing" its Mist development activity was to avoid "lumpiness" of investment and the large revenue requirements associated with lumpiness. Also, as explained by Dr. Hanson, the company is pursuing a "just-in-time" strategy, which will allow course corrections if change in markets or regulatory requirements occur. Nevertheless, the facilities were designed and constructed with phased expansion in mind. If the company believed that cost savings or operational advantage and safety could be achieved by either advancing or delaying construction, the company could opt to take advantage of the opportunities.

Regarding cost savings, the company pursued advance construction where the incremental cost of building during Phases II & III were significantly less expensive than the anticipated cost of reconstruction at a later date. Specifically, during Phase II our design engineering company, KTI Fish, estimated the cost impact of pre-building the Miller Station headers, compressor building, and dehydration system for expansion to 300 MMcfd, rather than building it just to the Phase II design rate of 145 MMcfd. They estimated an incremental cost of $370,800 to install these facilities during Phase II, compared to an estimated future cost of $1.4 million (in 1998 dollars) to rebuild these same facilities to achieve the future requirement of 300 MMcfd. This is a net savings of over $1 million.[1]

Additionally during Phase II, twin 16" pipelines were installed from Miller Station to the Calvin Creek area to provide for an ultimate capacity of approximately 350 MMcfd from this area, even though one 16" pipeline could have handled all of the Phase II incremental deliverability. During the bid process for the gathering system construction, pipeline contractors provided bids for the construction of a single 16" pipeline as well as for construction of twin pipelines in the same right-of-way. Rockford Corporation was the selected bidder for the project, and their bid reflected a reduction of $14.50 per foot if NW Natural elected to install a single 16"

[1] In 1998 the "full capacity" of Miller Station was anticipated to be 300 MMcfd. Work since that time has indicated that it can be expanded to achieve a full 425 MMcfd within the existing physical limitations of the plant site.

pipeline as opposed to twin 16" pipelines. This equates to $186,281 based on the actual 12,487' length of each 16" pipeline. Utilizing this information plus our actual cost of pipe, the incremental cost to install the second 16" pipeline during Phase II was $463,400 as compared to a cost estimate of $2,203,600 (in 1998 dollars) for the future installation of the same 16" pipeline. This significant difference in costs would have been caused by the necessity of repeating certain functions for the second construction, such as mobilization of the installation crew and equipment, clearing the right-of-way, and ditching the route. It was much easier, and cheaper to do this work once.

Q. In addition to the issues related to costs, were there other considerations around pre-building certain facilities?

A. Yes, there were also safety and operational considerations. The company's primary concern when doing significant construction in or around any of the storage facilities while they are operational is safety. Storage is a critical component of NW Natural's winter supplies, so construction activity must be scheduled so as not to impact the facilities' operational mission. Normal conditions dictate that the Mist storage facility is operational most days of the year (for injection or withdrawal) with very little equipment downtime. To accommodate the operational requirements during Phase II a significant amount of the rebuild at Miller Station was accomplished with the facility online. This work was accomplished with a great emphasis on safety and without a single

significant incident. Future work will not involve the major below-grade facilities (headers, valve manifolds, piping, etc.) which were installed during Phase II minimizing both operational and safety issues.

Q. Does the fact that the company has pre-built some facilities in anticipation of new phases mean that the facilities are not currently used to serve customers?

A. No. These facilities are currently being used to serve customers, although they may not be used at full capacity until subsequent phases are placed into service. This situation is comparable to the installation of a backbone feeder that is installed to serve developing markets. The line currently serves existing customers, but it will also permit additional service to future customers.

Q. How do the pre-built facilities serve existing customers?

A. With regard to the twin 16" gathering lines, both lines will be used effective with the in-service date for both gas injections and gas withdrawals. Having the looped gathering system improves the overall deliverability from Al's Pool, the first Calvin Creek storage reservoir, because it permits withdrawal at higher pressure, producing higher withdrawal rates. The looped gathering lines also improve reliability because an equipment failure or flow blockage in one line, which typically would occur during high flow (cold weather) periods, would not result in failure of the entire gathering system. Last, the looping means that injections can occur more efficiently. Less horsepower is required for the injection cycle because

there is less pressure loss associated with injections through a looped system. The gathering systems for the Bruer and Flora reservoirs are looped as well, which is one of the reasons why those reservoirs have performed so well.

At Miller Station, the pipes, headers, and valves installed during Phase II are being used to provide service to current customers. Like the looping of the gathering system, Miller Station's enhanced capacity permits more efficient and reliable service by minimizing the pressure drops through the facilities.

Q. Does this conclude your testimony?

A. Yes.