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**Missouri Public
Service Commission**

Exhibit No.:

Issue(s):

Witness/Type of Exhibit:


Sponsoring Party:

Case No.:

Natural Gas Costs

Busch/Direct

Public Counsel

ER-2004-0034


DIRECT TESTIMONY

OF

JAMES A. BUSCH

Submitted on Behalf of the Office of the Public Counsel

AQUILA, INC.

CASE NO. ER-2004-0034 


February 27, 2004

1 year with the Missouri Department of Economic Development as a Research
2 Analyst. I accepted my current position with Public Counsel in September 1999.
3 Further, I also am a member of the adjunct faculty of Columbia College, Jefferson
4 City Campus.

5 Q. Have you previously testified before this Commission?

6 A. Yes. Attached is Schedule JAB-1, which is a list of the cases in which I have
7 filed testimony before this Commission.

8 Q. What is the purpose of your testimony in Case No. ER-2004-0034?

9 A. The purpose of my testimony in Case No. ER-2004-0034 is to present Public
10 Counsel's recommendation for natural gas costs that should be included in
11 Aquila, Inc.'s (Aquila or Company) electric rates.

12 [REDACTED]
13 [REDACTED]
14 [REDACTED]
15 [REDACTED]
16 [REDACTED]
17 [REDACTED]
18 [REDACTED]

19 Q. How is your testimony organized?

20 A. My testimony is organized in the following manner. First, I will briefly discuss
21 the movement of the price of natural gas over the past year, current market
22 conditions, and potential future movements in the price of natural gas. Then I will
23 give Public Counsel's recommendation for setting the price of natural gas in this

1 case that is used in the calculation of Aquila's revenue requirement. Following
2 that discussion, I will briefly describe the gas cost recovery mechanism discussed
3 by Aquila witness Keith Stamm in his Direct Testimony and provide OPC's
4 recommendation concerning the gas cost recovery mechanism.

5 **NATURAL GAS PRICE MOVEMENT IN THE PAST YEAR**

6 Q. What happened to the price of natural gas during the year 2003?

7 A. This past year saw another large price spike for natural gas when the March
8 contract expired at \$9.133 per MMBtu. That price was the second highest
9 monthly expiration ever for a NYMEX natural gas contract, only surpassed by the
10 record price set in January 2001. A late winter cold snap caused storage levels to
11 dwindle to near record lows late in the winter heating season causing the price to
12 spike.

13 Due to these low levels of storage, fears of potential price spikes for this
14 upcoming winter heating season (November 2003 – March 2004) permeated the
15 market, which generally kept prices high throughout the summer. However, due
16 to relatively normal weather during the summer cooling season, record amounts
17 of storage were injected throughout the injection season. This has brought the
18 national storage level to above not only last year's amount, but also above the
19 five-year average entering this heating season. The large amounts of natural gas
20 put into storage this past summer also helped keep prices above normal
21 throughout the heating season. Even though prices remained relatively high, they
22 generally fell since reaching a summer high of \$5.945 per MMBtu in June.

1 However, with the recent winter weather in the Northeast, natural gas prices have
2 jumped again during the first week of December.

3 Q. What factors contributed to the decrease in the price of natural gas during most of
4 2003?

5 A. There were many factors that contributed to the decrease in the price of natural
6 gas during the year 2003. I will briefly describe some of the more important
7 factors.

8 As I discussed earlier, the price of natural gas fell over the summer and
9 fall due to record injections of storage during that timeframe. There was fear of
10 potential winter price spikes related to low levels of storage at the beginning of
11 this injection season. Those fears led to higher prices for natural gas in the
12 industry. However, as the injection season went on, record levels of natural gas
13 were injected into storage. Even though there is always the potential for price
14 spikes, one potential cause has been substantially reduced.

15 The second factor was the weather. Generally, this past summer across
16 the United States was near normal as far as temperatures were concerned. With
17 no major, sustained heat waves, there was not a huge increase in demand for
18 natural gas by electric generating facilities.

19 The third factor was the economy. Even though it has recently been
20 reported that the nation's economy has grown at an impressive clip over the third
21 quarter of 2003, there was not a huge increase in industrial demand for natural
22 gas. Some of the economic growth can be attributed to the fact that the nation is
23 still recovering from the recession of 2001. Also, the higher price level of natural

1 gas itself may have tempered any industrial demand. When the price of natural
2 gas gets too high, many industrial consumers can switch to less expensive fuels.

3 **CURRENT CONDITIONS IN THE NATURAL GAS MARKET**

4 Q. What are the current conditions in the natural gas market?

5 A. Currently, the natural gas market is one month into the five-month winter heating
6 season. Storage levels are above both the five-year average and above last year's
7 storage amount. However, due to the recent winter storm in the Northeast and a
8 cold snap in early December, prices on the NYMEX have spiked recently.
9 Natural gas futures for January delivery on the NYMEX closed at \$6.135 per
10 MMBtu on Friday, December 5, 2003, while the 12-month futures strip for 2004
11 was \$5.1439 per MMBtu.

12 Q. Do you believe the most recent price run-up is an indication of this winter's
13 prices?

14 A. No. One of the problems with the futures market is that short-term events cause
15 prices to rise or fall dramatically even though the event is not an indication of
16 future activity. That is, an early winter cold snap does not mean that this winter
17 will bring colder-than-normal weather across the United States. I believe that the
18 market moves as much on fundamentals as it does on the psychology of traders.
19 When the traders see cold weather, they often bid the price of gas up. However, if
20 this winter is colder than normal, prices could stay at present levels or even rise.

21 Q. Are you alone in your opinion about this winter's natural gas price?

22 A. No. The Energy Information Administration (EIA) is currently optimistic about
23 the price of natural gas this winter. Attached, as Schedule JAB-2 is a brief press

1 release from EIA from December 8, 2003. In this press release, the EIA indicates
2 that it is predicting a price of natural gas for this winter of between \$4.50 and
3 \$5.00 per MMBtu.

4 Also, on that same Schedule is a brief press release from the American
5 Gas Association (AGA). The AGA echoes the EIA in believing that there will be
6 plenty of natural gas in storage for this winter. It does, however, predict that this
7 winter could see volatile price swings. Concerning the recent price increases, Mr.
8 Robert Best, the new Chairman of the AGA is quoted as saying, "it did not make
9 much sense for natural gas costs in February to be based on a cold snap in early
10 December."

11 Q. What are current storage levels for natural gas nationwide?

12 A. The latest EIA report indicated that there is 3.095 Tcf of natural gas in storage.
13 This is 5% above last year's total and 4% above the five-year average.

14 Q. Is this winter forecasted to be warmer or colder-than-normal?

15 A. Schedule JAB-3, attached to this testimony, is a news story from the NOAA
16 (National Oceanic and Atmospheric Administration) Climate Prediction Center
17 from November 20, 2003. This winter outlook predicts that warmer-than-normal
18 weather is expected for the South, West, and the entire central United States.
19 However, it also indicates that temperatures could vary, especially in the eastern
20 United States.

21 Q. What does this mean for natural gas prices?

22 A. I think this forecast fits with the previous comments by the EIA and AGA.
23 Warmer-than-normal weather, coupled with adequate storage will lead to falling

1 natural gas prices. However, if this winter has periods of colder-than-normal
2 temperatures, natural gas prices will increase with those swings.

3 **LIKELY FUTURE MOVEMENT OF THE PRICE OF NATURAL GAS**

4 Q. What is the outlook for the price of natural gas for the rest of this winter's heating
5 season?

6 A. I agree with the comments of the AGA and EIA regarding the price of natural gas
7 for this winter. With the relative high level of storage, a normal or warmer-than-
8 normal winter should cause prices to fall this winter. However, the market is
9 extremely sensitive to weather fluctuations. Cold snaps will put a lot of strain on
10 the price of natural gas and fluctuations in price could occur.

11 Q. What is the outlook for the price of natural gas for the year 2004 and beyond?

12 A. Assuming a normal winter, storage levels should be relatively strong as the
13 industry leaves the winter heating season and enters the injection season in April.
14 Under this likely scenario, I believe that the price of natural gas should stay
15 mostly in the \$3.50 to \$4.50 range over the foreseeable future.

16 Q. What is EIA's natural gas price projection for 2004?

17 A. Attached, as Schedule JAB-4 is EIA's Short-Term Energy Outlook. This outlook
18 provides EIA's projections of various winter fuels. In its November 2003 Short-
19 Term Energy Outlook, the EIA projects the well-head price of natural gas to be
20 \$3.99 per Mcf, where a Mcf is roughly equivalent to an MMBtu. This projection
21 assumes relatively normal weather this winter.

1 **PUBLIC COUNSEL'S RECOMMENDATION**

2 Q. Based on your above discussion, what is Public Counsel's recommendation for
3 the price of natural gas to be imbedded in rates in this case?

4 A. In this case, I believe that the price of natural gas to be used as an input in the
5 calculation of electric generation and purchased power fuel costs should be based
6 on a four-year weighted average of natural gas prices adjusted for any basis
7 differential. The four years that I have utilized to calculate this average are the
8 actual settlement prices based on the NYMEX for the three years ended
9 December 2003 and the 12-month futures strip price, January 2004 – December
10 2004. Therefore, the underlying price of natural gas would be \$3.99 per MMBtu
11 as adjusted for the basis differential between Williams Natural Gas Pipeline
12 (WNG) and the NYMEX. Please see Schedule JAB-5 for the calculation of my
13 \$3.99 per MMBtu recommendation.

14 Q. What is basis differential?

15 A. Basis differential is the price difference between two separate delivery points for
16 natural gas. In this instance, Aquila receives its natural gas supplies off of the
17 WNG pipeline. This pipeline is based primarily in the Mid-continent area
18 (Kansas and Oklahoma). The NYMEX prices are based on the Henry Hub index
19 in Louisiana. Since these areas are different, each has its own pricing variations.
20 However, these prices generally move tandem. However, to get a clearer picture
21 of the price that the Company will actually pay for natural gas, the NYMEX
22 prices should be adjusted by the historical price differential between the Henry
23 Hub and the actual location where the Company receives its supplies.

1 Q. Why did you utilize this type of four-year average as the basis of Public Counsel's
2 recommendation?

3 A. I utilized this hybrid approach of historical and future data in recognition of the
4 volatility of the natural gas market. Although the past is important for realizing
5 the actual activity of the Company and the market, relying solely on the past may
6 not be a good predictor of future price movements. However, as I discussed
7 earlier, simply picking a date and using the 12-month strip of futures prices for
8 natural gas prices lacks reliability. I believe that combining the past with the
9 future provides a better basis for establishing the price level for natural gas that
10 the Commission should utilize in determining the Company's overall rates.

11 Q. What is the weighting that you used to help forecast the appropriate level of
12 natural gas costs?

13 A. I weighted each month's average natural gas price by a three-year average of
14 natural gas volumes actually used by Aquila for electric generation for each
15 specific month.

16 Q. On what pricing information is Public Counsel's recommendation based?

17 A. The pricing information is based on the NYMEX monthly settlement prices for
18 the months January 2001 – December 2003 and the 12-month futures strip,
19 January 2004 – December 2004 on November 20, 2003, updated for December's
20 actual settlement price. The NYMEX prices were utilized because this data is
21 readily available and an accurate reflection of actual market activity. Attached, as
22 Schedule JAB-5 is a list of the monthly data that I used to make my
23 recommendation.

1 conditions in the gas market and Empire's situation. However, in Empire's
2 subsequent rate case, Case No. ER-2002-424, Empire proposed the extension of
3 the IEC. At that time, OPC opposed the continuation of the IEC. Ultimately, the
4 IEC was discontinued.

5 Q. Does this conclude your Direct Testimony?

6 A. Yes it does.

**Cases of Filed Testimony
James A. Busch**

<u>Company</u>	<u>Case No.</u>
Union Electric Company	GR-97-393
Missouri Gas Energy	GR-98-140
Laclede Gas Company	GO-98-484
Laclede Gas Company	GR-98-374
St. Joseph Light & Power	GR-99-246
Laclede Gas Company	GT-99-303
Laclede Gas Company	GR-99-315
Fiber Four Corporation	TA-2000-23; et al.
Missouri American Water Company	WR-2000-281/SR-2000-282
Union Electric Company d/b/a AmerenUE	GR-2000-512
St. Louis County Water	WR-2000-844
Empire District Electric Company	ER-2001-299
Missouri Gas Energy	GR-2001-292
Laclede Gas Company	GT-2001-329
Laclede Gas Company	GO-2000-394
Laclede Gas Company	GR-2001-629
UtiliCorp United, Inc.	ER-2001-672
Union Electric Company d/b/a AmerenUE	EC-2002-1
Laclede Gas Company	GR-2002-356
Empire District Electric Company	ER-2002-424
Southern Union Company	GM-2003-0238

Aquila, Inc.

EF-2003-0465

Missouri American Water Company

WR-2003-0500

Union Electric Company d/b/a

GR-2003-0571

Busch, James

From: Enerfax Daily [enerfaxdaily@enerfax.com]
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Enerfax Daily

PHYSICAL GAS PRICES		Monday, December 8, 2003			
<u>Gulf/Eastern Region</u>				Trunk E.La	6.08
Agua Dulce	5.95	NNG Demarc.	5.71	<u>Western Region</u>	
ANR SE	6.14	Niagara	6.28	California Border	5.52
Carthage TG	5.96	PEPL Pool	5.51	El Paso Permian	5.50
Chicago Citygate	6.12	Sonat Tier 1	6.17	El Paso San Juan	5.29
Columbia Gulf Onshore	6.17	TCO IPP Pool	6.40	Waha Hub	5.64
Dominion South Point	6.46	TETCO E.La	6.20	<u>Canadian/Rockies Region</u>	
Henry Hub	6.27	TETCO M-3	7.16	Nova/Aeco \$/MMBtu	5.09
Houston Ship Channel	5.96	TETCO S.TX	5.97	Dawn Hub/Union	6.23
Katy Hub	5.92	TGP Zone 0	5.96	Northwest Stanfield	5.28
NGPL - LA Pool	6.09	TGP Zone 1 (500 Leg)	6.12	Wyoming Pool	5.35
NGPL - Midcontinent	5.52	TGT Zone SL	6.17	Opal	5.36
NGPL STX	5.83	New York Citygate	7.28	PGT-Malin	5.37
NGPL TX/OK	5.78	Transco Station 65	6.26	Huningdon/Sumas	5.23
		Transco Zone 6 (NY)	7.29		
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Page 5 - 3/4 Page - 6" x 13.5" - \$2000 per month or \$1600 with a one year contract signed by January 1, 2004

1/2 Page - 3"x 9" (portrait); or 6" x 4.5" (landscape) - \$1600 per month or \$1280 with a one year contract signed by January 1, 2004

1/4 Ad - 3"x 4.5" - \$880 per month or \$1600 with a one year contract signed by January 1, 2004

Page 6 - 1/4 Ad - 3"x 4.5" - \$1000 per month or \$800 with a one year contract signed by January 1, 2004

1/2 Page - 3"x 9" (portrait); or 6" x 4.5" (landscape) -- \$1500 per month or \$1200 with a one year contract signed by January 1, 2004

Page 7 - 1/4 Ad - 3"x 4.5" - \$500 per month, includes 6 lines in the text version or \$400 with a one year contract signed by January 1, 2004

Physical Power Prices in \$/MWH
High Low Average

AEP	36.00	50.25	32.15
Off Peak	16.00	15.00	15.65
Synergy	36.00	30.50	32.65
Off Peak	16.00	15.50	15.75
ERCOT	47.50	46.50	47.00
ERCOT (N)	48.00	48.00	48.00
Entergy	44.00	42.50	43.15
TVA	00.00	00.00	00.00
Comed	31.00	28.00	29.20
NEPOOL*	63.00	59.00	61.65
PJM West	47.50	46.00	46.75
Palo Verde	26.50	25.25	25.55
Off Peak	48.50	45.00	47.35

More Electricity Prices in Section O

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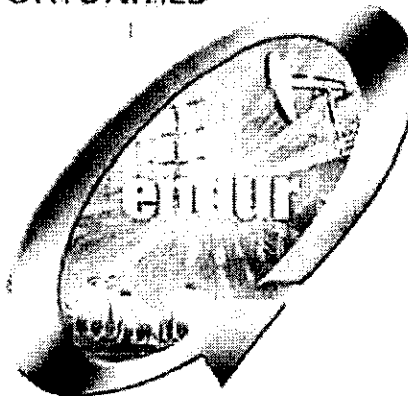
* Based on the ENERGY Business
and Technology magazine, Feb 2003

Enerfax Daily - Section D - December 8, 2003

Today's Power Bulletins

- Northeast Digs Out from Relentless Snowstorm
- Dynegy Enters into Exclusive Discussions with Ameren Regarding Illinois Power
- Peabody Names Walter Hawkins VP and Treasurer, as Steve Schaab Announces Retirement
- Duke Energy Names Myron Caldwell Treasurer of New Finance Organization
- Calpine Receives Award from InfoWorld as One of Top 100 Companies Using Most Innovative Information Technology
- Calpine Celebrates Completion of Geysers Recycled Water Pipeline, Partnership Extends Green Power Production and Provides for Municipal Water
- Reliant Resources Unlikely to Exercise Option on CenterPoint Energy's Shares Of Texas Genco
- Transmission Outage Affects Customers in Northeastern Wisconsin and Western Upper Peninsula
- Financier George Soros Backing Management Buyout Bids at 2 UK Power Plants Owned by American Electric Power

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Section E - December 8, 2003

EIA Says US Winter Natural Gas Supplies Adequate

There should be adequate natural gas supplies to meet this winter's needs, even if it is colder than average, according to the Energy Information Administration. The EIA says it is too soon to say whether last week's dramatic rise in natural prices is a short-term spike or the harbinger of a sustained rise above \$5.00-range of recent months. Its model shows that even if this winter is 10% colder than average, the nation would have adequate supplies compared with historical averages. The EIA is forecasting prices of \$4.50-\$5.00 per MMBtu this winter. Natural gas prices last week have jumped from \$4.92 to \$6.12 amid the first run of cold weather in the Northeast. Citing robust drilling and industry success with coalbed methane and other unconventional gas, the EIA has taken a somewhat optimistic view of natural gas production. While some analysts expect production to decline in 2003, the EIA projects a 2% increase for the year. Besides greater domestic production, the US is also gaining incremental supply with additional gas imports through liquefied natural gas. But this increase is partially offset by a significant decline in imports from Canada.

AGA Says Winter Natural Gas Supply Adequate

The United States will have plenty of natural gas to meet consumer demand this winter, but there could be wild price swings, according to Robert Best, the new chairman of the American Gas Association. However, Best warned that prices are expected to remain volatile through the winter season. Prices for natural gas to be delivered in January and February shot up nearly 30% last week, although prices fell back some on Friday. Best blamed the price jump on cold weather, saying it did not make much sense for natural gas costs in February to be based on a cold snap in early December. Even though consumers are expected to use less natural gas this winter, prices are forecast to be higher and the EIA predicts bills for consumers will be up an average 6% during this winter. The AGA plans to push hard to get Congress to pass a broad energy bill early next year that would speed up drilling permit applications and open more lands to exploration. The AGA expects Congress to pass the energy bill sometime between President Bush's State of the Union address on January 20th and Congress' mid-February President's Day holiday recess.

Enerfax Daily - Section F - December 8, 2003

WELLHEAD TO BURNERTIP**Natural Gas Futures Lower as Longs Bail Ahead of Weekend**

Natural gas futures for January delivery on the NYMEX dropped \$0.202 yesterday to \$6.135 per MMBtu, pressured by a steady flow of profit taking ahead of the weekend despite a Northeast storm and bullish technicals after a near 30% run up earlier last week. The February on contract lost \$0.171 to \$6.132 per MMBtu. Other months ended mixed, with some 2006-2009 contracts finishing up slightly. The cash market was up big, but the Midwest cash was still lagging behind futures. An unexpected cold snap across much of the nation last week helped back the rally, which saw prices surge in the previous 4 sessions as shorts were forced to cover when a series of technical resistance points were breached. Open interest on Thursday jumped more than 6,200 lots on a 10% price jump, a sign of new length in the market, some of which probably bailed Friday before more moderate weather arrives. The CFTC Com-

Today's Gas Bulletins

- EIA to Forecast Tighter Long-Term Natural Gas Supply Outlook in Annual Report to Be Released in Next Week, Citing Declining Growth Rates in North American Production
- Houston Exploration Commences Exchange of 7% Senior Subordinated Notes
- Peoples Energy Declares Quarterly Dividend of \$0.53 per Common Share
- SunGard to Acquire FAME; Adds Reference Data Solutions to its Market Data Offerings
- El Paso 1.55 Billion Market Manipulation Settlement Approved by California Judge
- Majority of California PUC's Board Objects to Pacific Gas and Electric's Reorganization
- NEB Requests Minister of Environment Refer Application for Seismic Program in Gulf of St. Lawrence to Review Panel
- FERC Says More than \$70 Million in Penalties and Fines Assessed by Office of Market Oversight and Investigations Since Its Creation in August 2002
- Ex-Enron Official John Forney Pleads Not Guilty to Conspiracy

Schedule JAB-2
Page 4 of 6

Section G - December 8, 2003

mitment of Traders report shows non-commercials, or speculative funds, had reduced their net short exposure by 7,000 lots to about 42,000 as of December 2nd, still a sizeable position. Last week, the EIA reported a 59 Bcf storage withdrawal, above the 5-year average drop for that week of 29 Bcf, but below the year-ago withdrawal of 91 Bcf. The EIA report showed that total storage levels of 3.095 Tcf are 139 Bcf, or 5%, above last year and 117 Bcf, or 4%, above the 5-year average. For this week, look for the EIA to report a withdrawal of about 85 Bcf to 95 Bcf, compared to a 162 Bcf decline for the same week last year. Traders will be watching this week's inventory report to see how heavily stocks were tapped to meet last week's surge in heating load. With January resistance at \$6.25 broken by the late

(Continued in Section H)

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Enerflex Daily - Section H - December 8, 2003

Natural Gas NYMEX Volume		PETROLEUM PRICES	
Month	Volume	CRUDE	WTX Int Cushing
Jan	24024	34794	
Feb	23040	33761	\$ 29.19
Mar	16243	27526	\$ 27.74
Apr	8565	23059	\$ 29.29
May	2452	15794	\$ 30.78
Jun	1707	12480	
Jul	1317	12209	
Aug	1958	11921	
Sep	1	1410	
Oct	321	1373	
Nov	176	6115	
Dec	144	8035	
Jan	141	7330	
Feb	130	4824	
Mar	52	6254	
Apr	20	4431	
May	19	4370	
Jun	15	3996	
Jul	15	3996	
Aug	15	4063	
Sep	15		
Oct	15		
Nov	15		
Dec	15		

(Continued from Section G)

spike on Thursday, resistance is now pegged at Thursday's high of \$5.75. Support is seen at \$2.00 and the price is expected to trade in the \$2.00 to \$2.50 range. Expect to see a slight recovery in the East, Midwest and Texas to moderate to normal or slightly above by Tuesday, with above seasonal readings expected in the West for the next 2 days. The National Weather Service outlook for December 11-15 calls for normal or above normal temperatures for most of the northern half of the nation, with below seasonal readings expected across southern tier states and California. Natural Gas for credit delivery across the US and Canada was generally \$0.40 higher on Thursday. The price of the NYMEX contract at the Henry Hub gained \$0.57 to \$4.27 per MMBtu. Look for the cash market to drop sharply today.

Section I - December 8, 2003

Bruce Power Arrived in Restart Phase A Unit 3 Nuclear Reactor

Bruce Power has received approval from Canadian regulators to restart its Bruce A unit 3 nuclear reactor and should have it reconnected to Ontario's power grid later this month. Safety and operating tests will begin shortly, and the reactor is expected to produce about 750 MW into the grid once it's reconnected. The approval granted by the Canadian Nuclear Safety Commission, comes after the restart of the Bruce A unit 4 reactor in October. At the time, the unit 3 reactor was expected to restart in November. Both units, located on the shores of Lake Huron about 150 miles northwest of Toronto, have undergone a long repair and upgrade program and were originally expected back in service by June. The reactors were mothballed in 1998 after they were found to be operating at maximum safety levels by Ontario Hydro. Bruce Power was purchased in February from money losing parent British Energy by a consortium of firms led by Saskatoon, Canada, Illinois, Illinois and Ontario Municipal Employees Retirement System, each own a 31.6% share in Bruce. The Power Workers' Union and the Society of Energy Professionals own the remaining 5.2%.

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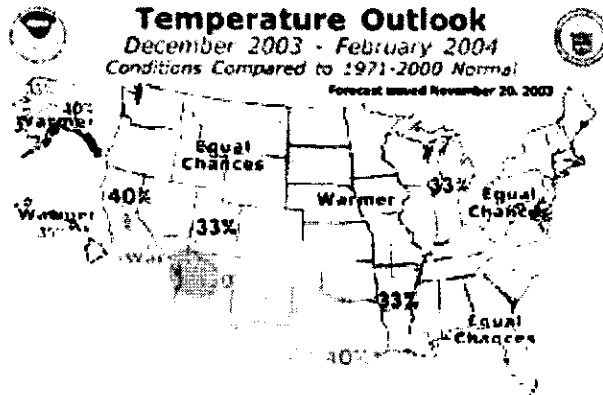
Month	High	Low	Change
Jan	51.438	0.1104	
Feb	50.208	-0.0009	
Mar	50.000		
Apr	5.140	5.780	0.178
May	4.800	4.980	-0.081
Jun	4.800	4.780	-0.101
Jul	4.800	4.780	-0.081
Aug	4.800	4.790	-0.088
Sep	4.800	4.740	-0.088
Oct	4.800	4.907	-0.088
Nov	5.130	5.082	-0.078
Dec			

NYMEX Natural Gas Options Volatility

Month	NYMEX Futures Month Contract	Days Left to Opt Exp.	Implied Volatility
Jan	\$5.135	18	78.0%
Feb	\$5.132	53	70.8%
Mar	\$5.807	81	64.4%
Apr	\$4.952	112	48.2%
May	\$4.792	144	39.9%

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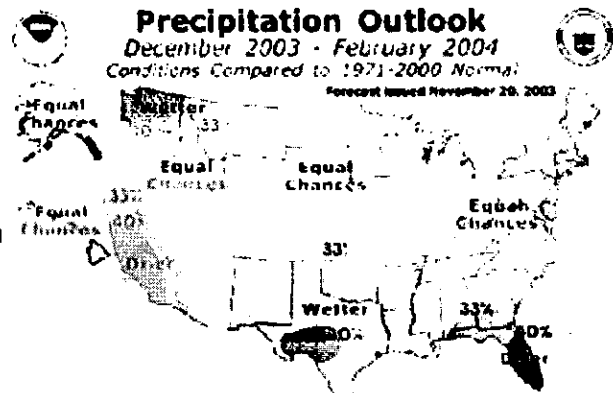
NOAA ISSUES WINTER OUTLOOK UPDATE; WINTER WEATHER STILL PROMISING MUCH VARIABILITY



Nov. 20, 2003 — The [NOAA Climate Prediction Center](#) today released its update to the U.S. winter outlook, which says temperatures and precipitation may vary this season, especially in the East. **(Click NOAA image for larger view of forecast winter temperatures for the USA. Click here for high resolution version, which is a large file. Please credit "NOAA.")**

For December, January and February, [NOAA](#) forecasters are calling for the likelihood of above-average precipitation over Texas, Oklahoma, Washington, northern Oregon and northern Idaho, while below-normal precipitation is likely over Florida, southern Georgia, and California. Meanwhile, above normal temperatures are now likely over the central U.S. from Texas to Wisconsin, including almost all of the Great Plains. Above-normal temperatures are also expected for the southwest U.S., including all of New Mexico and Arizona; and West Coast states of California, Oregon, and Washington, and for Alaska and Hawaii. For other parts of the nation, the winter will have equal chance of above-, below- or near-normal temperatures and precipitation.

NOAA forecasters continue to expect the existing multi-year drought conditions in much of the interior West and parts of the Central Plains to continue for at least the next three months. Some improvement is likely, mostly in some areas in the north-central Plains and parts of the West. In many areas in the inter-mountain region, from Arizona to Montana and the western Great Plains, drought will likely persist and contribute to a lingering, long-term water shortage. **(Click NOAA image for larger view of forecast winter precipitation for the USA. Click here for high resolution version, which is a large file. Please credit "NOAA.")**



"Conditions in the central Pacific will not play a strong role in the winter weather patterns over the U.S.," said Edward O'Lenic, meteorologist at the NOAA Climate Prediction Center. "While last winter's jet stream patterns were relatively persistent, leading to cooler than average conditions in the eastern U.S., this winter we see more frequent jet stream swings, resulting in more variable weather patterns and regimes lasting from one to several weeks," he added.

Today's winter outlook update expands the area of warmer-than-normal expected conditions from the South and West to include all of the central U.S., but excludes the inter-mountain West and Rocky Mountain region. The wetter-than-normal area in the

Northwest, and the slight increased risk of dryness in the southeast and California are also new. These changes are based on updated empirical and dynamical prediction tools NOAA forecasters utilize to make seasonal climate forecasts.

Over the last month and the first few weeks of November, the U.S. has been experiencing some dramatic weather events. However, according to the [NOAA Climatic Data Center in Asheville, N.C., October 2003](#) ranked as the 8th warmest and 30th driest October for the U.S. in 108 years. The Western region and central part of the U.S. were mostly dry, while the Northeastern and extreme Northwestern regions were mostly wet for October. The outlook for December through February implies a continuation of at least some of the elements that contributed to these observations. In particular, odds are better than average for abnormally wet conditions in the Northwest, while drier-than-average conditions are more likely than average in California and Florida.

NOAA will issue an update for the January-February-March period and beyond on December 18, 2003.

The NOAA Climate Prediction Center is part of the [NOAA National Weather Service](#), which is the primary source of weather data, forecasts and warnings for the United States and its territories.

NOAA is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and providing environmental stewardship of the nation's coastal and marine resources. NOAA is part of the [U.S. Department of Commerce](#).

Relevant Web Sites

[NOAA Climate Prediction Center](#)

[NOAA Drought Information Center](#)

[El Niño/Southern Oscillation \(ENSO\) Diagnostic Discussion](#)

[Weekly El Niño/Southern Oscillation \(ENSO\) Update](#)

[Most Recent 2 Months Sea Surface Temperature Anomaly Animation](#)

[El Niño and La Niña-related Winter Features over North America](#)

[Sea Surface Temperature Outlook](#)

[ENSO Impacts by Region](#)

[NOAA Storm Watch](#) — Get the latest severe weather information across the USA

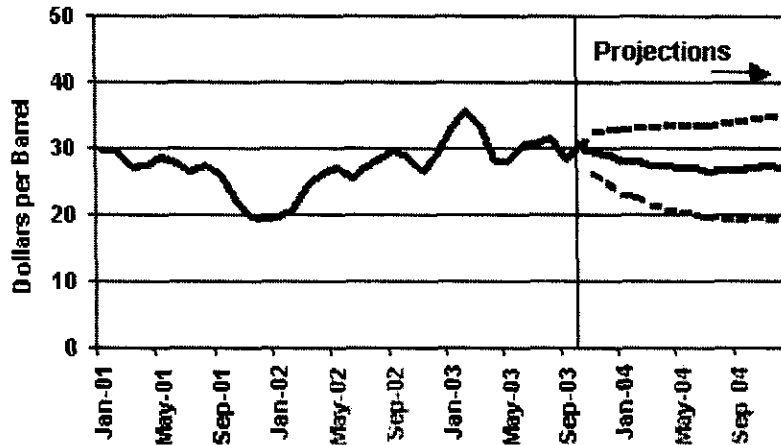
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Short-Term Energy Outlook – November 2003

November 6, 2003 Release (Next Update: December 8, 2003)

**Figure 1. WTI Crude Oil Price
(Base Case and 95% Confidence Interval*)**



*The confidence intervals show +/- 2 standard errors based on the properties of the model. The ranges do not include the effects of major supply disruptions.
Sources: History EIA; Projections Short Term Energy Outlook, November 2003.

Overview

World Oil Markets. While West Texas Intermediate crude oil prices have remained slightly below our previous baseline projection for October, current prices are close to \$29 per barrel, with prices for the 5 trading days ending November 5

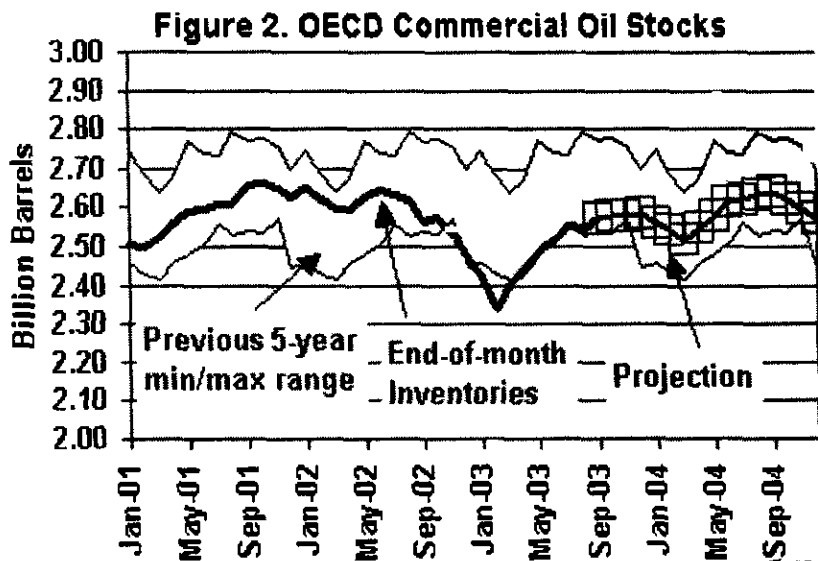
averaging \$29.20 per barrel (Figure 1). Our projected gradual decline toward \$27 per barrel reflects a slow but steady return toward more normal levels of petroleum stocks in industrialized countries compared to previous months. It is assumed in this *Outlook* that overall OPEC oil production (including natural gas liquids) in 2004 will decline from the 2003 average by about 0.7 million barrels per day as the effect of quota reductions offset increased output from Iraq. Two other factors will also impact world oil markets: Russia may not limit its oil production and overall non-OPEC production is likely to rise by some 1.3 million barrels per day in 2004 from 2003.

Degree-Day Forecasts. Starting with this issue of the *Outlook*, degree-day projections by Census Division from the National Oceanographic and Atmospheric Administration (NOAA) Climate Prediction Center (CPC) will be used in the *Short-Term Energy Outlook (Outlook)* in place of the history-based "normal" values previously used. While degree-day outlooks are subject to considerable uncertainty at both the national and regional level, EIA feels that the CPC projections contain information that can help to improve the quality of EIA's baseline energy projections. The CPC projection used in this month's *Outlook* is roughly 1.4 percent colder than the previously-used norm in 2004.

Winter Fuels Update. A warm start to the heating season has kept early heating demand levels at a minimum in the United States, contributing to continued builds in underground natural gas storage to above-average levels. Heating degree-days were approximately 11 percent below normal in October (on a

population-weighted basis) and the first week in November brought unseasonably warm weather to key heating areas in the Midwest and Northeast. Consequently, working gas in storage is projected to reach nearly 3,200 billion cubic feet at the end of the injection season and the natural gas spot price at the Henry Hub dipped below \$4.00 per million Btu (mmBtu) on October 31 for the first time in 2003. However, mid-winter futures for natural gas remain near \$5.00 per mmBtu, and at \$28-\$30 per barrel, West Texas Intermediate crude oil prices, while weaker than previously projected, remain above the average of \$26.90 per barrel seen during the fourth quarter over the last 3 years. Continued above-average temperatures would yield new downward pressure on heating fuel prices during the fourth quarter, but consumer prices for fuels still seem poised to exceed year-ago levels during the October to December period. Given NOAA's degree-day forecasts, the outlook for household heating bills remains mixed relative to 2002-2003: natural gas-heated homes: up 6 percent; heating oil users: down 6 percent; propane-heated households: about flat; and homes with electric heat: up about 4 percent.

Details



Sources: History EIA; Projections Short Term Energy Outlook, November 2003.

World Oil Markets.

Crude Oil Prices. Average monthly prices for the major marker crude oils rose by \$2-\$3 per barrel in October, offsetting declines of a similar amount in September. Prices for these marker crude oils were \$1-\$2 per barrel higher than year-ago (October 2002) (Figure 1). The OPEC basket price

continued to be within or above its target range for the nineteenth consecutive month and has not fallen below this range since March 2002. However, oil prices softened towards the end of the month. EIA projects that the industrialized countries' oil inventories, which were about even with year-ago levels at the end of October, will show noticeable year-over-year increases compared to the extraordinarily low levels seen at the end of 2002.

However, OECD commercial inventories are tight relative to normal levels for this time of year and are expected to remain so until the middle of 2004 (Figure 2). Until these inventories are rebuilt to well above observed 5-year lows, WTI crude oil prices should remain firm, then gradually slide to roughly \$27 per barrel as Iraqi oil exports in 2004 begin returning to near pre-war levels.

OPEC Oil Supply. In October, OPEC 10 oil production (excluding Iraq) was stable at an estimated 25.5 million barrels per day, about the same as their estimated September production level and only slightly above the OPEC 10 production targets that took effect on June 1 (Figure 3). The return of Iraqi oil exports to pre-war levels is not expected to lead to a sharp price decline in 2004 because it is assumed that, based on the surprise decision in September to cut quotas beginning November 1 and the possibility of further adjustments, overall OPEC production (including natural gas liquids) will not increase next year and may fall by 2-3 percent from the 2003 average.

International Oil Demand and Supply. World oil demand is projected to grow by about 1 million barrels per day in 2003 and in 2004, slightly less than the projected growth in non-OPEC oil production of 1.3 million barrels per day in 2004 (Figure 4). About 1/3 of the growth in world oil demand in 2003 is projected to come from the U.S., with China and other non-OECD countries projected to provide a total of another 0.5 million barrels per day of demand growth.

U. S. Energy Prices

Motor Gasoline: The October average motor gasoline price (regular unleaded gasoline) dropped to \$1.56 per gallon compared to \$1.68 in September. Motor gasoline prices have been drifting downward, as expected, following the late summer price surge (Figure 5). Pump prices should continue to decrease through the winter, as crude oil prices and margins continue to ease. However, the relatively tight levels of gasoline inventories should act as a brake on a more accelerated price drop. By the end of October, gasoline inventories remained just above the 5-year min/max range (Figure 6). In 2004, the annual pump price is projected to average \$1.46 per gallon (down roughly 11 cents per gallon from the projected 2003 average), as crude oil prices and average annual refiner margins recede. (Here, "refiner margin" refers to the difference between the average refiner price for gasoline and the average per-gallon crude oil input cost.) This year, refiner margins soared in March and again in August and September as supplies of gasoline fell to low levels. Next year, the assumption of higher (but still tight) stock levels for gasoline should reduce slightly the average refiner margin.

Some uncertainties remain in our projections about the gasoline market during the next several months, particularly in the Mid-Atlantic and New England

regions, because several large states have mandated changes in fuel additives. New York and Connecticut use Federal reformulated gasoline (RFG) that contains methyl tertiary butyl ether (MTBE). MTBE is used in RFG to meet the minimum 2.0 percent oxygen weight requirement, to reduce gasoline's air emissions, and to improve engine performance. However, detection of MTBE in some ground water supplies has led these two states to ban its use in gasoline by the end of 2003. MTBE, which makes up about 11 percent of a gallon of RFG, will be replaced by fuel ethanol. The MTBE bans introduce significant uncertainties to Northeast gasoline markets. It is more difficult and costly to produce RFG with ethanol and the MTBE ban introduces an additional constraint to the supply system. While supply is expected to be adequate, developments during the phaseout of MTBE from gasoline in California earlier this year and the Midwest's past experience with ethanol-based RFG over the past few years suggest a greater potential for temporary price spikes. For a comprehensive analysis of the Connecticut and New York gasoline markets and MTBE bans refer to the EIA report, "Preparations for Meeting New York and Connecticut MTBE Bans," October 2003.

Recently, California's weekly price for regular motor gasoline was \$1.71 per gallon, or about 17 cents per gallon higher than the national average price of \$1.54 per gallon. The price difference has narrowed over the last month.

Distillate Fuel Oil (Diesel Fuel and Heating Oil): As expected, residential heating oil prices have risen as the first month of the heating season has passed. Diesel fuel oil prices, on the other hand, have eased over this same time period. Diesel prices are normally expected to increase this time of year, pushed by the seasonal demand patterns of heating oil. Currently, a weakening in crude oil prices and a healthy level of distillate inventories has mitigated steeper upward price movements for this fuel. Heating oil prices this winter season (October-March), are likely to average about \$1.32 per gallon, or about the same as last winter's average price (Figure 7). Nevertheless, this winter may see price spikes, especially if winter weather on the East Coast turns abnormally cold for prolonged periods or if world oil prices increase substantially. Cold weather alone could add an additional 10-15 cents per gallon to the base case projections and perhaps even more at the local level. At the end of October, distillate fuel oil inventories were almost 133 million barrels, a level in the middle of the 5-year min/max range (Figure 8).

Natural Gas: Mild weather during the last 4-5 months (a relatively cool summer followed by a warm early autumn) reduced industrial demand, and a modest production response to increased drilling contributed to historically high volumes of gas injections into underground storage, which has resulted in robust levels of natural gas stocks. Inventories of working gas are now comfortably above the middle of the 5-year average range. Nearly 3.2 trillion cubic feet of working gas were in storage by November 1. Historically, the gas industry regards any level over 3.0 million cubic feet of gas working gas in storage by November 1 as a sufficient amount to meet the heating season demand unless very severe winter weather conditions prevail. On October 31, the cash price at the Henry Hub dipped below \$4.00 per mmBtu (\$3.98 per mmBtu), reaching the lowest price of the year. Assuming our base case weather forecast, spot prices in the \$4.50-\$5.00 per mmBtu range (or \$4.64-\$5.15 per mcf) can be expected for the winter of 2003-2004 (Figure 9).

For 2003, wellhead prices are projected to show an increase of almost \$2.00 per thousand cubic feet (mcf) (still the largest U.S. annual wellhead price increase on record) over the 2002 annual average, pushing the annual average for the year to about \$4.90 per mcf. However, average annual wellhead prices in 2004 are projected to drop by \$0.90 per mcf (about 18 percent), pushed down by significant gains in net imports of natural gas (5 percent over 2003 levels compared to a net decrease from the previous year's level), a more robust storage situation throughout the entire year, slow gas demand growth, and a projected decline in crude oil prices.

U. S. Oil Demand

This year, total petroleum demand is projected to increase by 243,000 barrels per day from last year's average, or 1.2 percent, to 20.00 million barrels per day (Figure 10). Demand for motor gasoline, the largest oil-based product, is also projected to increase 1.3 percent for the year. While motor gasoline demand growth was nearly flat during the first half of the year as a result of lack of growth in highway travel (due in part to harsh weather conditions during the first quarter), a 2.4-percent increase in motor gasoline demand over the second half of the year is anticipated due to the resumption of growth in highway travel brought about by the general improvement in the economy.

Jet fuel markets, having been adversely affected by several outbreaks of the SARS epidemic as well the Iraqi military campaign earlier in the year, are expected to remain sluggish for the rest of the year as well. For the first half of 2003, revenue ton-miles showed little growth, but capacity continued to expand. Moreover, recently published FAA data show continued year-to-year declines in jet fuel purchases. Airlines, seeking to increase load factors, have announced plans to trim capacity further during the rest of this year. As a result, commercial jet fuel demand is projected to contract by about 1 percent in 2003.

Moreover, domestic military demand will likely show a decline as a result of an increase in overseas activity (particularly in the first half of the year), contributing to the projected year-over-year decline of 2.6 percent in total jet fuel demand.

Distillate fuel oil use is projected to increase 3.9 percent in 2003. Demand during the first half of the year increased 7 percent as a result of harsh weather during the first quarter and high sales to the power generation sector during the spring and summer in the wake of spikes in natural gas prices. Transportation demand, the largest distillate component, is projected to increase 3.0 percent for the year as a whole, reflecting continued growth in overall economic activity. Residual fuel oil demand, bolstered by high space-heating demand during the first quarter and firm natural gas prices throughout the year, is projected to register an increase of 10.7 percent this year. The same weather- and price-related factors that boosted distillate demand during the first half of the year also brought about an 11.3-percent increase in demand for residual fuel oil during that period. Moreover, recent data point to a 27-percent increase in third quarter demand. However, a decline in the relative price of natural gas and the assumption of normal weather patterns are expected to bring about a 4.1-percent decline in residual demand in the current quarter. Despite the colder-than-average weather in first quarter, liquefied petroleum gas demand is projected to decline 5.5 percent for the year as a whole, largely as a result of weakness in petrochemical activity as well as high natural gas prices and higher production costs for much of the year.

Petroleum demand growth in 2004 is projected to average 310,000 barrels per day, or 1.5 percent, to 20.31 million barrels per day. All the major products, except residual fuel oil, are expected to contribute to that growth. Motor gasoline demand is projected to increase 2.2 percent, reflecting a continued acceleration of economic growth and an almost 9-percent decline in retail pump prices. Jet fuel demand, having declined for two consecutive years, is projected to post a growth rate of 1.6 percent to average 1.60 million barrels per day, still below the 2001 average. Distillate demand growth is projected to moderate to 1.7 percent, as demand reductions resulting from the assumption of more normal weather partly counteracts the projected 3.1-percent growth in transportation diesel demand. Residual fuel oil deliveries, having experienced growth in 2003, are projected to decline by 6 percent in 2004. That reversal reflects the assumptions of more or less normal weather and greater availability of natural gas, prices of which are projected to decline to levels that more effectively compete with other fossil fuels. Demand for liquefied petroleum gas is expected to recover smartly from the weaknesses of the previous year, with growth averaging 4 percent. Growth in petrochemical activity and declines in natural gas feedstock prices are both expected to offset the decline in space-heating demand

under baseline assumptions of normal weather during the 2003-2004 winter season.

Oil Supply

Average domestic oil production is expected to decrease in 2003 by 11 thousand barrels per day, or 0.2 percent, to a level of 5.74 million barrels of oil per day. For 2004, a 1.7 percent decline is expected, resulting in an average annual production rate of 5.64 million barrels of oil per day (Figure 11).

Lower-48 States oil production is expected to decrease by 5,000 barrels per day to a rate of 4.76 million barrels per day in 2003, followed by a decline of 67,000 barrels per day in 2004. Oil production from the Mars, Mad Dog, Ursa, Thunder Horse and Nakika Federal Offshore fields is expected to account for about 12 percent of the lower-48 oil production by the 4th quarter of 2005.

Alaska is expected to account for 16.8 percent of total U.S. oil production in 2004. Alaskan oil production is expected to decrease by 0.6 percent in 2003 and decrease by 3.2 percent in 2004. The combined production rate from the two significant fields, Alpine and North Star, averaged nearly 173 thousand barrels per day during June 2003. Production from the Kuparuk River field plus the production from West Sak, Tobasco, Tarn and Meltwater fields is expected to stay at an average of 210 thousand barrels per day over the forecast period.

Natural Gas Supply and Demand

Natural gas demand is expected to fall by 2 percent in 2003 as high prices discourage demand, particularly in the industrial and electric power sectors (Figure 12). A modest increase of nearly 1 percent in consumption is projected for 2004 driven by strong economic growth and projected lower prices.

This winter, demand for natural gas is expected to be about 2 percent lower than last winter's level, due largely to the effect of weaker heating-related demand. Gas-weighted heating degree-days for the season (Q4 2003 and Q1 2004), under our baseline weather projections, would be about 2.5 percent below year-ago levels. Winter natural gas prices are projected to be about 10.5 percent

higher than last winter in the residential sector as cumulated natural gas utility costs through 2003 are recovered in higher household delivered charges. In the event of colder-than-expected weather this winter, natural gas prices could go higher.

Working natural gas in storage is estimated to be near 3.2 billion cubic feet (Bcf) at the end of October, over 3 percent above the 5-year average level (Figure 13). This is the result of the higher-than-normal storage injections that have characterized the 2003 stockbuild period.

Natural gas production is expected to show increases of about 3 percent this year. High natural gas prices and sharply higher oil and natural gas field revenues have resulted in strong natural gas-directed drilling activity this year following the downturn in 2002 (Figure 14). Monthly oil and natural gas field revenues are expected to continue to average over \$400 million this year (Figure 15). The prospects for significant reductions in natural gas wellhead prices over the forecast period hinge significantly on the productivity of the increased drilling in terms of expected output. An average natural gas wellhead price of about \$3.99 per thousand cubic feet (mcf) is projected for 2004, about \$0.90 per mcf lower than the expected 2003 average, based on the assumption that, barring severe weather this winter, pressure on natural gas markets related to storage refill will be considerably less in 2004 than in 2003.

Electricity Demand and Supply

Electricity demand in 2003 is expected to remain at close to last year's levels (Figure 16). Following the relative increase in demand in the first quarter due to cold weather, declines in demand occurred during the second and third quarters, also driven largely by weather factors, i.e., lower cooling demand this summer than last summer. In 2004, annual electricity demand is projected to rebound, growing along with the economy at a rate of about 2.4 percent.

Natural gas-fired electricity production is expected to decrease by about 4 percent in 2003 due to fuel substitution in response to high natural gas prices, as indicated by increasing oil-fired plant utilization beyond what otherwise might have been projected. Also in 2003, petroleum-generated electricity production is expected to increase by about 21 percent. In 2004, petroleum-generated electricity production is projected to decline about 5.8 percent as natural gas availability improves. Hydroelectric generation in 2003 is expected to increase by 4.8 percent overall due to improved water levels in the Eastern half of the country. Nuclear generation in 2003 is expected to be lower than last year by 1.8 percent. Part (at least) of the reason for the lower nuclear generation is that two

nuclear plants have been in extended shutdown mode. However, nuclear and hydropower for electricity generation are expected to be more abundant this winter than last winter. Nuclear plants that experienced extended outages are expected to be back on line in 2004, when nuclear generation increases 2.4 percent over 2003 levels. Hydroelectric generation is also expected to increase in 2004 due to the somewhat recovered levels of precipitation this year.

Coal Demand and Supply

Coal consumed to generate electricity climbed 3.3 percent during the first seven months of 2003, compared to the same period in 2002. Coal, nuclear and gas-fired generation are typically used to meet baseload demand, although natural gas is also the primary peaking demand fuel. Year-to-date nuclear generation is down 2.4 percent and natural gas-fired generation is down 9.5 percent. Coal-fired generation, up 2.5 percent, has taken up the slack in baseload demand. Despite flatness in total electricity demand and total electric sector generation, coal-fired electricity generation is expected to grow by 0.4 percent and electric sector coal consumption to grow by 1.0 percent in 2003 (Figure 17). Coal-fired generation and associated coal consumption is expected to continue growing in 2004, as generation grows at 0.8 percent while consumption rises by 1.2 percent.

Demand in other coal-consuming sectors is expected to grow moderately in 2003. Expected increases in the coke plant sector (1.9 million short tons (mmst) or 8.2 percent) are nearly offset by a projected decline in consumption in the retail and general industry sectors (1.5 mmst or 2.3 percent). Total non-electric sector coal demand growth for 2003 is projected to be 0.3 percent. Non-electric sector growth is expected to decline in 2004, (0.8 percent) as demand for coal as a boiler fuel continues to decline and coke plant demand falls.

Total U.S. coal production is expected to decline by 0.6 percent in 2003 (Figure 18). Year-to-date U.S. coal production (January through September) is roughly 802.5 mmst, or 2.2 percent lower than the same period of 2002. Western region coal production is likely to grow 1.5 percent, while Appalachian and Interior production falls 3.4 percent and 1.1 percent respectively. In 2004, growth in electric sector coal demand is expected to lead to an increase in total coal production (0.8 percent), but Western region coal production is projected to continue its strong growth at a rate of 4.5 percent.

Representation of Uncertainty in STEO Using the STIFS Model

The EIA uses its Short-Term Integrated Forecasting System (STIFS) model to analyze monthly trends in U.S. energy demands and prices, both nationally and by sector, and to generate its monthly *Short-Term Energy Outlook (STEO)*. This model consists of approximately 920 endogenous variables, 216 of which are stochastic (i.e., have error distributions associated with them).

Confidence intervals presented in the *STEO* for a selected STIFS variable, such as the crude oil price, gasoline price and natural gas spot price, are analytically calculated using information about the error distribution of the modeled variable and the error distributions of any endogenous variables that may affect the variable of interest. These confidence intervals, based on +/- 2 standard errors within the STIFS model, do not include the impact of major supply disruptions and other phenomena not represented in the model.

To the extent that supply disruptions in world oil markets and/or other phenomena not included in the STIFS model do significantly affect future market developments, confidence intervals presented in the *STEO* likely will be less than the usual 95 percent, all other factors being equal.

Table HL1. U.S. Energy Supply and Demand: Base Case

(Energy Information Administration\Short-Term Energy Outlook -- November 2003)

	Year				Annual Percentage Change		
	2001	2002	2003	2004	2001-2002	2002-2003	2003-2004
Real Gross Domestic Product (GDP)							
(billion chained 1996 dollars)	9215	9440	9702	10101	2.4	2.8	4.1
Imported Crude Oil Price ^a							
(nominal dollars per barrel)	22.00	23.69	27.54	24.68	7.7	16.3	-10.4
Petroleum Supply (million barrels per day)							
Crude Oil Production ^b	5.80	5.75	5.74	5.64	-1.0	-0.2	-1.7
Total Petroleum Net Imports							
(including SPR)	10.90	10.54	11.26	11.46	-3.3	6.8	1.8

Energy Demand

World Petroleum

(million barrels per day)	77.1	77.6	78.6	79.7	0.6	1.3	1.4
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Petroleum

(million barrels per day)	19.65	19.76	20.00	20.31	0.6	1.2	1.5
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Natural Gas

(trillion cubic feet)	22.23	22.52	22.06	22.26	1.3	-2.0	0.9
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Coal ^c

(million short tons)	1060	1066	1076	1087	0.5	0.9	1.0
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Electricity (billion kilowatthours)

Retail Sales ^d	3370	3475	3478	3560	3.1	0.1	2.4
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Other Use/Sales ^e	173	180	176	182	4.2	-2.3	3.5
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Total	3543	3655	3654	3742	3.2	0.0	2.4
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Total Energy Demand ^f

(quadrillion Btu)	96.3	97.6	97.6	99.6	1.3	0.0	2.1
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Total Energy Demand per Dollar of GDP

(thousand Btu per 1996 Dollar)	10.45	10.34	10.06	9.86	-1.1	-2.7	-1.9
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Renewable Energy as Percent of Total ^g	5.6%	6.2%	6.4%	6.6%
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^aRefers to the refiner acquisition cost (RAC) of imported crude oil.

^bIncludes lease condensate.

^cTotal Demand includes estimated Independent Power Producer (IPP) coal consumption

⁴Total of retail electricity sales by electric utilities and power marketers. Utility sales for historical periods are reported in EIA's Electric Power Monthly and Electric Power Annual. Power marketers' sales for historical periods are reported in EIA's Electric Sales and Revenue, Appendix C. Data for 2001 are estimates.

⁵Defined as the sum of facility use of onsite net electricity generation plus direct sales of power by industrial- or commercial-sector generators to third parties, reported annually in Table 7.5 of the Monthly Energy Review (MER). Data for 2001 are estimates.

⁶The conversion from physical units to Btu is calculated by using a subset of conversion factors used in the calculations performed for gross energy consumption in Energy Information Administration, Monthly Energy Review (MER). Consequently, the historical data may not precisely match those published in the MER or the Annual Energy Review (AER).

⁹Renewable energy includes minor components of non-marketed renewable energy, which is renewable energy that is neither bought nor sold, either directly or indirectly, as inputs to marketed energy. The Energy Information Administration does not estimate or project total consumption of non-marketed renewable energy.

SPR: Strategic Petroleum Reserve.

Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical data are printed in bold; forecasts are in italics. The forecasts were generated by simulation of the Short-Term Integrated Forecasting System.

Sources: Historical data: Latest data available from Bureau of Economic Analysis and Energy Information Administration; latest data available from EIA databases supporting the following reports: Petroleum Supply Monthly, DOE/EIA-0109; Petroleum Supply Annual, DOE/EIA-0340/2; Natural Gas Monthly, DOE/EIA-0130; Electric Power Monthly, DOE/EIA-0226; and Quarterly Coal Report, DOE/EIA-0121; International Petroleum Monthly DOE/EIA-0520; Weekly Petroleum Status Report, DOE/EIA-0208. Macroeconomic projections are based on Global Insight Forecast CONTROL1003.

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CASE NO. ER-2004-0034

NATURAL GAS PRICE CALCULATION

	2001	2002	2003	<u>NYMEX</u> (11/20)	Includes Basis	Monthly Volumetric	
					Differential	Percent	
January	9.978	2.555	4.988	4.904	5.4271071	1.76%	0.095268
February	6.293	2.006	5.660	4.944	4.5466071	1.65%	0.075223
March	4.998	2.388	9.133	4.844	5.1616071	3.21%	0.165513
April	5.384	3.472	5.146	4.579	4.4661071	7.35%	0.328178
May	4.891	3.319	5.123	4.549	4.2913571	7.48%	0.321085
June	3.738	3.420	5.945	4.564	4.2376071	12.77%	0.540939
July	3.182	3.278	5.291	4.581	3.9038571	25.40%	0.991549
August	3.167	2.976	4.693	4.601	3.6801071	24.26%	0.892841
September	2.295	3.288	4.927	4.591	3.5961071	9.59%	0.345005
October	1.830	3.686	4.430	4.601	3.4576071	3.19%	0.110299
November	3.202	4.126	4.459	4.766	3.9591071	1.72%	0.06817
December	2.316	4.140	4.860	4.946	3.8863571	1.62%	0.063026

RECOMMENDATION \$ 3.997

March '03 was deleted due to lack of data on WNG for that month.

BASIS CALCULATION

NYMEX	WNG	
9.978	9.98	-0.002
6.293	6.29	0.003
4.998	5.03	-0.032
5.384	5.34	0.044
4.891	4.82	0.071
3.738	3.66	0.078
3.182	3.05	0.132
3.167	3.10	0.067
2.295	2.24	0.055
1.830	1.75	0.080
3.202	3.05	0.152
2.316	2.24	0.076
2.555	2.51	0.045
2.006	1.90	0.106
2.388	2.31	0.078
3.472	3.29	0.182
3.319	3.20	0.119
3.420	3.08	0.340
3.278	3.08	0.198
2.976	2.84	0.136
3.288	2.98	0.308
3.686	3.32	0.366
4.126	4.06	0.066
4.140	3.98	0.160
4.988	4.62	0.368
5.660	5.12	0.540
5.146	4.63	0.516
5.123	4.83	0.293
5.945	5.52	0.425
5.291	5.17	0.121
4.693	4.57	0.123
4.927	4.77	0.157
4.430	4.29	0.140
4.459	4.18	0.279
4.860	4.38	0.480
		0.179