Office of Pipeline and Producer Regulation
Washington, D.C. 20426

EXHIBIT NO. ____(PRC-1)

PREPARED DIRECT TESTIMONY OF

PATRICK R. CROWLEY

<u>WILLIAMS NATURAL GAS COMPANY</u>
DOCKET NO. RP91-152-000

Federal
Energy
Regulatory
Commission

WASHINGTON, D.C.
JANUARY 15, 1991

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FEDERAL ENERGY REGULATORY COMMISSION

OFFICE OF PIPELINE AND PRODUCER REGULATION

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SUMMARY:

Mr. Crowley testifies in regard to the appropriate depreciation rate for storage plant; an adjustment to WNG's Mcf•mile study to take into account the use of non-discounted volumes and the use of storage during the peak day deliveries; the amount of storage activity used to support sales and transportation services; and the amount of storage capacity to made available to customers converting from firm sales service to firm transportation service.

Q. Please state your name and address.

A. My name is Patrick R. Crowley. My business address is 825 North Capitol Street, Washington, D.C. 20426.

Q. By whom are you employed and in what capacity?

A. I am employed by the Federal Energy Regulatory Commission as an Industry Economist in the Depreciation Branch of the Gas Pipeline Rates Division.

Q. What is your educational background?

A. I graduated from DePaul University in 1976 with a Bachelor's Degree in Economics and again from DePaul with a Master's Degree in Economics in 1978.

Q. What are your duties at the Federal Energy Regulatory Commission?

A. My duties at the Commission include the responsibility for the analysis and development of the proper and adequate depreciation rates to be utilized by oil and natural gas pipeline companies in the recoupment of the capital cost of physical property, the development of mcf•mile studies on gas pipelines, and the analysis of storage filed capacities.

Q. Have you filed testimony in any other Commission proceedings?

A. Yes, I have filed testimony in the following rate cases:

Black Marlin Pipeline Company, RP81-67-000
National Fuel Gas Supply Corp., RP83-105-000
Tarpon Transmission Company, RP84-82-000
National Fuel Gas Supply Corp.,RP86-136-000
Pacific Gas Transmission Co., RP87-62-000
Sea Robin Pipeline Company, RP88-181-000
Paiute Pipeline Company, RP88-227-000
U-T Offshore System, RP89-38-000
Southwest Gas Storage Co., RP89-60-000
Tarpon Transmission Company, RP84-82-004

In addition to the testimony I filed in those cases, I have prepared and supported Staff positions in many other oil and natural gas pipeline company cases over the last several years which were resolved by settlements prior to the filing of testimony.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of this testimony is to present my analysis as to the appropriate depreciation rates for Williams Natural

Gas Company (WNG) gathering and storage plant in service; present my adjustments to the Mcf•mile study made by WNG; and present my recommendations in regard to the appropriate level of Account No. 858. My testimony includes this written prepared testimony, Exhibit No.____(PRC-1), explaining the derivation of the storage depreciation rate; my adjustment to the Mcf•mile study; my analysis of the amount of storage activity which is used to support sales and transportation services on WNG's system; and finally, my proposal of a level of storage capacity and deliverability which should be made available upon conversion from sales service to transportation service. The supporting documents contained in Exhibit No.___(PRC-2) include a set of workpapers showing the calculations of the depreciation rates, adjustments to the MCF•mile study, and the calculations of storage usage and capacities.

DEPRECIATION

Q. What is the purpose of depreciation?

A. The purpose of depreciation is to spread the recovery of the capital cost of physical plant over the useful life of the facilities. That schedule of recovery, the depreciation rate, must be periodically reviewed to ensure the appropriateness of the recovery. This ensures that the capital costs are paid for by those customers that are using the plant and that those customers are paying no more than their fair share of the capital costs.

Q. Please define depreciation.

A. Depreciation, as defined by the Uniform System of Accounts prescribed for Natural Gas Companies, 18 C.F.R. Part 201 (1990) is:

> the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of gas plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities and in the case of natural gas companies the exhaustion of natural resources.

Q. How is this loss of service value spread among the accounting periods and customers?

A. There are two generally accepted depreciation accounting methodologies used to recoup the plant investment over the life of the facilities for natural gas pipelines. These are the Straight Line Average Remaining Life (ARL) method and the Unit Of Production (UOP) method. Both methods seek to distribute the cost of the plant investment in a manner consistent with the actual use of the system. The Straight Line ARL method spreads the cost over the number of years that the facility is expected to provide a useful service while the Unit Of Production method spreads the costs over the number of units expected to flow through the system over its estimated life-span.

Q. What are WNG's current depreciation rates, what has WNG filed for in this case, and what are your recommendations?

A. The prefiled rates, WNG's filed rates, and my recommended rates are as shown below:

Plant	WNG's Prefiled Rate	WNG's Filed Rate	Staff's Proposed Rate
Production	4.10%	2.50%	2.50%
Prod. Ext.	4.80%	4.80%	4.80%
Gathering	4.10%	1.30%	1.30%
Storage	3.33%	3.33%	1.67%
Transmission	2.30%	2.30%	2.30%

The gathering rate reflects the composite depreciation rate for the seven gathering areas. All other categories of plant should retain the existing depreciation rate.

Q. Why have you recommended a change in the storage plant depreciation rates?

A. It is my opinion that WNG's current and proposed depreciation rate for the storage facilities is beyond the zone of reasonableness and in excess of what is needed for an adequate recovery of its investment.

Q. What leads you to believe that WNG's storage depreciation rate is beyond the zone of reasonableness?

A. If you calculate the remaining life that is implicit in the existing depreciation rate, that is, divide the net plant ratio (i.e., the net undepreciated plant divided by the gross plant investment) by the depreciation rate (38% / 3.33%), you find that WNG's current depreciation rate would recoup the storage plant within 11.5 years. These calculations are shown on the bottom of Schedule No. 2 of Exhibit No.___(PRC-2).

Q. What do you believe is the zone of reasonableness for WNG's remaining economic life?

A. I believe that the zone of reasonableness lies in the neighborhood of 25 years. As I will discuss later in my testimony, I have recommended depreciation rates for the storage plant based on a life expectancy of 25 years in conjunction with the transmission plant life expectancy.

Q. Please explain how you determine a depreciation rate in general.

A. To determine the appropriate depreciation rate, one must first find the amount of the plant in service needed to be recouped. This is done by finding the depreciable plant in service and subtracting the reserve for depreciation. This remainder, the net plant, is then divided by the estimated remaining life. The result is an annual depreciation expense which is then divided by the depreciable plant in service to arrive at the annual depreciation rate. The difficulty, of course, is estimating the appropriate life expectancy. I will discuss the life expectancies along with the depreciation rate derivation for the storage plant later.

Q. What methodology did you use to calculate the depreciation rates for the storage plant?

A. I used the straight line average remaining life (ARL) methodology for the storage plant because these facilities are not tied to any particular supply sources. These facilities are used to store gas from all of WNG's gas supply points and improve the operational efficiency and peak day deliverability of the system. Thus their life expectancy is based on total gas supplies available and to be available to the WNG system. In this methodology, the net plant (which is the plant in service minus the reserve for depreciation) is simply divided by its estimated average remaining life to arrive at the dollars to be recouped each year. This expense is then divided by the gross plant to arrive at the depreciation rate. Another way of looking at this method is to divide the ratio of the net plant in service and the gross plant in service by the average remaining life to arrive at the percentage of plant that must be recovered each year, which is the same as the depreciation rate. These calculations are shown at the bottom of Schedule No. 1 of Exhibit No.___(PRC-2) and are labeled Base Rate Derivation.

Q. Please describe Schedule No. 1.

A. Schedule 1 shows the calculation of the composite depreciation rate for the storage plant. It includes the existing gross plant in service as of February 28, 1991, the end of the base period, and a depreciation rate appropriate to recoup the existing net plant over its average remaining life as described above. Schedule No. 1 also includes the near term plant additions along with an appropriate depreciation rate for each vintage year of additions. The existing net plant is divided by 23 years to arrive at the base depreciation rate, that is, the rate that will recoup the existing plant in service over its useful life. This 23 years is the estimated average remaining life of the plant in operation today.

Q. How did you arrive at the remaining life of 23 years?

A. My estimate of the life expectancies for the physical plant of the WNG system is based on the long term general supply and demand for natural gas in WNG's supply area. The WNG system is connected to the Hugoton and Panhandle Fields, two of the largest producing fields in the United States, as well as several smaller fields. I have estimated the remaining life of the facilities connected to these fields to be at least 25 years.

Q. Why is the average remaining life of the existing plant 23 years when you have stated that the total remaining life of the system is approximately 25 years?

A. All of WNG's depreciable property in use today will not survive to 2016 (1991 plus 25 = 2016). Some of today's plant can be expected to be retired, for any number of reasons, between now and 2016; therefore, the average life expectancy of WNG's facilities must be somewhat shorter than 25 years. In depreciation studies in general, an attempt is made to estimate that shorter life expectancy by examining the history of plant additions and retirements to find the underlying pattern of plant mortality which gives rise to the interim retirements expected to take place between the study date and the last year of company operations. I estimated the probable impact of such a study to be a reduction in the average remaining life by about two years.

Q. On what do you rely for your assumption that there will be gas available in the year 2016?

A. The Department of Energy Energy Information Administration's Annual Outlook For Oil And Gas 1991 presents the long term projections for energy supply and demand out to the year 2010. The forecasts for the "Reference" model indicate a domestic natural gas production (Schedule No. 3) in the Midcontinent area beginning at a level of 3.45 Trillion Cubic Feet (TCF) in 1990 and rising to 3.70 TCF in 2000. Thereafter, the production levels decline to 2.67 TCF by 2010. On the demand side (Schedule No. 4), consumption of natural gas in WNG's market area (referred to as Federal Region 7; Nebraska, Kansas, Iowa, and Missouri) begins at a level of 0.84 TCF in 1989 and rises to 1.21 TCF by 2000. Thereafter it declines to a level of 1.13 TCf by 2010.

Q. What do these figures tell you?

A. What these figures tell me is that production of natural gas in WNG's production area is expected to grow until approximately the year 2000 when it peaks at 3.70 TCF per year (under the reference case scenario) and then slowly taper off to 2.67 TCF. WNG's market area will also experience a growth to 2000, then a tapering off. With WNG's market area demand comfortably within WNG's supply area abilities I see no reason why the WNG physical plant should not remain used and useful out to at least the year 2016.

Q. How have you incorporated future plant additions in the depreciation rate?

A. In my calculation of appropriate depreciation rates, I have included an estimate of the plant additions for the near term future so that the rates will be applicable to the plant in service over the period for which the rates are designed. My estimate of these additions is the average of the last three years' additions. This calculation is shown for each function on Schedule No. 2.

Q. How did you arrive at the rates for the near term plant additions?

A. The rates for the near term plant additions are based on the anticipated useful life of those additions. Given that my analysis is based on a total remaining useful life of 25 years for WNG's operations, the first year's additions to plant would be expected to be used and useful for the whole 25 years, 1991 to 2016; therefore the depreciation rate for those first year addition facilities is 1/25 or 4.00%. The useful life of the second year's plant addition would be expected to be only 24 years, that is 1992 to 2016, therefore its depreciation rate is 1/24 or 4.17%. Finally, the third year's addition would be expected to last 23 years, so its depreciation rate is 1/23 or 4.35%. These rates are designed, of course, for plant that has not yet been built or put into service and so has not been depreciated at all.

Q. Have you examined WNG's as filed and revised gathering plant depreciation rates?

A. Yes. When WNG filed this RP91-152 rate case it utilized a 2.5% depreciation rate for all the (combined) gathering facilities in Mr. Malcolm's Exhibit No. 3. However, in the RP89-183 case, which was still on-going at the time, the judge ordered that the gathering rate be broken out into separate rates for each gathering area. WNG consequently filed supplemental testimony showing the derivation of seven gathering area depreciation rates in Exhibit Nos. ____(WNG-78) and ____(Revised WNG-78). Staff witness Eugene Snyder examined those rates and submitted testimony making some minor adjustments to those refiled rates in Exhibit No.___(ERS-4). In order to carry the new gathering area depreciation scheme forward into the RP91-152 case, WNG has offered new testimony with updated gathering area rates reflecting eight gathering areas, updated plant and depreciation reserve information, and updated natural gas reserves data in its Exhibit No.___(WNG-100). I have examined the most recent information supplied by WNG and the resulting depreciation rates and find them reasonable, except for the splitting of offsystem and other. This will be discussed in greater detail by Staff witness Snyder.

Dth•MILE STUDY

Q. Turning now to your analysis of WNG's Dth•mile study, will you explain why you performed this study?
A. Yes; I was asked by Staff witness Michael Oberleitner to examine WNG's Dth•mile study (submitted by Witness Daryl Johnson in Exhibit No. 1 and the Supplemental Working Papers, Volume 2 of 3) to determine the reasonableness of the weighted average length of haul on the WNG system in both Zones 1 and 2.
Q. Did you find any problems with the study submitted by WNG?
A. Yes I found two major problems with the study. The first was the use of volumes which were adjusted for discounting in the annual Dth•mile portion of the study. The second was the absence of any consideration of the impact of storage in the study.
Q. How were discounted volumes used in allocating costs and designing WNG's rates?
A. WNG's Dth•mile study was used to allocate costs and design tariff rates by Mr. Mucci; the study itself was performed by Mr. Johnson; who in turn received his annual volume estimates from Mr. Lawson and his peak day volume estimates

from Mr. Malcolm. Mr. Johnson performed the study utilizing both projected volumes and projected volumes adjusted for discounting. Mr. Mucci used the projected volumes adjusted for discounting study for the design of his rates as reflected in the figures shown on Statement J, pages 1 and 4.

Q. Please explain what you mean by discounted volumes.

A. In order to achieve certain throughput levels, WNG has found it necessary to offer discounts to certain transportation customers. This is a reduction in the tariff rate applied to the volumes actually moved. Without the tariff discounts, the actual volume moved would have been smaller. In its Dth•mile study, WNG has reflected these discounts as a downward adjustment in the actual volumes moved. In other words, if some of the gas was carried at two/thirds of the tariff rate, then that gas is shown in the Dth•mile study as two/thirds of the actual volume to be moved. When I refer to discounted volumes in the following discussion I am referring to the reduction in actual volumes moved for purposes of the Dth•mile study.

Q. Why do you object to the use of volumes adjusted for discounting for the annual Dth•mile study?

A. I object to the use of volumes adjusted for discounting in the Dth•mile study because it distorts the relationship between zones. By adjusting the volumes for discounting, that is, reducing the actual volumes to be moved, WNG causes a reduction in the Dth•miles generated in Zone 1 and thereby causes a relative increase in the weighting of Dth•miles generated in Zone 2. This shifting can be seen by looking at the weighting of volumes and Dth•miles in the study as reprinted in my Schedule No. 5. Using non-discounted volumes, that is, actual volumes moved, the Dth•miles generated by Zone 2 transportation deliveries take up 80.6% of the total Dth•miles generated by total transportation services. Discounting Zone 1 volumes more heavily than Zone 2 volumes (seen in the last column of that Schedule No. 5) results in Zone 2 taking up 84.3% of the total Dth•miles generated. When the Dth•miles are used to allocate costs, this 3.7 percent shift in the weighting necessarily shifts cost responsibility from Zone 1 to Zone 2.

Q. Mr. Lawson seems to have provided the reasoning behind WNG's use of discounted volumes in its Dth•mile study, in his Exhibit No. 4, on page 10, where he notes that the Commission in its Rate Design Policy Statement recognized the necessity of adjustments to throughput levels in calculating maximum transportation rates. Would you comment?

A. Adjusting the volumes in Zone 1 for discounting, i.e., a reduction in the actual volumes to be moved, causes a shift in the relative weighting of Dth•miles and therefore shifts costs from Zone 1 to Zone 2, clearly a subsidization of Zone 1 costs by Zone 2 customers. In its Policy Statement, (47

FERC 61,295 at 62,056) the Commission specifically states that

> The objective set forth in Section 284.7 (c)(3) was designed to prevent subsidization of the discounts by the pipeline's nondiscounted rates.

Q. What is your recommendation to Mr. Oberleitner in regard to the discounting?

A. I recommend to Mr. Oberleitner that he disregard the discounted Dth•mile study and use the Annual non-discounted Dth•mile study for his commodity determinants.

Q. Did WNG use discounted volumes in its peak day Dth•mile study?

A. No, therefore there is no need to adjust the peak day study for discounted volumes.

Q. You referred earlier to the absence of consideration of the impact of storage operations in WNG's Dth•mile study, why is that a problem?

A. Storage operations are undertaken to ensure that gas is available near the market areas for delivery in the winter season and on the peak day. Without such facilities, pipelines would have to build far more extensive facilities to bring gas all the way from the producing fields every day in the winter season and on a peak day. Building such a larger system of producing wells, pipeline, and compressor stations would most likely be a very expensive proposition. Converting an old producing field near the market areas into a storage field allows the pipeline company to hold gas nearer the market and build the larger facilities only from the storage field to the market. Thus storage fields are a cost avoidance measure. The Dth•mile study is intended to measure cost incurrence in the delivery of gas to various customer groups. The absence of consideration of storage facilities in the Dth•mile study forces the calculation of Dth•miles on the peak day as if the gas had come all the way from the producing fields, which it has not. I have no problem with the assumption of producing field-to-market gas movement on an annual basis for the commodity portion of the Dth•mile study. However, for the peak day analysis this assumption is not correct. The entire pipeline system is designed and operated with the peak day in mind (See Mr. Mucci's Exhibit No. 6, page 8 beginning on line 23). The storage facilities and operations are a part of that design as is the cost avoidance nature of those storage facilities. On the peak day a substantial portion (50%) of the system deliveries are drawn from storage (See Response to data request ARD-1, item 41, reprinted in my Schedule No. 6). That storage drawn gas travels approximately 100 miles from the storage fields to the market rather than approximately 300 miles from the producing fields.

Q. But isn't it true that the gas in the storage field has to travel from the producing field to the storage field and then to the market, a 300 some mile trip altogether?

A. Yes, the gas does ultimately travel 300 some miles to get to the market -- but not on the peak day. On the peak day at least half the gas travels only 100 miles. On an annual basis the storage operation may not have a great impact on a Dth•mile study since it merely stores the gas along its 300 mile trip. But on the peak day it has a large impact, cutting the average miles of haul for Zone 2 by about a third. The whole point of building the storage facilities is so that the gas will not have to travel 300 miles on the peak day. It is unfair to Zone 2 customers (who are already being allocated most of the costs of those storage facilities) to allocate mileage related peak day costs on the basis of Dth•miles generated over a 300 mile haul rather than the approximately 100 mile haul their gas actually takes on the peak day.

Q. How did you estimate that the gas movement from storage to market is approximately 100 miles?

A. The storage fields can be located by looking at the flow diagrams. I cannot measure precisely the average miles of haul from the storage fields to each customer so I have used Kansas City as a base reference for "the market". Kansas City lies approximately 80 miles from the cluster of storage fields south of Ottawa Station (North Welda, South Welda, Colony, and Piqua Fields). Kansas City is also approximately 88 miles from the McClouth Field and a dozen miles from the Craig Field. Springfield, Missouri, another major customer, lies further from the storage fields, approximately 180 miles from the Elk CIty storage field. Some customer groups lie closer to the storage fields, some further away. The 100 miles is simply an attempt to capture the impact of having storage fields close to the market areas.

Q. What impact does this have on the allocation of mileage related costs?

A. The exclusion of the impact of storage facilities causes a shifting of costs in a way similar to the reduction in volumes to be moved which I discussed earlier. As seen in Schedule No. 5b, by reflecting the movement of Zone 2 gas to be farther than it actually travels, WNG has generated more Dth•miles in Zone 2 relative to Zone 1 on the peak day when in fact Zone 2's share of the Dth•miles should be much lower. Necessarily, some peak day mileage related costs are thus shifted from Zone 1 customers to Zone 2 customers.

Q. How have you made the adjustment to account for the impact of storage facilities on the peak day portion of the Dth•mile study?

A. WNG has stated in its data responses that approximately half of its peak day deliveries are drawn from storage. Although further refinement is necessary, I have estimated the impact of including the storage activity on the peak day by assuming that all these withdrawals are made in Zone 2 from Zone 2 storage fields. I then prorated that half of total system peak day deliveries among the Zone 2 service groups (sales for resale, direct sales, firm and interruptible transportation) according to each one's share of total Zone 2 throughput. Each of these prorated shares of Zone 2 throughput was then assumed to move 100 miles on the peak day. The remaining throughput for each of Zone 2's service groups was assumed to move the same distance as shown in the summary sheets for the WNG Dth•mile study, approximately 320 to 340 miles. The Dth•miles thus generated were added together and divided by total throughput to arrive at the adjusted peak day average mile of haul for Zone 2 gas movements, approximately 180 miles. These calculations are shown on Schedule No. 7. These adjusted average miles of haul were given to Mr. Oberleitner to apply to his volume estimates to arrive at the Dth•miles he uses to allocate costs and design rates.

Q. You state that further refinement is necessary, please explain.

A. As I understand WNG's Dth•mile study, the miles of haul at each delivery point is calculated by prorating the actual delivery volumes from 1989 by the volume shares of all injection points in 1989 upstream of that delivery point. Those shares are then mutiplied by the actual miles to the particular injection points. The study then sums the total Dth•miles generated by deliveries at that delivery point and divides by the volume to arrive at the average mile of haul for that delivery point. This average mile of haul for each delivery point is then plugged into the study provided by WNG in the Supplemental Workpapers and multiplied by the projected volumes to arrive at the Dth•miles used to allocate costs and design rates. The further refinement would be to introduce the storage fields as upstream injection points for the peak day for both Zone 1 and Zone 2 deliveries.

STORAGE UTILIZATION IN SUPPORT OF SALES AND TRANSPORTATION

Q. Did you provide Mr. Oberleitner with a calculation showing the share of storage activity resulting from sales and transportation services?

A. Yes, I have estimated the usage of storage operations in support of sales service and transportation service for average monthly activity and peak day activity.

Q. What is your estimate of average monthly storage activity caused by sales and transportation service?

A. My calculations show that 57% of storage activities are related to sales service and 43% of the storage activities are related to transportation services, based on March 1990 to February 1991 data. As will be seen later, some of the transportation related storage activity is seasonal in nature and when storage capacity is allocated to contract storage service some of the 43% of transportation-related storage activity will be reflected as contract storage activity. Transportation customers may still desire to engage in seasonal imbalancing but with contract storage service being offered there is no guarentee that there will be space available for seasonal imbalancing. To ensure their deliveries they will have to contract for the storage service they need.

Q. How did you arrive at the estimates of 57% and 43% for storage utilization in support of sales and transportation services?

A. I arrived at those estimates by examining the WNG natural gas account for the last three years, March 1988 -- February 1991. The gas account shows all the categories of gas entering and leaving the pipeline by month. These are reproduced on Schedule Nos. 8 and 9 of Exhibit No.___(PRC-2) labelled Pipeline Receipts and Pipeline Deliveries. This welter of activity is not so neatly summarized on the graph on Schedule No. 10. To get a better picture of the activities on the pipeline I examined the net activities, i.e., gas purchases in excess of sales, storage withdrawals in excess of injections, and transportation receipts in excess of deliveries.

Q. What did these net activities reveal?

A. The net activity figures showed that the storage operation was being used for more than the sales operations of the pipeline. Schedules No. 11 and 12 reproduce the Net Sales Activity and Net Storage Activity figures. These are summarized in the graph on Schedule No. 13. It can be seen there that the storage activity for 1988 and 1989 closely follows the sales activity. That is, sales in excess of purchases are drawn from storage. However, in 1990 the storage activity loses its close correlation to sales activity, as seen in the graph.

Q. What accounted for the change in correlation?

A. The change in correlation is accounted for by the transportation activity. The figures for the transportation activity are shown in Schedule No. 14. As summarized in the graph on Schedule No. 15, transportation deliveries matched transportation receipts fairly closely through 1988 and 1989. Around March of 1990 the receipt and delivery figures began to diverge along a seasonal pattern. Receipts exceeded deliveries throughout the warmer months and deliveries exceeded receipts over the colder months. The excess gas had to go somewhere until it was delivered. It shows up in storage.

Q. Do the gas account figures support that assumption?

A. Yes. The graph on Schedule No. 16 shows the Net Storage, Net Sales, and Net Transportation figures over the last three years. It can be seen there that the three net figures are closely related. To make it clearer I added the excess purchases and excess transportation figures and then compared the result to the net storage activity. The figures are shown on Schedule No. 17 and the graph on

Schedule No. 18. It shows that the storage activity is clearly made up of both sales and transportation activity.

Q. How did you arrive at the shares for storage usage between sales and transportation?

A. Since it is the net sales and transportation gas volumes that affect storage rather than total volumes, I calculated the shares of each as a percentage of the total net activity. However, because the sales and transportation figures are sometimes offsetting in their effect on storage, I took the absolute values of each and derived the percentages. These are shown on Schedule No. 19. The first two years show that gas sales accounted for approximately 80% of the storage activity. In 1990, however, the conversions from sales to transportation begin to show up and the storage activity began to shift toward transportation services. The year March 1990 to February 1991 shows that sales service accounted for 57% of the storage activity while transportation services accounted for 43% of the storage activity.

Q. How did you arrive at the estimate for storage usage for the peak day?

A. The peak day calculations are essentially the same as the average day except that because it is the peak day there are no storage injections, only storage withdrawals. Schedule No. 20 shows the gas deliveries out of the pipeline and gas receipts into the pipeline. I have reduced the gas receipts on a prorata basis to remove the effect of fuel use. As seen on the bottom of that schedule, net sales (purchases in excess of sales) accounted for 61% of the storage activity on the peak day and transportation accounted for 39% of the storage activity.

STORAGE CAPACITY AND DELIVERABILITY FACTORS FOR SERVICE TO SALES CUSTOMERS CONVERTING TO TRANSPORTATION SERVICE

Q. Did you calculate storage capacity and deliverability factors that should be made available for contract storage service to sales customers converting to transportation service?

A. Yes.

Q. What were the results of that computation?

A. I have determined that WNG should make available for storage service to converting customers at least 0.61 units of storage deliverability for every one unit of gas converted by sales customers from sales service to transportation service. Further, WNG should make available for storage service to converting customers 26 units of storage capacity for each unit of sales converted to transportation.

Q. Why did you make that calculation?

A. Storage is an integral part of the sales service in as much as the pipeline company must purchase gas throughout the year, store it in the summer months, and have it available for delivery in the winter months. Transportation service relies on storage for imbalancing and displacement. Storage operations are not intended for seasonal balancing of transportation service gas. Transportation gas should be received into the pipeline and delivered shortly thereafter. Sales customers who convert to transportation service may still have large heating season requirements and deliveries but no seasonal storage capabilities. With substantial sales service converting to transportation such deliveries would be impossible without the seasonal storage operation. If the transportation customer is not given access to seasonal storage, it may not be able to get its deliveries and thus transportation is no longer a real option. The customer is forced to remain with the sales service. If the offer of transportation service is to be truly comparable to the sales service, it must be offered with some seasonal storage rights. My computation shows how much of the storage service should be made available to converting sales customers to achieve that comparability of service.

Q. How did you arrive at the estimated amount of storage capacity and deliverability that should be made available for contract storage service to converting customers?

A. I have used a three step approach to determine the storage that should be made available for contract storage service to converting customers. The first is to determine the capacity and the peak day deliverability of the storage system. The second is to determine the sales requirements of the WNG system. The third step is to determine the amount of annual storage capacity and daily deliverability of the storage system that should be made available.

Q. Please describe the first step.

A. Determining the capacity and peak day deliverability is found by examining the FERC Form 567, the flow diagram. In it, each of the nine storage fields is shown along with the maximum daily withdrawal and maximum seasonal withdrawal design capacities. I have summarized this information along with the annual average day and peak day injections into storage and withdrawals from storage for the operational years 1988, 1989, and 1990 on Schedule No. 22. The total capacity of the fields is 49,563 MMcf for maximum seasonal withdrawal and 1,274 MMcf for maximum daily withdrawal.

Q. Please describe the second step.

A. The second step is to determine the requirements of the WNG system. WNG's firm sales customers and firm transportation customers have entitlements to service. These represent the maximum system deliveries that WNG is obligated provide, which may or may not coincide with the actual peak day deliveries. WNG has provided these entitlement estimates in response to Kiesco's Data Request items 55 and 92, and I have included them in Exhibit No.____(PRC-3). I have summarized these entitlements by service on Schedule No. 24. The total entitlement level for firm sales and firm transportation customers is 1,897,602 Dth per day.

Q. Please describe the third step.

A. The third step is to determine the storage capabilities a converting customer shuld get. As discussed earlier, a customer converting from sales service to transportation service without access to seasonal storage service is not getting truly comparable service. To have comparable service the customer must be able to contract for seasonal storage service. Furthermore, those who have converted or will convert should be given the right of first refusal to obtain the share of storage service they would have used had they stayed a sales customer.

Q. How did you determine the shares of storage to which the converting customer should have the right of first refusal.

A. The share of storage to which the converting customer should have the right of first refusal should be at least as much as the customer's entitlements would be as prorated by the deliverability of the storage system. Because the maximum daily storage deliverability is less than the potential system entitlements (1,274,000 versus 1,897,602; seen on Schedule No. 24), the daily storage deliverability must be made available to the entitlement holders on a prorata basis. As shown on Schedule No. 24, I have reduced the maximum daily storage deliverability by 8.5% to allow for operational balancing and then divided the availability by the requirements to arrive at a 0.61 factor. The converting sales customer may contract for at least .61 units of storage daily deliverability for each unit of entitlement converted from sales to transportation.

Q. How did you arrive at the 8.5% estimate for balancing?

A. WNG was unable to provide me with an estimate of storage activity caused solely by system operations and balancing, therefore I estimated the balancing as a ratio of summer storage withdrawals to annual transportation receipts. I used summer withdrawal because there should be no seasonal need for summer withdrawals, the normal pipeline capacity should be sufficient for summer needs. Thus any summer withdrawals are probably for balancing of transportation customer imbalances. The ratio of these average summer monthly withdrawals to the transportation receipts is 8.4% for the twelve months March 1990 to February 1991. In prior years that ratio was much smaller. However, with transportation becoming an ever greater part of system operations I would expect the need for balancing capacity to reflect the more recent figure. I have rounded it to 8.5%.

Q. How did you arrive at the total storage capacity entitlement?

A. The maximum seasonal storage withdrawal capacity on WNG's system is 49,563,000 MCF. The entitlements are 1,897,602 MCF. Dividing through, each converting customer may contract for at least 26 units of seasonal storage capacity for each unit of entitlements converted from sales service to transportation service (also shown on Schedule No. 23).

CONTRACT STORAGE SERVICE CAPACITY AND DELIVERABILITY LEVELS

Q. Does WNG have storage capacity available for firm and interruptible storage service?

A. Yes. Wng has a maximum seasonal storage withdrawal capacity of 49,563,000 MCF as shown in the Annual Flow Diagram FERC Form 567. However, based on its reply to Amoco Data Request item #35 (included in my Exhibit No.___(PRC-3)), its implied working gas level (cetificated capacity minus cushion gas) is 39,104,000. These figures are reproduced on Schedule No. 21 of Exhibit No.___(PRC-2). The difference between the actual working gas level and the maximum working gas level of approximately 10.5 BCF should be available for storage service. Furthermore, while the 39 and 49 BCF figures represent the capcity of the fields, the actual cycling of gas in and out of the fields each day or month allows a greater volume to move through storage. This is borne out by the annual storage injection and withdrawal figures seen on Schedule No. 12, which show an annual 56 BCF being cycled through storage.

Q. Have you calculated and recommended a level of storage capacity and deliverability that should be made available for contract storage service all customers?

A. Yes.

Q. How much of its total storage deliverability and capacity should WNG make available for the contract storage service?

A. I have recommended that the amount of storage deliverability and capacity that should be made available for contract storage use is 20%. I have arrived at this figure by allocating the existing storage deliverability to the sales service and to the balancing requirements. The remainder should be available for contract storage service. These calculations are shown on Schedule No. 23. There it can be seen that the total sales service entitlements multiplied by the storage entitlement factor (calculated on Schedule No. 24) carves out almost 73% of the storage deliverability for dedication to sales service. Adding to that the allowance for balancing needs of approximately 8.5% to serve the transportation customers leaves approximately 19% for contract storage service. You can see on Schedule No. 24 that firm transportation customers (FTS Conversions and Other FTS) constitute almost 20% of the firm service entitlements on WNG's system. These are the customers most likely to need a seasonal contract storage service since the WNG system is not capable of providing peak day deliveries without storage service. To determine the storage capacity that should be allocated to contract storage service I multiplied the sales service entitlements by the capacity entitlement factor of 26 (from Schedule No. 24) to arrive at 39.5 Bcf, which is 80% of the 49.5 design capacity. The rest of the capacity, 20%, is available for contract storage service. So based on the entitlements I recommend that 20%

of the storage deliverability and capacity be made available to contract storage service. I would note here that the converting sales customers' shares of capacity and deliverability are a subset of the total capacity and deliverability levels set aside for contract storage service.

Q. You recommend that contract storage service be allotted 20% of storage capacity to serve the transportation customers (the amount left over after assuring service to sales customers) but earlier you noted that transportation constitutes 43% of storage activity. Please comment.

A. Although sales service makes up approximately 80% of the <u>entitlements</u> on WNG's system, sales service constitutes only 57% of <u>actual</u> 1990 - 1991 storage operations. The other 43% of actual storage operations are serving the system balancing needs and firm and interruptible transportation customers. Transportation receipts and deliveries on the WNG system show a definite seasonal pattern over the last year with net injections over the summer months and net withdrawals over the winter months. Simple balancing should not show a seasonal pattern. Referring to Schedule Nos. 14 and 15, the net transportation receipts and deliveries was somewhat seasonal in 1988 and 1989 but the net transports as a percent of receipts is generally under 10%. Then in 1990 a major change took place in transportation activities with net transports out of storage in the winter season and net transports into storage in the summer season. The graph on Schedule No. 15 indicates that some of those transportation imbalances appear to be seasonal imbalancing which in fact becomes seasonal storage. Although transportation customers may wish or need to contract for storage service at the same level they are currently using, there will be only 20% of capacity available for contract storage service given that the entitlements for sales service require that the lion's share of storage be available for sales service. Any further storage contract service or continued seasonal balancing would have to be on an interruptible basis when the storage operations are not being used to satisfy sales customers' requirements.

Q. How would that allocation of storage to contract storage service affect the current services?

A. Given the current usage of the storage system, on the peak day storage would be fully utilized. Approximately 60% of the deliverability would be used by sales service although it is entitled to 73%. Twenty percent would be available for contract storage service. And the rest (20%) would be available for system balancing of firm and interruptible transportation service, exchange services, and deliveries by displacement if the sales customers are not using their full share. The current transportation customers who are using the storage system for seasonal balancing (and not paying for a seasonal storage service) may not get service if the sales and contract storage service customers are using thier full entitlements. To ensure deliveries they should contract for storage service.

Q. Does this conclude your testimony?

A. Yes.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Re: Williams Natural Gas Company
Docket No. RP91-152-000

Affidavit

Patrick R. Crowley, being first duly sworn, on oath states that he is the Patrick R. Crowley whose prepared direct testimony entitled PREPARED DIRECT TESTIMONY was served on all parties to the above referenced proceeding. Patrick R. Crowley further states that if asked the questions contained in the text of such testimony he would give the answers that are therein set forth and that he adopts the aforesaid answers as his direct testimony in this proceeding.

Patrick R. Crowley

Patrick R. Crowley

District of Columbia

Sworn To and Subscribed Before Me

this 14th day of January, 1992

Notary Public

My Commission Expires November 14, 1994