U.S. Energy Information Administration

Office of Energy Statistics

Office of Oil, Gas, and Coal Supply Statistics

Supporting Statement for Survey Clearance:

U.S. Energy Information Administration's (EIA) Oil and Gas Reserves System Surveys:

>   **Form EIA-23L,** *Annual Report of Domestic Oil and Gas Reserves (County Level Report) - Revision*

>   **Form EIA-23S,** *Annual Report of Domestic Oil and Gas Reserves (Summary Version) – Continuation of Suspension*

>   **Form EIA-64A,** *Annual Report of the Origin of Natural Gas Liquids Production – Extension of Collection without change*

>   **OMB No. 1905-0057**

Part B:

Statistical Methods

December 2015

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B. STATISTICAL METHODS

B.1.   Respondent Universe

Form EIA-23L

The Form EIA-23L, *Annual Survey of Domestic Oil and Gas Reserves*, collects data on domestic production and reserves of crude oil, condensate, and natural gas. Form EIA-64A, complimentary to the EIA-23L, collects data on production of natural gas liquids. These data are used to develop national and regional estimates of proved reserves of domestic crude oil, condensate, and natural gas, an estimated yield of natural gas plant liquids from total natural gas proved reserves, and to facilitate national energy policy decisions.

Operators of crude oil and natural gas wells were selected as the appropriate respondent population for the Form EIA-23L because the well operators have access to the most current and detailed reserves information. Therefore, they presumably have better proved reserves estimates than do other possible classes of respondents, such as working interest or royalty owners.

The universe of currently active oil and natural gas well operators in the United States contains roughly 13,000 operators. Though the larger well operators are quite well-known to EIA, they comprise only a small portion of all operators. The small well operators are not well-known and are difficult to identify because they go into and out of business more easily, frequently alter their corporate identities, make relatively large property sales and acquisitions that significantly change their size, and often change addresses. EIA uses commercial vendors of production data, such as Drilling Info, and operator data from state regulatory agencies, to build and maintain its survey frames.

EIA estimates and publishes data that meet predetermined reliability constraints on proved reserves and production for crude oil, natural gas, and lease condensate by state for most states, and by state subdivision for the states of Alaska, California, Louisiana, New Mexico, and Texas. EIA also publishes natural gas data by reservoir type for shale and coalbed methane by state/subdivision. (Hereafter, the term "state/subdivision" refers to an individual subdivision within a state or an individual state that is not subdivided.)Each operator reporting on the survey is currently asked to report proved reserves and production for crude oil, natural gas, and lease condensate by field for each field in which it operates, as well as the reservoir type associated with the reserves. Shale, coalbed methane, and conventional are the main reservoir types reported by operators. Reservoir types of low permeability and chalk are also used.

Form EIA-64A

The Form EIA-64A, *Annual Report of the Origin of Natural Gas Liquids Production*, collects information on the annual volumes of natural gas received and natural gas liquids extracted at domestic gas processing plants by area of origin. It also includes the total gas shrinkage resulting from the natural gas liquids extracted and the annual volume of natural gas utilized as fuel at gas processing plants. These data enable EIA to estimate, by area of origin, the yield of natural gas plant liquids extracted from domestic natural gas.

The EIA-64A frame is a census survey of natural gas processing plants. All natural gas processing plant operators need to file a Form EIA-64A for each of their plants. Plants are requested to report natural gas liquids production by the area of origin of the natural gas processed. The majority of the plant operators report only one area of origin for the natural gas processed by the plant. The state or the area of origin reported is generally also the plant location.

The Form EIA-64A gas plant survey frame contains data on all known active and inactive natural gas processing plants in the United States. The survey frame contains roughly 600 active natural gas plants, and many new processing plants are being built to facilitate the production of tight oil and shale gas resources. Each year, EIA provides Form EIA-64A to all known natural gas processing plant operators as of December 31 of the reporting year. In addition, plant operators whose plants were shut down or dismantled during the reporting year are required to complete forms for that portion of the reporting year the plants were operated. Many new processing plants are being built to facilitate the production of tight oil and shale gas resources.

Operators of natural gas plants were selected as the appropriate respondent population for the Form EIA-64A because they have access to the most current and detailed information on natural gas plant liquids. Therefore, these operators have better access to gas plant liquids production and gas shrinkage data than do other possible classes of respondents, such as gas producers or pipelines.

B.2.   Statistical Sampling, Imputation, and Estimation Procedures

B.2.1. Sampling

Current Form EIA-23L

EIA uses a cut-off sample for the Form EIA-23L, which includes some former respondents to the Form EIA-23S. Cut-off samples are comprised of all operators with measures of size larger than a predefined production threshold. The reporting burden for operators below the predefined threshold is eliminated. Cut-off sampling also allows data collection and validation/editing efforts to be focused on larger operators, whose responses are more likely to influence published summary-level data. Sample selection is performed using state/subdivision operator production.

Estimates are required for multiple attributes (natural gas and liquids by state/subdivision and by reservoir type). Thus, a variant of cut-off sampling, *quasi-cut-off sampling,* allows a sample design that yields reliable estimates for the various attributes (sometimes called "target variables," or "variables of interest")[1]. Because many operators selected for their production in one attribute (e.g., liquids) will also have production in other attributes (e.g., gas), a few more respondents may be added to the sample than the minimum number required to meet preset reliability constraints for a particular attribute in a particular state/subdivision. This may cause some state/subdivisions to appear to have a few "extra" respondents scattered throughout the population below the cut-off threshold, but the total number of respondents does not increase.

The cut-off sample for the Form EIA-23L will have roughly 650 respondents. As in the past, sampling will be based on annual production volumes of the well operators, at the state/subdivision and geological province level (geological provinces define the estimation groups, See section B.2.2). Using this sample design, EIA expects that roughly 90% of U.S. oil and natural gas reserves volumes will be reported on the Form EIA-23L, leaving the remaining 10% to be estimated.

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[1] Knaub J.R., Jr. (2011). "Cut-off Sampling and Total Survey Error," Journal of Official Statistics, Letter to the Editor, 27(1), pp. 135-138. http://www.jos.nu/Articles/abstract.asp?article=271135

The cut-off sample thresholds for the Form EIA-23L will be selected based on the target estimated relative standard error (RSE) value of 5% for all publication groups as shown in Tables 1 and 2 in section B.2.7. The RSE is a percentage measure of the precision of a survey statistic and is used as one way to measure error induced by sampling. RSEs are estimated to account for using model-based predicted values for the roughly 10% of the population that is either a non-respondent or not included in the sample for estimate oil and gas reserves. Most sampled areas will be able to achieve the 5% RSE, but some areas with mostly small operators may not, because the 5% condition would necessitate sampling a large number of extremely small operators. In these cases a more reasonable (higher) cut-off will be imposed to avoid over sampling these extremely small operators, to reduce respondent burden, and to stay within EIA's resource constraints. In some situations, data for these areas will be combined or withheld to prevent disclosure issues.

The sampling cut-off production rates and the survey sample are determined as follows:

1) The sampling frame is constructed from commercial data provided by Drilling Info and data provided by state and federal regulatory agencies. A census is taken of Alaska and a near census of the federal offshore Gulf of Mexico well operators.

2) Operators are sorted by their gas production, largest to smallest, for each state/subdivision and geographic province and reservoir type.

3) For each state/subdivision and reservoir type, the largest operator from each geographic province is added to the sample.

4) Operators are added to the sample one at a time for each state/subdivision publication group. To add an operator, the largest operator from each geologic province which makes up the state/subdivision is considered. Whichever one of those operators reduces the anticipated RSE of the estimated reserves the most is added to the sample. This process is repeated until the estimated RSE for each published state/subdivision estimate is 5% (or as low as possible if 5% is unattainable in a particular area consisting mostly of extremely small operators). The lowest gas production rates sampled in this way are the gas production cut-offs used for the state/subdivision and geologic provinces in subsequent operational sampling procedures. This selection procedure is performed for every possible state/subdivision substratum. Some state/subdivision substrata may be combined.

5) Operators are sorted by their oil production, largest to smallest, for each state/subdivision and geographic province and reservoir type.

6) For each state/subdivision and reservoir type, the largest operator from each geographic province is added to the sample.

7) Operators are added to the sample one at a time for each state/subdivision publication group. To add an operator, the largest operator from each geologic province which makes up the state/subdivision is considered. Whichever one of those operators reduces the anticipated RSE of the estimated reserves the most will be added to the sample. This process will be repeated until the estimated RSE for each published state/subdivision estimate is 5% (or as low as possible if 5% is unattainable in a particular area). The lowest oil production rates sampled in this way will be the oil production cut-offs used for the state/subdivision and geologic provinces. This selection procedure will be performed for every possible state/subdivision substratum. Some state/subdivision substrata may be combined. Operators producing less than 500 barrels of oil per day nationally will not be selected in this fashion, regardless of their impact on RSE calculations.

See section B.2.7 for estimates of anticipated RSEs. The proposed sample size is 650. This is a reduction of 200 respondents from the sample size of 850 in the previous clearance. The reduction in the sample

size is due to two reasons. First, some companies initially drawn for the sample were identified as subsidiary companies to parent companies that already were in the sample. These subsidiaries were removed from the sample and the parent companies will report for all of their subsidiary companies. Second, the geological provinces used to define estimation groups were modified to meet the target RSEs with a lower sample size.

B.2.2. Estimating Proved Reserves

The published estimates of U.S. proved reserves and production are the sum of the estimates for the individual states covered by the sample. Correspondingly, estimates for the states with subdivisions (estimates are published separately by subdivision for California, Louisiana, New Mexico, and Texas) are the sum of the subdivision estimates. The remaining states are not subdivided and may be considered as a single subdivision. EIA expects that using this cut-off sample will result in roughly 90% of the U.S. proved reserves for both oil and gas being reported directly on Form EIA-23L, leaving only 10% to be estimated.

Production data from other sources (Drilling Info or the state regulatory agencies) are used to estimate proved reserves for the non-surveyed operators. The estimates, performed at the geological province level, are based on reported reserves and production at the operator/field level within that geological province. EIA proposes to change the field level requirement and allow operators to report production and reserves estimates by county level subtotals. EIA already requires operators to include county information for each field reported, and data sources such as Drilling Info contain county information as well.

The published estimates would be created using weighted least squares to fit an equation relating production to reserves. County level data from operators who report on Form EIA-23 will be grouped into geological provinces i.e., areas that have similar geologic characteristics and are therefore more likely to be in like stages of oil and gas development and the equation is fitted separately for each province and each fuel type (crude oil, lease condensate, associated-dissolved natural gas, and nonassociated natural gas). Additional estimates would be created for shale natural gas and coalbed methane, using appropriate subtotals of county level data.

The boundaries of the geologic provinces used for this purpose are similar to the province and basin boundaries developed by the United States Geological Survey (viewable at http://certmapper.cr.usgs.gov/geoportal/catalog/search/browse/browse.page). Forty-five geologic provinces are identified, though only about 40 provinces are used in practice. Some provinces are combined because they have too few operators for sufficient statistical rigor when analyzed individually.

Use of this estimation procedure reduces reporting and analysis burden by minimizing the number of operators that have to be surveyed. Since the statistical distributions of production and proved reserves are to a significant degree positively skewed, weighted linear regression estimation is used to reduce a propensity for dominance of the provincial fit by the largest operators and largest fields. The weight is defined as inverse of the operator's size or annual production.

The following ratio estimation function is used in the provincial estimation models:

(1) $RCP = x * PCP$

where:

RCP = Operator's Year End Reserves in County (C) in Province (P),

PCP = Operator's Annual Production in County (C) in Province (P), and

x = fit parameter determined by weighted least squares.

For each geologic province, ratio estimation functions were derived for conventional liquids production and conventional gas production, using Equation (1). Three more functions are derived for shale natural gas, coalbed methane, and tight oil. Operators that report a reserves-to-production ratio greater than 50 are excluded from the calculation of the province coefficients. (Note that the aforementioned situation is rare—the reported values of this type are typically erroneous or based on less than a full year's production.)

The CRE function is applied to data for non-sampled operators from Drilling Info to estimate the proved reserves of non-surveyed operators in all states, except Illinois, Indiana, Kentucky, and Tennessee. Current production information is not available in these four states, so the same estimation procedure described above is not applicable.

Obtaining operator production data for the smaller oil and gas producing states of Tennessee, Illinois, Kentucky, and Indiana requires an alternative approach to using Drilling Info data, because Drilling Info excludes these states or the data is not current. Samples of operators in these states must be built from lists of oil and gas companies licensed to do business in the state, internet searches, and past reports on the Forms EIA-23L and EIA-23S. Because production data is not current or not available, the sampling process described in the previous section cannot be used. The summary-level data (U.S. level and "Miscellaneous States" level) may be published including these states 'as reported' (i.e., no estimates for the total state population will be generated for these states).

The largest operators in the states of Illinois, Indiana, Kentucky, and Tennessee should be identifiable using prior years' data from Drilling Info where available and current data from state regulatory agencies. However, the frame will be incomplete and may be insufficient to reliably estimate reserves for non-sampled operators in these states. These four states, when combined, are estimated to hold less than 0.5% of U.S. total oil and condensate reserves and less than 1% of U.S. total natural gas reserves.

EIA will continue to study the available information for Tennessee, Illinois, Kentucky, and Indiana to determine if reliable proved reserve estimates can be generated using the same methods as in the other states. In particular, EIA will coordinate with state agencies, including agencies other than oil and gas regulatory agencies, and industry trade journals, newsletters, etc., to build a sample frame that includes these states.

Figure 1 shows the map of geologic provinces used to group the reported data and estimate proved reserves for the non-sampled operators. The reported reserves and the estimated reserves are summed to the county level. The county level reserves are then summed to the state/subdivision level which is then summed to the U.S. level.
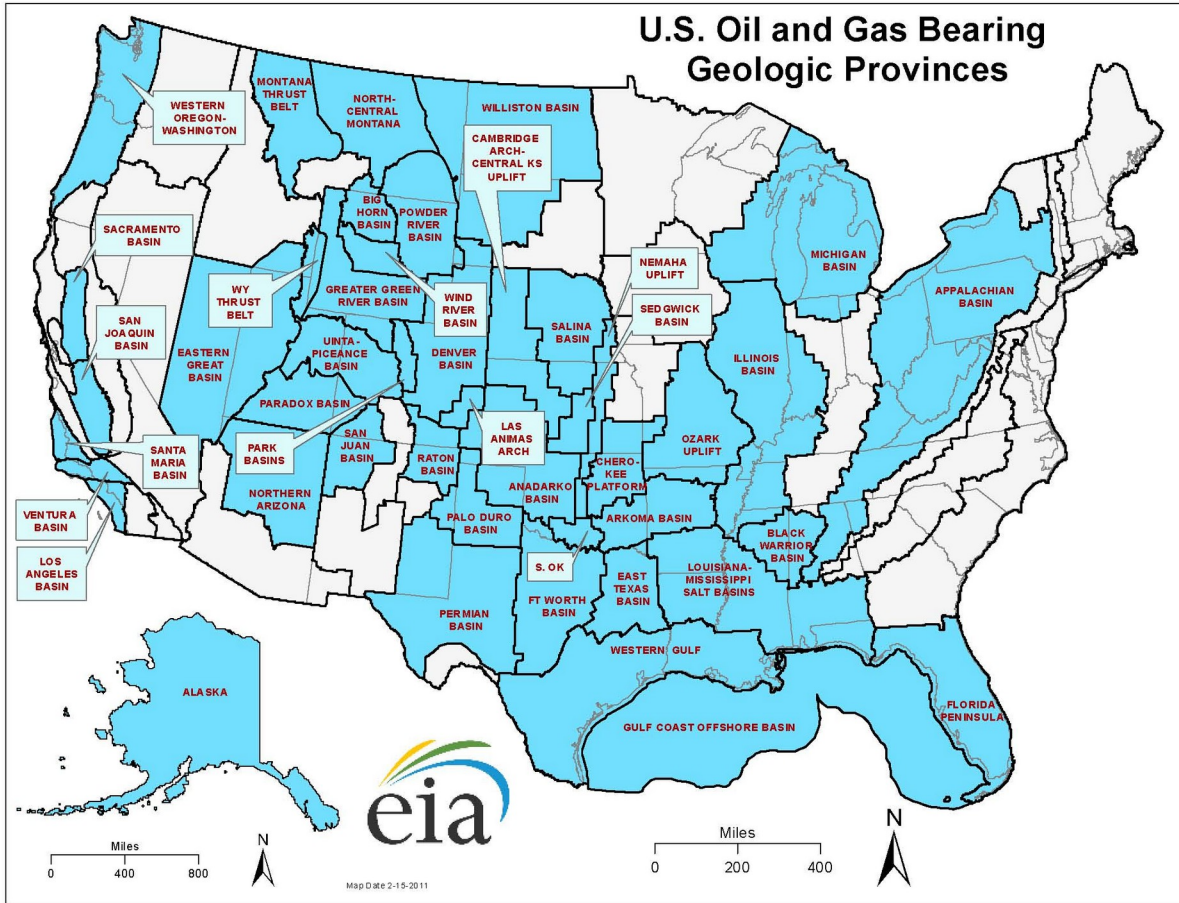
Figure 1: U.S. Oil and Gas Bearing Geologic Provinces

B.2.3. Estimating Reserves Balancing Categories

Estimated proved reserves balancing categories (i.e., revisions, extensions and discoveries, etc.) are assumed to have the same relationship to estimated year-end reserves as the reported proved reserves balancing categories have to the reported year-end reserves. Ratios for the total reported categories in a province are applied to the estimated reserves volumes to calculate the estimated balancing categories. Estimated balance items will have the same proportion to year-end reserves as do the reported volumes.

The instructions for Form EIA-23L specify that when reporting proved reserves balance data, the following arithmetic equation applies:

Proved Reserves at End of Previous Report Year

    +   Revision Increases

    −   Revision Decreases

    −   Sales

    +   Acquisitions

    +   Extensions and Discoveries

    −   Report Year Production

=   Proved Reserves at End of Report Year

Any remaining difference in the annual proved reserves balance between the published previous reporting year-end proved reserves and current reporting year-end proved reserves, not accounted for by the estimated proved reserves changes, is included in the adjustments for the area. One of the reasons that adjustments are necessary is that the inclusion of operators with the same operating characteristics in each year's sample is uncertain. There is no guarantee in the smaller producing states/subdivisions that the same small operators will be selected each reporting year, or that the operators selected will have similar production volumes when compared with operators selected in a prior reporting year.

Other reasons for more substantial adjustments to the annual proved reserves balance may include any combination of the following:

- The frame sample coverage may or may not have improved between survey years, such that more or fewer operators were included in the reporting year than the previous year.

- One or more operators may have reported data incorrectly in one reporting year or the next, but not both, and the error was not detected during data validation.

- Operation of properties was transferred during the reporting year from operators not in the sample to surveyed operators.

- Operation of properties was transferred during the reporting year to an operator with a different evaluation of the proved reserves associated with the properties than that of the previous year's operator.

- The respondent changed the classification of their natural gas from non-associated gas to associated-dissolved gas, or vice versa.

- The trend in reserves changes imputed for the non-sampled operators, which was based on the trend reported by the sampled operators, did not reflect the actual trend for the non-sampled operators.

The causes for adjustments are known for some, but not all instances of imbalance. The only problems for which the effects cannot be expected to balance over a period of several years are problems associated with an inadequate survey frame or with any actual trend in reserves changes for non-sampled operators not being the same as the reserves changes for sampled operators. EIA continues to attempt to improve sources of operator data to create as comprehensive a frame as possible.

B.2.4. Yield of Natural Gas Plant Liquids and Dry Natural Gas from Total Natural Gas

The published reserves, production, and reserves change statistics for crude oil, lease condensate, and natural gas (wet after lease separation) are derived from data reported on Form EIA-23L and the application of the estimation methods discussed previously. The information collected on Form EIA-64A is then utilized to calculate, on a regional basis, the estimated yield of natural gas plant liquids and dry natural gas from total natural gas.

In estimating the volumes of natural gas on a dry basis, downward adjustments of the natural gas data, wet after lease separation, are made. These reductions are based on estimates of the gaseous equivalents of the liquids removed (in the case of production), or expected to be removed (in the case of reserves), from the natural gas stream at natural gas processing plants. Form EIA-64A collects the volumetric reduction, or shrinkage, of the input natural gas stream that results from the removal of the natural gas plant liquids (NGPL) at each natural gas processing plant.

The shrinkage volume is then allocated to the plant's reported area or areas of origin. Because shrinkage volume is, by definition, roughly in proportion to the NGPL recovered (i.e., the volume of NGPL produced), this allocation is in proportion to the reported production of NGPL volumes for each area of origin. However, these derived shrinkage volumes are rejected if the ratio between the shrinkage and the NGPL production (gas equivalents ratio) fall outside certain limits of physical accuracy. The ratio is expected to range between 1,558 cubic feet per barrel (where NGPL consists primarily of ethane) and 940 cubic feet per barrel (where NGPL consists primarily of natural gasoline). If the computed gas equivalents ratio falls outside these limits, the plant operator is contacted to gather additional data to explain this discrepancy.

This imputed ratio is calculated for the aggregate of all plants from the area that report production and shrinkage and also have a gas equivalent ratio within the aforesaid limits. The imputed ratio is applied only if there are at least five plants reporting NGPL production in a producing area that are within these range limits. If there are less than five plants, the imputed ratio is calculated based on all plants in the survey for which the individual gas equivalents ratio is within the acceptable limits. Less than 1% of gas liquids production is associated with shrinkage volumes imputed in this manner. Based on the Form EIA-64A survey of 2014, the national weighted average gas equivalents ratio was computed to be 1,430 cubic feet of natural gas shrinkage per barrel of NGPL recovered.

The total shrinkage volume (reported plus imputed) for all plants reporting a given area of origin is then subtracted from the estimated value of natural gas production (wet after lease separation) yielding dry natural gas production for the area. The amount of the reduction in the wet natural gas production is then expressed as a percentage of the wet natural gas production. The expected yield of dry natural gas can then be calculated from wet natural gas proved reserves and proved reserves changes by using the same percentage reduction factor.

A further refinement of the estimation process is used to generate an estimate of the yield of NGPL in those states with coalbed methane fields. The states where this procedure is applied are Alabama, Arkansas, Colorado, Illinois, Indiana, Kansas, Louisiana, Maryland, Montana, New Mexico, Ohio, Oklahoma, Pennsylvania, Tennessee, Utah, Virginia, West Virginia, and Wyoming. Estimates for Illinois, Indiana, and Tennessee are not published individually, but are included in national aggregates. The first step in the process is to identify all Form EIA-23L reported coalbed methane production. The assumption is that coalbed methane fields contain little or no extractable natural gas liquids. Therefore, when the normal shrinkage procedure is applied to the natural gas proved reserves volumes, the estimate of state coalbed methane volumes are excluded and are not reduced for liquid extraction. Following the computation for shrinkage, coalbed methane reserves are added back to each of the dry gas reserves in a

state. The effect of this calculation is that the large increases in natural gas proved reserves in some states from coalbed methane fields do not cause errors in the EIA-64A derived estimates of NGPL yields.

B.2.5. Imputation for Item Non-Response

Form EIA-23L

Survey questionnaire items for which a response is not received are anticipated to be rare for the sampling method for Form EIA-23L. Non-response items will be imputed, using Equation (1) in the same manner as for the non-sampled cases.

Form EIA-64A

Form EIA-64A is a census that gathers data from all active natural gas processing plants, and a 100% response rate is expected. NGPL recovery rates are calculated from data supplied on Form EIA-64A. If a plant fails to report data, EIA will follow up with the plant operator to acquire the missing data. In the very rare event the data is lost or unattainable, production data from the Form EIA-816, *Monthly Natural Gas Plant Liquids Report*, could be used to calculate an estimated shrinkage factor for that plant.

B.2.6. Frame Maintenance

Form EIA-23L

Since its inception in 1977, EIA has maintained an operator sampling frame from which the Form EIA-23L samples have been drawn. This frame is intended to include all active crude oil and natural gas well operators in the United States.

The sampling frame maintenance procedure uses state production records and commercial information databases (Drilling Info) to update information on the definite and possible crude oil and natural gas well operators already listed, and to add information about apparent new operators. This procedure identifies both active operators and inactive/non-operators, thereby improving the sampling frame for future sample selections. The Form EIA-23L sampling frame also retains and properly identifies the names and addresses of both definite and possible non-operators (which are often prior operators) so that these operators can more easily be reclassified to the active operator list should future review indicate a resumption of operating status.

Form EIA-64A

Each year, the Form EIA-64A plant frame is compared to listings of natural gas processing plants from the Form EIA-816, *Monthly Natural Gas Plant Liquids Report,* Form EIA-757, *Natural Gas Processing Plant Survey*, the *LPG Almanac*, and the *Oil and Gas Journal*. A list of possible changes to the plant frame is compiled each year. Telephone calls to the newly-identified plants are conducted to verify their operating status. Changes identified during frame maintenance are coordinated with the Form EIA-816 and EIA-757 program offices at EIA.

B.2.7. Efforts to Reduce Total Survey Error

Frame Coverage Errors

Of all the sources of controllable error connected with the Form EIA-23L survey, errors in identifying the survey frame are expected to have the greatest impact on estimates. If the sampling frame does not list all well operators in a given state, the sample selected from the sampling frame for the state will not be representative of the entire operator population, a condition called "undercoverage."

Undercoverage is a problem with certain states, but it does not appear to be a problem with respect to the total domestic proved reserves estimates for either crude oil or natural gas. Using a state/subdivision cut-off instead of a U.S. total cut-off reduces the potential to miss a significant operator in a state.

While it is relatively straightforward to use existing sources to identify large operators and find addresses for them, such is not the case for small operators. The Form EIA-23L frame is most likely to be deficient in states where a large portion of total proved reserves and production is accounted for by small operators. These states are not likely to allocate sufficient resources to keep track of all operators on a current basis. Some undercoverage of this type may exist, particularly with respect to natural gas operators. EIA is continuing to work to remedy the undercoverage problem in those states where this problem has occurred.

Reporting Errors and Data Processing Errors

Reporting errors on the part of respondents are of concern in a survey of the magnitude and complexity of the Form EIA-23L. Several steps have been taken by EIA to minimize and detect such problems. The survey instrument is carefully developed, and it includes a detailed set of instructions for filing data, subject to a common set of definitions similar to those already used by the industry. Data validation/editing software is continually developed to detect different kinds of probable reporting errors and flag them for resolution by analysts, either through confirmation of the data by the respondent or through submission of amendments to the filed data. Data processing errors, consisting primarily of random keypunch errors, are detected by the same software.

Estimation Errors by Respondents

The principal data elements of the Form EIA-23L survey consist of respondent estimates of proved reserves of crude oil, natural gas, and lease condensate. However, until a particular reservoir has been fully produced to its economic limit and abandoned, the proved reserves of the reservoir are not subject to direct measurement, but instead must be inferred from limited, imperfect, or indirect evidence. As a result, respondents cannot perfectly estimate their proved reserves, and such estimates change over time.

Reserves estimates change from year to year as new discoveries are made, as existing fields are more thoroughly appraised, as existing reserves are produced, and as prices and technologies change. Higher fuel prices typically increase proved reserves estimates (positive revisions) as operators consider a broader portion of the resource base economically producible, or proved. Lower prices, on the other hand, generally reduce estimates (negative revisions) as the economically producible base diminishes.

Sampling Errors

As in most establishment surveys, Form EIA-23L reserves and production data are highly skewed. In most States, reserves data for natural gas, oil, and lease condensate are provided by relatively few well operators, and there are many small operators. The classical ratio estimator (CRE) is model-based and is well-suited for the cut-off sampling design used for the Form EIA-23L. CRE is based on well-established theory with readily available standard error estimators[2]. The model-based CRE[3] is quite robust for estimation of both out-of-sample cases and for non-response.

Based on the 2014 Form EIA-23 data collection, EIA anticipates RSEs by state and subdivision similar to the following:

Table 1: Anticipated Estimated Natural Gas Reserves RSEs

State/Subdivision	Estimated RSE	State/Subdivision	Estimated RSE
AK Alaska	0%	OH Ohio	4%
AL Alabama	4%	OK Oklahoma	2%
AR Arkansas	1%	PA Pennsylvania	2%
CA 1 Los Angeles Basin Onshore	5%	TX 1 Texas Railroad Commission District 1	4%
CA 2 California Coastal Region Onshore	4%	TX 2 Texas Railroad Commission District 2	4%
CA 3 California San Joaquin Basin Onshore	3%	TX 3 Texas Railroad Commission District 3	4%
CA 99 California State Offshore	4%	TX 4 Texas Railroad Commission District 4	3%
CO Colorado	2%	TX 5 Texas Railroad Commission District 5	2%
FG Federal Gulf of Mexico Offshore	3%	TX 6 Texas Railroad Commission District 6	3%
FL Florida	5%	TX 7B Texas Railroad Commission District 7B	4%
FP Federal Pacific Offshore	2%	TX 7C Texas Railroad Commission District 7C	3%
KS Kansas	4%	TX 8 Texas Railroad Commission District 8	1%
LA N Louisiana North	2%	TX 8A Texas Railroad Commission District 8A	3%
LA S Louisiana South Onshore	4%	TX 9 Texas Railroad Commission District 9	3%
LA 99 Louisiana State Offshore	4%	TX 10 Texas Railroad Commission District 10	4%
MI Michigan	3%	TX 99 Texas State Offshore	4%
MS Mississippi	4%	UT Utah	3%
MT Montana	3%	VA Virginia	2%
ND North Dakota	3%	WV West Virginia	2%
NM E New Mexico East	2%	WY Wyoming	2%
NM W New Mexico West	1%		
NY New York	5%		

Table 2: Anticipated Estimated Crude Oil Plus Lease Condensate Reserves RSEs

State/Subdivision	Estimated	State/Subdivision	Estimated

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[2] Royall, R.M. (1970), "On Finite Population Sampling Theory Under Certain Linear Regression Models," Biometrika, Vol 57, pp. 377-387.

[3] Knaub, J.R., Jr. (2005), "Classical Ratio Estimator," InterStat, October 2005, http://interstat.statjournals.net/YEAR/2005/abstracts/0510004.php?Name=510004.

	RSE		RSE
AK Alaska	0%	NM W New Mexico West	5%
AL Alabama	5%	OH Ohio	5%
AR Arkansas	6%	OK Oklahoma	5%
CA 1 Los Angeles Basin Onshore	4%	PA Pennsylvania	3%
CA 2 California Coastal Region Onshore	4%	TX 1 Texas Railroad Commission District 1	4%
CA 3 California San Joaquin Basin Onshore	3%	TX 2 Texas Railroad Commission District 2	2%
CA 99 California State Offshore	2%	TX 3 Texas Railroad Commission District 3	6%
CO Colorado	2%	TX 4 Texas Railroad Commission District 4	7%
FG Federal Gulf of Mexico Offshore	0%	TX 5 Texas Railroad Commission District 5	6%
FL Florida	5%	TX 6 Texas Railroad Commission District 6	6%
FP Federal Pacific Offshore	0%	TX 7B Texas Railroad Commission District 7B	6%
KS Kansas	5%	TX 7C Texas Railroad Commission District 7C	5%
LA N Louisiana North	3%	TX 8 Texas Railroad Commission District 8	2%
LA S Louisiana South Onshore	3%	TX 8A Texas Railroad Commission District 8A	2%
LA 99 Louisiana State Offshore	3%	TX 9 Texas Railroad Commission District 9	4%
MI Michigan	4%	TX 10 Texas Railroad Commission District 10	3%
MS Mississippi	5%	TX 99 Texas State Offshore	2%
MT Montana	3%	UT Utah	3%
ND North Dakota	2%	WV West Virginia	5%
NE Nebraska	8%	WY Wyoming	3%
NM E New Mexico East	3%		

Unit Non-response

Non-response is anticipated to be minimal for the Form EIA-23L sampling method. Because estimated reserves are published at aggregated levels by geographic region, these rare non-responses are not anticipated to have a significant impact on published totals. For states where a large share of total proved reserves is accounted for by smaller operators, any errors in estimating aggregated data are expected to be somewhat larger than in states where a large share of total proved reserves is accounted for by larger operators.

B.3.   Maximizing Response Rates

EIA uses standard procedures to conduct the data collections for the Form EIA-23L and Form EIA-64A. An introductory letter signed by a relevant EIA official is sent to each company that is selected for the sample. Follow-up procedures for non-response consist of an email message or a reminder letter (for those not using email) to all companies that do not return a completed survey form by the due date. This reminder communication is followed by repeated email messages, letters, and phone calls until a response is received or other agreeable solution is found.

B.4.   Testing Procedures

Form EIA-23L instructions will be updated to reflect the changes to Form EIA-23L and any revised online EIA glossary terms. Changes are not proposed for the Form EIA-64A data collection, and Form EIA-23S is currently suspended. Therefore, no cognitive testing or review was determined to be necessary for Forms EIA-23S or EIA-64A at this time.

B.5.   Statistical Consultations

For additional information concerning this data collection, please contact Steven Grape at (202) 586-1868, or steven.grape@eia.gov.

For information concerning this request for OMB approval, please contact the agency Forms Clearance Officer, Alethea Jennings, at (202) 586-5879, or alethea.jennings@eia.gov.