PERFORMANCE EVALUATION

The Weekly Natural Gas Storage Report (WNGSR)

(June 2011 for 2008 through 2010)

Introduction

The Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy. EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. EIA is the Nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the U.S. Government.

The *Weekly Natural Gas Storage Report* (*WNGSR*) is the EIA's only report designated a Principal Federal Economic Indicator (PFEI). The WNGSR was designated as PFEI in January 2008, because it is a key source of weekly natural gas volumetric data. Each week, EIA collects data about the amount of working natural gas in underground storage facilities as of 9 a.m. Friday. EIA compiles and processes these data for release on its website the following Thursday at 10:30 a.m. Summary totals are presented for the United States broken into three regions: the West, the East, and the Producing Region.

EIA is submitting this report, in accordance with the Office of Management and Budget's Statistical Policy Directive Number 3, which requires each agency that issues a PFEI to report every 3 years on the performance of that principal indicator. Statistical Policy Directive No. 3 further requires that a PFEI performance evaluation address the "accuracy and reliability of the series, the effects of revisions, and performance relative of established benchmarks"[1] as well as other standards for documentation, promptness in releasing estimates, and avoidance of premature disclosure. In this report, EIA finds that the WNGSR has performed effectively in each of these performance elements during its inaugural 3-year (2008 through 2010) period as a PFEI.

I. Accuracy and Reliability of the Series

The WNGSR relies on weekly survey data from a sample selected with probability proportional to size of operators of underground storage facilities.[2] EIA's survey form, "Weekly Underground Natural Gas Storage Report" (Form EIA-912), collects data on the volumes of working gas in storage. The frame for the EIA-912 is the list of respondents to EIA's "Monthly Underground Natural Gas Storage Report" (Form EIA-191), which is a census of operators of underground natural gas storage fields in the United States. EIA aggregates EIA-191 data by State and storage region, and reports them with a 2-month lag in the *Natural Gas Monthly*.

[1] *Federal Register*, Vol. 50, No. 186, Office of Management and Budget (September 25, 1985), pp. 38932-34, http://www.whitehouse.gov/sites/default/files/omb/assets/omb/inforeg/statpolicy/dir_3_fr_09251985.pdf.
[2] Energy Information Administration, ***Methodology***, November 25, 2008, http://ir.eia.gov/ngs/methodology.html.

Sampling Error

EIA uses a bootstrap method[3] to compute standard errors for the *WNGSR*, because the EIA-912 estimator is a complex, non-smooth function, and the sample design is stratified. The bootstrap method has the most flexibility in dealing with the EIA-912's small sampling fractions and non-smooth estimator. Once a month, EIA calculates standard errors and coefficients of variation for the three regions and nationally (Table 1). Estimated coefficients of variation fall well within the target level of 3 percent nationally and in all regions except the West. Relatively large coefficients of variation in the West, based on bootstrap standard errors, result from the small number of companies in the region. However, sample coverage is well above 90 percent of total inventories in the West, and comparisons of the weekly estimates in the West closely track the monthly census of storage operators presented in the *Natural Gas Monthly* (discussed in more detail below).

Differences between Monthly and Interpolated Weekly Values

Comparing the *WNGSR* series with monthly working gas inventories reported in the *Natural Gas Monthly* provides an additional benchmark to evaluate the performance of the weekly series. As a census survey, rather than a sample survey, the monthly data can generally be considered more accurate than the weekly because there is no sampling error. In addition, because there is more time available for respondents to report and for EIA to review the data, it is likely that nonsampling error, such as error in measurement or reporting error, is reduced. To perform the comparison, a simple average daily interpolation was used to transform the weekly series into a monthly series that coincides with the last calendar day of the month.

The *WNGSR* sample was selected to achieve a target standard error of the estimate of working gas in storage of 3 percent for each region. On a national level, the average absolute difference between the two series for the period from 2008 to 2010 was 0.5 percent of monthly working gas levels (12 billion cubic feet (Bcf)), and the root mean square error was 15 Bcf (Table 2).

Factors contributing to the implied differences include:

- inadequacies in the linear interpolation of the weekly data to match the monthly cycle;
- revisions or resubmissions of data on the EIA-912;
- reclassification of base gas[4] to working gas during the 2-month lag between collecting the two series; and
- volume estimates for the nonsampled weekly operators that differ from actual values.

[3] Efron, B., and Tibshirani, R. J., *An Introduction to the Bootstrap*, (New York: Chapman & Hall, 1993).

[4] Base gas is the volume of gas needed to maintain adequate reservoir pressures and deliverability rates throughout the withdrawal season; base gas usually is not withdrawn. Working gas is the volume of natural gas in an underground storage facility available to be withdrawn, not including base gas.

Table 1. Sampling Errors and Coefficients of Variation for the WNGSR, 2008-2010

	Standard Error (Bcf)				Coefficient of Variation			
Week	East	Producing	West	National	East	Producing	West	National
1/4/2008	16.5	11.7	4.2	20.4	1.1%	1.4%	1.1%	0.7%
2/1/2008	13.5	9.3	3.6	16.7	1.2%	1.4%	1.4%	0.8%
2/29/2008	11.9	6.5	4.0	14.3	1.6%	1.2%	2.1%	1.0%
3/28/2008	11.2	6.7	1.1	12.9	2.0%	1.4%	0.7%	1.0%
5/2/2008	10.6	7.9	1.3	13.2	1.5%	1.4%	0.7%	0.9%
6/6/2008	12.1	11.8	5.4	18.0	1.3%	1.8%	2.0%	1.0%
6/27/2008	15.1	11.4	7.7	19.9	1.4%	1.7%	2.6%	1.0%
8/1/2008	16.4	10.5	4.4	19.8	1.2%	1.5%	1.3%	0.8%
8/29/2008	15.9	10.7	4.4	19.6	1.1%	1.5%	1.3%	0.8%
10/3/2008	20.5	10.8	2.2	23.3	1.1%	1.3%	0.5%	0.8%
10/31/2008	24.1	12.5	5.8	27.4	1.2%	1.4%	1.3%	0.8%
11/28/2008	19.4	15.8	4.1	24.9	1.0%	1.6%	0.9%	0.7%
1/2/2009	19.8	11.6	3.2	23.4	1.3%	1.3%	0.8%	0.8%
1/30/2009	15.6	10.1	6.1	19.7	1.5%	1.4%	1.8%	0.9%
2/27/2009	14.7	11.3	8.5	20.9	1.9%	1.6%	3.0%	1.2%
4/3/2009	11.9	7.6	11.0	18.1	1.9%	1.0%	3.9%	1.1%
5/1/2009	10.7	6.1	11.4	17.0	1.3%	0.7%	3.6%	0.9%
5/29/2009	14.5	10.1	11.9	21.0	1.4%	1.1%	3.2%	0.9%
6/26/2009	16.4	11.2	13.8	24.1	1.3%	1.1%	3.2%	0.9%
7/31/2009	15.5	15.0	11.7	24.3	1.0%	1.4%	2.7%	0.8%
8/28/2009	17.7	15.4	10.6	25.7	1.0%	1.4%	2.3%	0.8%
9/25/2009	18.7	16.3	9.6	26.1	1.0%	1.4%	2.0%	0.7%
10/30/2009	20.8	16.8	11.2	28.3	1.0%	1.4%	2.2%	0.7%
11/27/2009	20.6	18.2	13.1	30.6	1.0%	1.5%	2.5%	0.8%
1/1/2010	17.8	16.6	12.1	26.3	1.1%	1.7%	2.8%	0.8%
2/26/2010	10.3	14.9	5.8	18.8	1.2%	2.6%	2.0%	1.1%
3/26/2010	8.5	13.8	6.2	17.6	1.4%	2.4%	2.2%	1.2%
4/30/2010	12.2	15.2	10.7	22.0	1.3%	2.0%	3.3%	1.1%
5/28/2010	13.3	16.4	14.5	24.9	1.2%	1.9%	3.7%	1.1%
6/25/2010	14.3	18.1	17.6	28.9	1.1%	1.9%	4.0%	1.1%
7/30/2010	15.9	19.0	12.1	27.2	1.1%	1.9%	2.6%	0.9%
8/27/2010	18.0	18.3	6.2	27.0	1.1%	1.9%	1.3%	0.9%
9/24/2010	19.6	17.9	6.1	28.1	1.1%	1.7%	1.2%	0.8%
10/29/2010	21.3	19.1	8.0	29.7	1.0%	1.6%	1.6%	0.8%
11/26/2010	21.6	18.7	9.9	30.0	1.1%	1.5%	2.0%	0.8%
12/24/2010	17.2	18.6	9.4	26.9	1.0%	1.7%	2.1%	0.8%

Source: Energy Information Administration, Form EIA-912, *Weekly Underground Natural Gas Storage Report*, 2008-2010

Table 2. Differences between Interpolated End of Month from Weekly and Published Monthly Working Gas Estimates, 2008-2010

	Monthly From Weekly Values (Bcf)				Natural Gas Monthly (Bcf)				Difference From Natural Gas Monthly Values(Bcf)				Percentage Difference From Natural Gas Monthly Values			
Month End	East Region	Producing Region	West Region	Total Lower 48	East Region	Producing Region	West Region	Total Lower 48	East Region	Producing Region	West Region	Total Lower 48	East Region	Producing Region	West Region	Total Lower 48
Jan-08	1,155	677	258	2,091	1,139	660	256	2,055	16	17	2	36	1.4%	2.6%	0.8%	1.8%
Feb-08	760	535	189	1,484	749	524	191	1,465	11	11	-2	19	1.5%	2.1%	-1.0%	1.3%
Mar-08	570	498	174	1,242	574	497	176	1,247	-4	1	-2	-5	-0.7%	0.2%	-1.1%	-0.4%
Apr-08	679	544	194	1,417	689	549	197	1,436	-10	-5	-3	-19	-1.5%	-0.9%	-1.5%	-1.3%
May-08	913	651	253	1,817	924	657	256	1,836	-11	-6	-3	-19	-1.2%	-0.9%	-1.2%	-1.0%
Jun-08	1,142	709	305	2,157	1,157	705	310	2,171	-15	4	-5	-14	-1.3%	0.6%	-1.6%	-0.6%
Jul-08	1,410	746	353	2,509	1,415	745	356	2,516	-5	1	-3	-7	-0.4%	0.1%	-0.8%	-0.3%
Aug-08	1,689	794	381	2,864	1,693	791	382	2,867	-4	3	-1	-3	-0.2%	0.4%	-0.3%	-0.1%
Sep-08	1,880	852	428	3,160	1,887	845	431	3,163	-7	7	-3	-3	-0.4%	0.8%	-0.7%	-0.1%
Oct-08	2,010	939	463	3,412	2,009	932	458	3,399	1	7	5	13	0.0%	0.8%	1.1%	0.4%
Nov-08	1,912	961	466	3,339	1,909	971	466	3,346	3	-10	0	-7	0.2%	-1.0%	0.0%	-0.2%
Dec-08	1,554	898	391	2,843	1,552	901	388	2,840	2	-3	3	3	0.1%	-0.3%	0.8%	0.1%
Jan-09	1,071	753	333	2,156	1,053	756	331	2,142	18	-3	2	14	1.7%	-0.4%	0.6%	0.7%
Feb-09	780	705	291	1,777	767	707	287	1,761	13	-2	4	16	1.7%	-0.3%	1.4%	0.9%
Mar-09	644	738	283	1,665	644	734	279	1,656	0	4	4	9	0.0%	0.5%	1.4%	0.5%
Apr-09	760	821	317	1,898	768	821	314	1,903	-8	0	3	-5	-1.0%	0.0%	1.0%	-0.3%
May-09	1,043	941	384	2,367	1,048	940	380	2,367	-5	1	4	0	-0.5%	0.1%	1.1%	0.0%
Jun-09	1,323	1008	433	2,764	1,322	1003	427	2,752	1	5	6	12	0.1%	0.5%	1.4%	0.4%
Jul-09	1,579	1068	442	3,089	1,580	1072	434	3,086	-1	-4	8	3	-0.1%	-0.4%	1.8%	0.1%
Aug-09	1,800	1092	461	3,353	1,800	1099	454	3,352	0	-7	7	1	0.0%	-0.6%	1.5%	0.0%
Sep-09	1,981	1162	495	3,638	1,988	1164	490	3,643	-7	-2	5	-5	-0.4%	-0.2%	1.0%	-0.1%
Oct-09	2,086	1190	515	3,792	2,097	1194	516	3,807	-11	-4	-1	-15	-0.5%	-0.3%	-0.2%	-0.4%
Nov-09	2,079	1209	522	3,810	2,085	1224	524	3,833	-6	-15	-2	-23	-0.3%	-1.2%	-0.4%	-0.6%
Dec-09	1,692	1011	437	3,141	1,686	1012	433	3,131	6	-1	4	10	0.4%	-0.1%	0.9%	0.3%
Jan-10	1,218	779	355	2,351	1,197	769	353	2,319	21	10	2	32	1.8%	1.3%	0.6%	1.4%
Feb-10	840	571	294	1,705	832	570	294	1,696	8	1	0	9	1.0%	0.2%	0.0%	0.5%
Mar-10	751	618	291	1,660	744	627	291	1,662	7	-9	0	-2	0.9%	-1.4%	0.0%	-0.1%
Apr-10	905	760	330	1,995	915	773	323	2,012	-10	-13	7	-17	-1.1%	-1.7%	2.2%	-0.8%
May-10	1,118	880	402	2,399	1,130	895	396	2,421	-12	-15	6	-22	-1.1%	-1.7%	1.5%	-0.9%
Jun-10	1,327	957	456	2,740	1,330	962	450	2,741	-3	-5	6	-1	-0.2%	-0.5%	1.3%	0.0%
Jul-10	1,499	978	476	2,953	1,507	987	473	2,967	-8	-9	3	-14	-0.5%	-0.9%	0.6%	-0.5%
Aug-10	1,697	966	476	3,139	1,701	971	479	3,150	-4	-5	-3	-11	-0.2%	-0.5%	-0.6%	-0.3%
Sep-10	1,912	1077	497	3,487	1,913	1092	495	3,500	-1	-15	2	-13	-0.1%	-1.4%	0.4%	-0.4%
Oct-10	2,087	1222	517	3,826	2,091	1237	519	3,847	-4	-15	-2	-21	-0.2%	-1.2%	-0.4%	-0.5%
Nov-10	2,024	1244	486	3,754	2,018	1263	491	3,773	6	-19	-5	-19	0.3%	-1.5%	-1.0%	-0.5%
Dec-10	1,590	1079	428	3,097	1,591	1077	439	3,107	-1	2	-11	-10	-0.1%	0.2%	-2.5%	-0.3%

Source: Energy Information Administration, Form EIA-912, *Weekly Underground Natural Gas Storage Report; Natural Gas Monthly*, 2008-2010

Revisions

EIA publishes revisions in the *Weekly Natural Gas Storage Report* when the effect of reported resubmissions of data is at least 7 billion cubic feet (Bcf) at either a regional or national level, for the preceding report week. *WNGSR's* revision posting policy was announced in a November 2002 Federal Register notice and subsequently updated in an April 2005 Federal Register notice.[5] Although all respondents' changes are entered into EIA's database for editing, imputation, and other analytic purposes, the changes only lead to a published revision when they total at least 7 Bcf at either a regional or national level. However, once the 7-Bcf revision publication threshold is exceeded in any region, then all resubmissions of data during the report week are reported, regardless of size. Consequently, published revisions on the national level may net less than 7 Bcf, as a result of offsetting revisions in another region.

Table 3. Published Revisions to the Weekly Natural Gas Storage Report, 2008-2010

Publication Date of Revision	Affected Reporting Period	Regions Affected/Amount of Revision (Bcf)	Total Reported Revision (Bcf)	Percent Difference From Original Publication Working Gas Estimate
20-Nov-08	31-Oct-08	West (+7)	7	0.2%
20-Nov-08	7-Nov-08	West (+7), Producing (-2)	5	0.1%
28-May-09	15-May-09	Producing (-9)	-9	-0.4%
14-Jan-10	1-Jan-10	East (-8), Producing (+3)	-5	-0.2%
23-Dec-10	10-Dec-10	West (+1), Producing (-10)	-9	-0.3%

Source: Energy Information Administration, Form EIA-912, *Weekly Underground Natural Gas Storage Report*, 2008-2010

During the period from 2008 through 2010, EIA revised published working gas stock data for five report periods as a result of respondent resubmissions of data. These revisions were reported to the public on four separate publication dates as noted in Table 3. The revised estimates of working gas stocks differed by less than 1 percent of the original published estimates. No single respondent was involved in more than one published revision during the 2008-2010 reporting period.

According to its published policies, EIA must issue an unscheduled release of revisions to its weekly estimates when the cumulative effect of data changes or corrections is at least 10 Bcf for the current or prior week. Revisions are to be disseminated on a Federal workday between 2:00 p.m. and 2:10 p.m. (Eastern Time) following notice of the pending release to the public between 1:00 p.m. and 1:10 p.m. (Eastern Time). No out-of-cycle revisions were required or executed during the 2008 through 2010 period.

[5] *Federal Register*, Vol. 67, No. 218, Energy Information Administration (November 12, 2002), pp. 68581-83, (http://www.eia.gov/oss/WNGSR-Revision-Policy-Nov12-2002.pdf); and *Federal Register*, Vol. 70, No. 79, Energy Information Administration (April 26, 2005), pp 21406-08, http://www.eia.gov/oss/WNGSR-Unscheduled-Release-Policy-Final-April2005.pdf.

Response Rates

Response rates to the Form EIA-912, measured as a percentage of the total number of sampled companies, never have fallen below 90 percent for any given week, and generally have exceeded 98 percent during the evaluation period from 2008 to 2010 (Table 4). EIA has never published a revision to *WNGSR* as a result of nonresponse.

Table 4. Response Rates for the Form EIA-912 Survey, 2008-2010

Response Rate (Percentage of Total Number of Sample Companies)	Frequency Count
0-89%	0
90-93%	1
94-97%	24
98-100%	132

Source: Energy Information Administration, Form EIA-912, *Weekly Underground Natural Gas Storage Report*, 2008-2010

II. Accuracy, Completeness, and Accessibility of Documentation

The methodological documentation for the WNGSR is available on the EIA website.[6] Documentation was last updated on November 25, 2008, after an independent internal quality assurance review of the *WNGSR* methodology, data processing system, and procedures by EIA's Statistical Methods Group. After examining the methodology and application, reviewers concluded that that the description of the methodology matched survey operations. This quality review ensured the completeness and accuracy of the published methodology as well as operational adherence of survey collection and data processing to the documentation. The methodology contains information about the survey and survey processing, sampling, estimation, imputation for nonresponse, computation of summary statistics, and derivation of historical estimates that predate the collection of the Form EIA-912.

III. Release Schedule Performance and Avoidance of Early Disclosure

The WNGSR is generally released each Thursday morning at 10:30 a.m., with exceptions for Federal holidays or other pre-approved purposes. Specific release times and dates for each calendar year are published in advance, and consistently have been met.

[6] See footnote number 2.

EIA had no unauthorized releases of the WNGSR data prior to the scheduled release time from 2008 through 2010, or at any time. However, a brief premature release of petroleum stock data from a different EIA weekly release, The *Weekly Petroleum Status Report* (*WPSR*), occurred on May 29, 2008, because of a combination of procedural and information technology errors involving the process and technologies deployed to respond to robot activity.

As a result of this event, on June 2, 2008, EIA instituted a review of its information technology processes to ensure the security of all of its weekly data releases.[7] This review necessitated temporarily moving the release time from 10:30 a.m. to 10:35 a.m. through January 2009. The decision to restore the 10:30 a.m. release time was announced on December 15, 2008.[8] In both cases the changes to the release time were announced prior to the scheduled release date.

EIA used that time to review the incident and took significant actions to stabilize its systems and strengthen its processes to reduce the likelihood that these errors happen again. A complete discussion of the response to this early release issue is available in the October 15, 2008, *Federal Register*.[9]

IV. Protection of Market Sensitive Information

The EIA-912 system is located at the Energy Information Administration, Forrestal Building, 1000 Independence Ave S.W., Washington, D.C. 20585. Access to the Forrestal Building is controlled by contract guard services. Data processing requires use of confidential data collected under the provisions of the *Confidential Information Protection and Statistical Efficiency Act* (CIPSEA). The EIA-912 system is not connected to another system. Changes to the PC used for processing including relocation of the system, hardware/software changes, and maintenance must be cleared by the Project Manager prior to implementation.

EIA operates the EIA-912 system in a standalone mode, Monday through Friday, during normal business hours. After-hours operations require advance approval from the Project Manager. EIA limits authorized users to EIA personnel or contractors with a need-to-know to access the data on the removable hard drives and/or the laptop. Data and software used to support processing are stored on the designated removable hard drives and/or the laptop.

Designated EIA employees and contractors perform data estimation and processing in a dedicated room in the Forrestal Building. Access is controlled by a 5-button cipher lock affixed to a soundproof door, which is locked at all times except during entry and exit of authorized personnel. The door leads into a sound-proofed office that contains no means of external communication. All removable system

[7] Energy Information Administration, *EIA Strengthens Process for Public Release of Weekly Petroleum and Natural Gas Data*, press release, June 2, 2008, http://www.eia.gov/neic/press/press300.html.
[8] Energy Information Administration, *EIA to Restore 10:30 AM Release Time for Weekly Petroleum and Natural Gas Data*, press release, December 15, 2008, http://www.eia.gov/neic/press/press311.html.
[9] *Federal Register*, Vol. 73, No. 200, Energy Information Administration (October 15, 2008), pp. 61101-61103, http://edocket.access.gpo.gov/2008/pdf/E8-24487.pdf.

components (hard drives and laptop), media (diskettes, CD's), and printed documents are stored in a GSA-approved security container, located within the dedicated room.

Visitors are not permitted access to the system during data processing without authorization of the Project Manager, on a need-to-know basis, and are accompanied by authorized staff at all times.

Authorized staff holds an estimation and data validation meeting in the dedicated room the day before scheduled release, with recorded attendance. Authorized staff runs the software for the final results and creates files for posting on the day of posting. They create primary and backup copies of needed files on thumb drives for delivery. The lead project manager for the day must sign off to authorize delivery of the files for posting. The thumb drive copies are transported by two authorized staff who sign a document acknowledging receipt of them for delivery. They carry the thumb drives directly to a separate work space within Forrestal for posting. Both remain in each others' sight. Thumb drives are held in plain sight.

Use of Storage Estimates Prior to Official Release

Access to the estimates prior to release is limited to project managers and analysts on the project team and others only as specified by the Office of Management and Budget in their Statistical Policy Directive: *Compilation, Release and Evaluation of Principal Federal Economic Indicators*. No other use of the estimates has established approval. Any other use is strictly prohibited.

Beginning with data submitted for the first report period after April 1, 2004, the information related to Form EIA-912 has been used for statistical purposes only, in accordance with the *Confidential Information Protection and Statistical Efficiency Act of 2002* (Title 5 of Public Law 107-347) and other applicable Federal laws. Data will not be disclosed in identifiable form without the respondent's consent. By law, every EIA employee, as well as every agent, is subject to a jail term, a fine, or both if he or she makes public ANY identifiable information reported through the EIA-912.