STATEMENT OF RICHARD NEWELL

ADMINISTRATOR

ENERGY INFORMATION ADMINISTRATION

U.S. DEPARTMENT OF ENERGY

before the

COMMITTEE ON ENERGY AND COMMERCE

SUBCOMMITTEE ON ENERGY AND POWER

U.S. HOUSE OF REPRESENTATIVES

February 10, 2011

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to address the subject of this hearing, the effects of Middle East events on U.S. energy markets.

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 regarding 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 United States Government. The views expressed in our reports, therefore, should not be construed as representing those of the Department of Energy or other federal agencies.

My testimony today focuses on several areas directly relevant to the hearing topic, including EIA's evaluation of the potential energy challenges posed by the situation in Egypt, our short-term and long-term outlooks for energy markets—especially petroleum, the role of the Middle East and North Africa in the global oil supply picture, the importance of choke points in the world oil transit system (see Figure 1), the role of spare production and refining capacity in the world oil market, and current features of the North American market for natural gas.

EIA's assessment of the potential implications of the situation in Egypt for energy markets

Egypt is a small net importer of crude oil, and a modest exporter of natural gas to regional markets via pipeline and as liquefied natural gas. Egypt's 2009 oil production was 680,000 barrels per day (bbl/d), or less than 1 percent of global supply of oil and other liquids, and its 2009 gas production was 2.4 trillion cubic feet, or about 2 percent of global gas production. Given Egypt's small role in the global supply-demand balance for both oil and natural gas, the primary issue for global energy markets surrounding the situation in the country is driven by two other concerns: (1) the possible spiral of unrest and (2) disruption of oil and gas transit through the Suez Canal and the SUMED pipeline.

First, there is a concern that unrest could spread to countries with a larger role in supplying world energy markets. It is not clear to what extent current oil prices, and the prices of futures and options contracts, which are discussed below, already reflect such concerns.

There is no doubt that the Middle East and North Africa are a major supply source of crude oil and other petroleum liquids to the world market. Crude oil and non-crude petroleum liquids produced in the Middle East and North Africa, which represent about 28 percent of estimated global liquids consumption of 86.6 million bbl/d in 2010, are extremely important to today's world market. In 2010, EIA estimates that 6 OPEC member countries in the Middle East (Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates) produced 20 million barrels per day (bb1/d) of crude oil, while 2 OPEC member countries in North Africa (Algeria and Libya) produced an additional 3 million bbl/d of crude oil. There is also some additional production by non-OPEC member states in both regions. OPEC members in the Middle East and North Africa also supply an important share of OPEC's non-crude petroleum liquids production,

which EIA estimates at 5.4 million bbl/d in 2010. Many analysts, including EIA, expect Middle East producers to supply a growing amount of oil to world markets in coming years.

Surplus oil production capacity, and the availability of refining capacity that can make use of the oil that would come from those sources, are important to world oil markets because they can act as a cushion in the event of any disruption in oil markets. EIA currently reports that there is about 4.7 million bbl/d of surplus capacity, with almost 80 percent of this in one country, Saudi Arabia. Most of the rest is located in other Persian Gulf countries including Kuwait, the United Arab Emirates, and Qatar. In this respect, the world oil market is much better situated to handle a disruption than it was in 2007 and early 2008, when the level of spare production capacity was extremely low. Unless a disruption were to directly affect the supply of oil from countries that maintain significant surplus capacity, the availability of that capacity could significantly cushion hypothetical disruptions affecting other important regional suppliers.

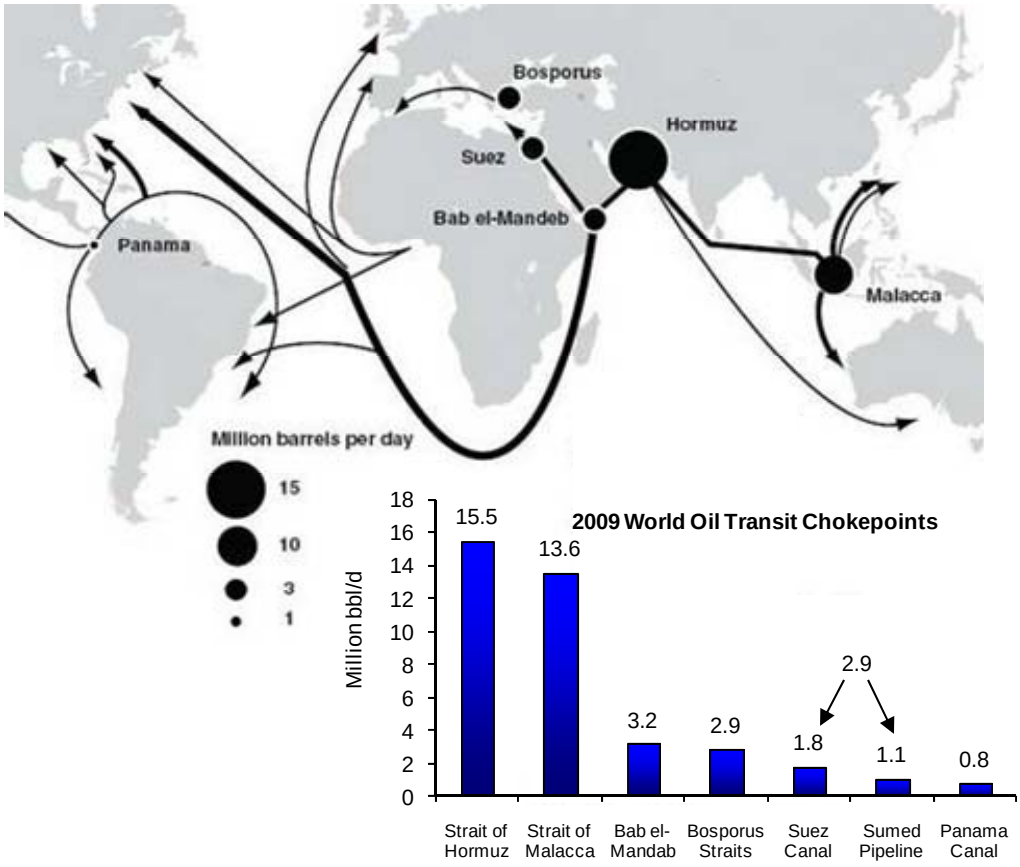
However, there is a wide range of views among analysts regarding the actual level of spare capacity. The disparity is the result of varying assessments of both actual production levels and available production capacity, and reflects a lack of transparency in global oil markets that has not been fully resolved by transparency efforts such as the Joint Oil Data Initiative (JODI). If surplus capacity were actually below EIA's published estimate, the impacts of any potential disruption on oil prices and economic output could be higher in magnitude.

In addition to tracking the level of surplus production capacity, EIA also pays close attention to refining capacity in order to better understand market dynamics. Total world refining crude oil distillation capacity as of January 1, 2011 was 88.3 million bbl/d, according to the Oil and Gas Journal. Based on reported crude oil production in 2010, the average world refinery utilization rate was about 81 percent. In 2007, when total world liquid fuels consumption was close to the level it was in 2010, the average world refining capacity utilization rate was about 86 percent.

Second, EIA took an in-depth look at a concern more directly related to Egypt involving the possibility of disruption of the Suez Canal and/or the Sumed (Suez-Mediterranean) pipeline. EIA estimates that roughly 3.1 million bbl/d (January-November 2010 average; 2.9 million bbl/d in 2009) of crude oil and oil products transit the Suez Canal or the Sumed pipeline, representing about 6 percent of total daily global waterborne oil movements. About 20-25 percent of global liquefied natural gas (LNG) shipments also pass through the canal, and several European countries are heavily dependent on those shipments. Information available to EIA as of February 8, when this written testimony was finalized, suggests that the canal and oil pipeline are both operating normally.

However, a gas pipeline in Egypt's Sinai Peninsula exploded on February 5. Jordan relies on Egyptian gas to generate around 80% of its electricity. Israel receives about 40 percent of its natural gas supply from Egypt, and 15 percent of Israeli electricity generation is met by this natural gas. Reports suggest the gas pipeline may remain shut down for about a week. While we are not aware of any reports of any current disruptions to canal or oil pipeline activity, we recognize that policymakers may want to understand the possible implications for energy markets of a disruption of these routes.

Figure 1: Major Oil Transit Chokepoints



Source: EIA (data estimates based on APEX tanker data); GAO (map)

For reasons outlined below, however, we would expect the direct effects of any such closures to be manageable, although there would undoubtedly be an adjustment period.

- Full diversion of all Suez Canal/Sumed flows around Africa is an extreme worst-case scenario, since it is likely that some crude or product streams would be redirected to reduce the need for such movements if the canal and the pipeline are disrupted.
- Even assuming a scenario where all 3.1 million barrels of crude and product that flow through the Suez Canal and Sumed daily (January-November 2010 data) were diverted around Africa, the increase in tanker requirements traffic would be modest in the context of current global oil shipment flows. Oil diverted around Africa could require an extra 6000 miles and 12 days of transit, with the actual values depending upon the exact destination.
- Our contacts in the tanker community suggest that the tanker market remains relatively relaxed. About 45 million bbl/d of waterborne oil shipments are moving

daily with a spare capacity margin of roughly 10 percent or 4 to 5 million barrels per day.

- Even if tanker rates were to increase significantly in a disruption scenario involving closure of the Suez Canal/Sumed transport route, which is again contrary to the indications above, tanker costs represent a very small component of overall delivered crude costs. For example, tanker costs from the Persian Gulf to the Gulf of Mexico generally fall within the range of $1 to $2 per barrel, so even a major increase in tanker rates would have little impact on delivered oil prices.

Impacts of the Egypt situation on U.S. energy markets

In considering the impact of recent developments on U.S. energy markets, it is important to recognize that the degree of global market integration differs across fuels. Oil is traded in a market that is fully global, so that impacts on U.S. markets would closely correspond to global market impacts. In this regard the actual source of imported oil to the U.S. does not really matter. After adjustment for quality differences, the prices of oil streams from different sources and regions are highly correlated.

The situation is somewhat different with respect to natural gas, because relatively higher transportation costs for intercontinental shipments of liquefied natural gas, and the recent rapid growth in U.S. production of shale gas, have allowed natural gas prices in North America to diverge significantly from natural gas prices in other world regions. Although small amounts of LNG continue to be imported, they do not play a large role in determining U.S. natural gas prices.

Recent oil market trends and the short-term energy outlook

At any point in time, the prices of crude oil and related futures and options derivatives reflect an aggregation of all information judged to be relevant by market participants. The situation in Egypt is certainly one important factor recently influencing prices, but there is no clear way to determine the share of recent price movement that is directly attributable to it. Some key observations concerning recent price movements follow.

West Texas Intermediate (WTI) crude prices have moved in a relatively narrow band over the past month with no strong directional trend. The daily closing price of the WTI March delivery contract ($86.94 per barrel on February 8) has generally moved in the range of $87 to $92 per barrel over the past month. The daily closing price for the Brent March delivery contract ($99.92 per barrel on February 8) has shown a clearer trend, rising about $6 per barrel over the course of the past month. The gap between Brent and WTI prices widened significantly in late January, and remains large by historical standards.

In EIA's view, recent Brent price movements are more representative of trends across broader crude oil prices that would drive gasoline prices than are recent WTI price movements. WTI prices are currently heavily influenced by storage capacity and the supply/demand balance at

Cushing, OK, the delivery point for the WTI futures contract traded on the New York Mercantile Exchange.

The short-term energy outlook

EIA's latest monthly *Short-Term Energy Outlook*, released on February 8, forecasts a continued tightening of world oil markets over the next 2 years. World crude oil and liquid fuels consumption grew by an estimated 2.4 million bbl/d in 2010, to 86.7 million bbl/d, the second largest annual increase in at least 30 years. This growth more than offset the losses of the previous two years and surpassed the 2007 level of 86.3 million bbl/d reached prior to the economic downturn. World oil consumption grows by an annual average of 1.5 million barrels per day through 2012 while the growth in supply from countries that are not members of the Organization of the Petroleum Exporting Countries (OPEC) averages about 0.3 million barrels per day this year and remains flat in 2012. Consequently, EIA expects the market will rely on both inventories and significant increases in the production of crude oil and non-crude liquids in OPEC member countries to meet world demand growth.

While on-shore commercial oil inventories in the Organization for Economic Cooperation and Development (OECD) countries remained high last year, floating oil storage fell sharply in 2010, and EIA expects that OECD oil inventories will decline over the forecast period to a level close to the middle of the previous 5-year range by the end of 2012. EIA expects that OPEC members' crude oil production will continue to rise over the next 2 years to accommodate increasing world oil consumption, especially with non-OPEC supplies expected to show limited growth. Projected OPEC crude oil production increases by 0.4 and 1.2 million barrels per day in 2011 and 2012, respectively.

Because of the projected tightening in world oil markets EIA expects the price of West Texas Intermediate (WTI) crude oil to average about $93 per barrel in 2011, $14 higher than the average price last year. For 2012, EIA expects WTI prices to continue to rise, with a forecast average price of $98 per barrel. Energy price forecasts are, however, uncertain. Based on futures and options prices, the probability that the monthly average price of WTI crude oil will exceed $100 per barrel in December 2011 is about 44 percent. Conversely, the probability that the monthly average December 2011 WTI price will fall below $85 per barrel is about 32 percent.

EIA expects regular-grade motor gasoline retail prices to average $3.15 per gallon this year, 37 cents per gallon higher than last year and $3.30 per gallon in 2012, with prices forecast to average about 5 cents per gallon higher in each year during the April through September peak driving season. There is regional variation in the forecast, with average expected prices on the West Coast about 25 cents per gallon above the national average during the April through September period. There is also significant uncertainty surrounding the forecast, with the current market prices of futures and options contracts for gasoline suggesting a 35 percent probability that the national average retail price for regular gasoline could exceed $3.50 per gallon during summer 2011 and about a 10 percent probability that it could exceed $4.00 per gallon. Rising

crude oil prices are the primary reason for higher retail prices, but higher refining margins are also expected to contribute.

The projected Henry Hub natural gas spot price averages $4.16 per million Btu for 2011, $0.22 per million Btu lower than the 2010 average. EIA expects the natural gas market to tighten in 2012, with the Henry Hub spot price increasing to an average $4.58 per million Btu.

The long-term outlook for oil and other liquids

International Energy Outlook. Before focusing on our U.S. Annual Energy Outlook, I want to briefly discuss some highlights of our *International Energy Outlook 2010* (*IEO2010*), which was issued last May. The *IEO2011* will be issued this spring. Although the *Annual Energy Outlook* focuses on our latest thoughts about domestic energy markets, it is useful to place this within a global context given the interconnectedness of U.S. energy markets and the broader global economy.

The United States accounted for one-fifth of the world's energy consumption in 2007, but this share is likely to decline over the next two decades. Global energy consumption will grow about 50 percent over the next 25 years, with most of the growth occurring outside of developed countries, in places like China, India, and the Middle East. Energy demand in non-OECD countries is expected to grow over 80 percent from 2007 levels, and by 2035 China will account for almost 25 percent of total world energy consumption. Renewables are the fastest-growing source of world energy supply, but under current market and technology trends fossil fuels are still expected to meet more than three-fourths of total energy needs in 2035, assuming current policies are unchanged.

Total global liquid fuels consumption projected for 2035 is 110.8 million barrels per day, which is 29 percent or 24.7 million barrels per day higher than the 2007 level of 86.1 million barrels per day. Conventional oil supplies from OPEC member countries contribute 11.0 million barrels per day to the total increase in world liquid fuels production from 2007 to 2035, and conventional supplies from non-OPEC countries add another 4.8 million barrels per day. World production of unconventional resources (including biofuels, oil sands, extra-heavy oil, coal-to-liquids, and gas-to-liquids), which totaled 3.4 million barrels per day in 2007, increases fourfold to 13.5 million barrels per day in 2035.

Natural gas consumption increases 44 percent globally over the projection period. Tight gas, shale gas, and coalbed methane supplies increase substantially in the *IEO2010* Reference case—especially from the United States, but also from Canada and China.

Annual Energy Outlook. Turning to the *Annual Energy Outlook 2011* (*AEO2011*), the Reference case was released in December 2010 and is intended to represent an energy future through 2035 based on given market, technological and demographic trends; current laws and regulations; and consumer behavior. EIA recognizes that projections of energy markets are highly uncertain and subject to geopolitical disruptions, technological breakthroughs, and other unforeseeable events. In addition, long-term trends in technology development, demographics,

economic growth, and energy resources may evolve along a different path than represented in the projections. The complete *AEO2011*, which EIA will release this spring, will include a large number of alternative cases intended to examine these uncertainties.

World oil prices declined sharply in the second half of 2008 from their peak in mid-July of that year. Real prices trended upward throughout 2009, and through November 2010 they remained generally in a range between $70 and $85 per barrel before climbing above $90 per barrel. Prices continue to rise gradually in the Reference case, as the world economy recovers and global demand grows more rapidly than liquids supplies from producers outside OPEC. In 2035, the average real price of crude oil in the Reference case is $125 per barrel in 2009 dollars.

The *Annual Energy Outlook 2011* (*AEO2011*) Reference case assumes that limitations on access to energy resources in resource-rich countries restrain the growth of non-OPEC conventional liquids production between 2009 and 2035, and that OPEC targets a relatively constant market share of total world liquids production. The degree to which non-OPEC and non-OECD countries restrict access to potentially productive resources contributes to world oil price uncertainty. Other factors causing uncertainty include OPEC investment decisions, which will affect future world oil prices and the economic viability of unconventional liquids. A wide range of price scenarios (from $50 per barrel to $200 dollars per barrel in 2035, in 2009 dollars) and discussion of the significant uncertainty surrounding future world oil prices will be included in the complete *AEO2011* publication.

Total U.S. consumption of liquid fuels, including both fossil liquids and biofuels, grows from 18.8 million barrels per day in 2009 to 22.0 million barrels per day in 2035 in the *AEO2011* Reference case. The transportation sector dominates the demand for liquid fuels and its share (as measured by energy content) grows only slightly, from 72 percent of total liquids consumption in 2009 to 74 percent in 2035. The *AEO2011* assumes the adoption of fuel economy standards for light-duty vehicles for model year 2011, as well as joint fuel economy and greenhouse gas emissions standards set forth by the Environmental Protection Agency (EPA) and the Natoinal Highway Traffic Safety Administration (NHTSA) for model years 2012 through 2016. The fuel economy standards increase further through model year 2020 to meet the statutory requirements of the Energy Independence and Security Act of 2007.

The Reference case does not assume any further changes in fuel economy standards. Some ideas for further standards are discussed in the September 2010 EPA/NHTSA Notice of Upcoming Joint Rulemaking to Establish 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy (CAFE) Standards. Nor does it include the proposed fuel economy standards for heavy-duty vehicles provided in *The Proposed Rule for Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles*, published by the EPA and NHTSA in November 2010. Enactment of further binding standards would lower the projection for liquid fuels use.

Biofuels account for most of the growth in liquid fuels consumption, increasing by 1.8 million barrels per day from 2009 to 2035. The biofuel portion of 2035 liquid fuels consumption is 3.9 quadrillion Btu in *AEO2011*, about the same as in *AEO2010*. Although the situation is uncertain, EIA's present view of the projected rates of technology development and market penetration of cellulosic biofuel technologies suggests that available quantities of cellulosic biofuels will be

insufficient to meet the renewable fuels standard (RFS) targets for cellulosic biofuels legislated in EISA2007 before 2022, triggering both waivers and a modification of applicable volumes, as provided in Section 211(o) of the Clean Air Act as amended in EISA2007.

U.S. dependence on imported liquid fuels, measured as a share of total U.S. liquid fuel use, reached 60 percent in 2005 and 2006 before falling to 52 percent in 2009. The liquids import share continues to decline over the projection period, to 42 percent in 2035.

In the *AEO2011* Reference case, U.S. domestic crude oil production increases from 5.4 million barrels per day in 2009 to 5.7 million barrels per day in 2035. Production increases are expected from onshore enhanced oil recovery (EOR) projects, shale oil plays, and deepwater drilling in the Gulf of Mexico. Cumulatively, oil production in the lower 48 States in the *AEO2011* Reference case is approximately the same as in the *AEO2010* Reference case, but the pattern differs in that more onshore and less offshore oil is produced in *AEO2011*.

Onshore oil production is higher in *AEO2011* as a result of an increase in EOR, as well as increased shale oil production, for which the resource estimate has been increased relative to *AEO2010*. In *AEO2011*, EOR accounts for 33 percent of cumulative onshore oil production. The bulk of the EOR production uses CO2. For CO2 EOR oil production, naturally produced CO2 or man-made CO2 captured from sources such as natural gas plants and power plants is injected into a reservoir to allow the oil to flow more easily to the well bore.

Offshore oil production in *AEO2011* is lower than in *AEO2010* throughout most of the projection period because of expected delays in near-term projects, in part as a result of drilling moratoria and associated regulatory changes, and in part due to the change in lease sales expected in the Pacific and Atlantic outer continental shelf (OCS), as well as increased uncertainty about future investment in offshore production.

As with natural gas, the application of horizontal drilling together with hydrofracturing techniques have allowed significant increases in the development of shale oil resources (oil resident in shale rock). With *AEO2011* incorporating five key shale oil plays (as opposed to two in *AEO2010*), oil production rises significantly in areas of the country where shale oil is being produced, including the Rocky Mountains (primarily from the Bakken shale), the Gulf Coast (primarily from the Eagle Ford and Austin Chalk plays), the Southwest (primarily from the Avalon play), and California (primarily from the Lower Monterey and Santos plays).

Conclusion

As I noted at the outset, while EIA does not take policy positions, its data, analyses, and projections are meant to assist policymakers in their deliberations and the private sector in making informed decisions. In addition to preparing the baseline projections that I have reviewed this morning, our full Annual Energy Outlook to be published this spring will include a large number of sensitivity cases that examine the impact of different market, technology, and policy assumptions. This concludes my testimony, Mr. Chairman and members of the Committee. I would be happy to answer any questions you may have.