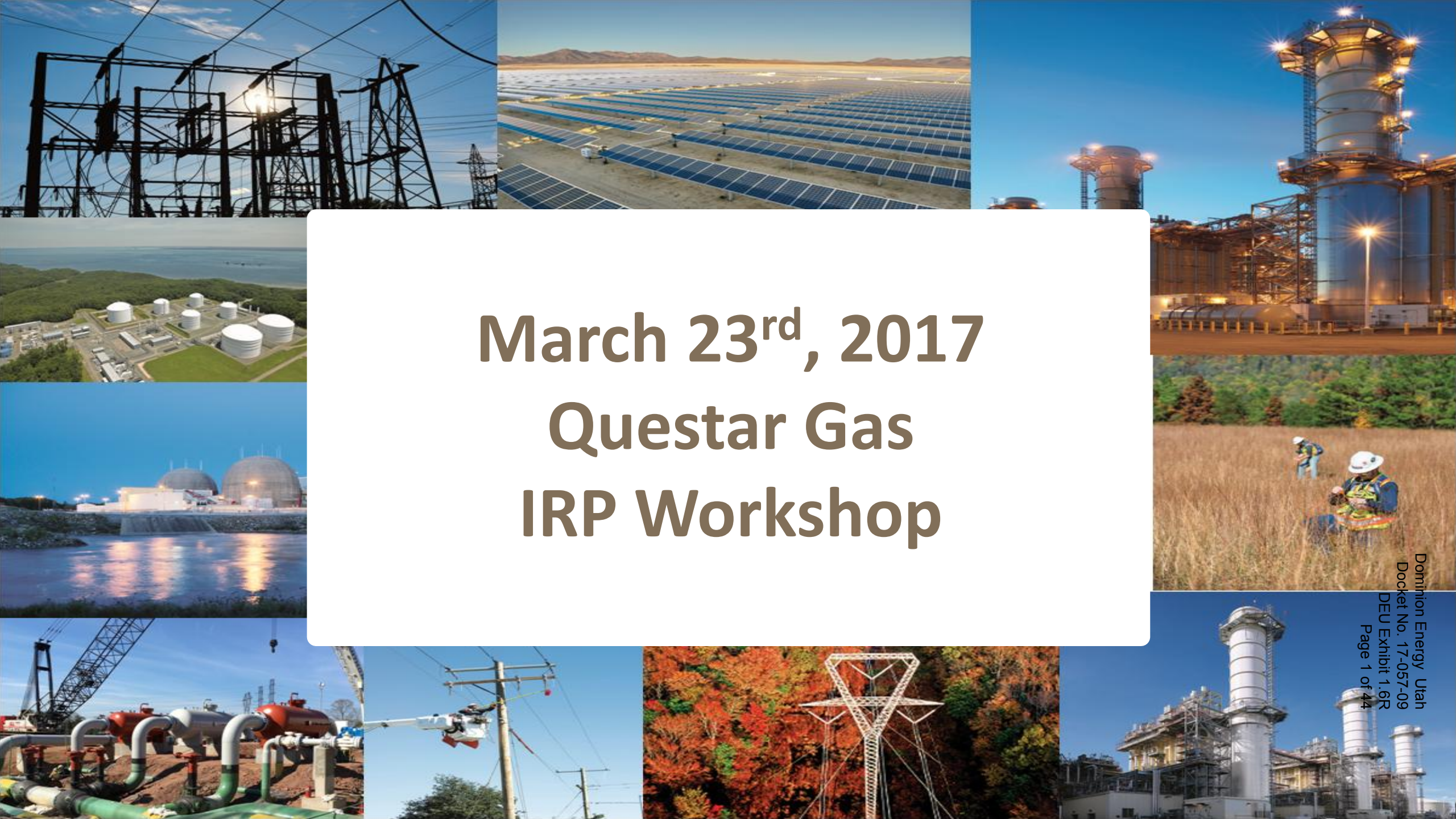


March 23rd, 2017
Questar Gas
IRP Workshop

IRP 2017 Schedule

- February 1, 2017-January 6th Weather Event, 2016 Appliance Survey
- February 28,2017-Peak Hour, Storage, and Transportation
- March 23, 2017-Liquefied Natural Gas and Excess Flow Valves
- April 20, 2017-Review of RFP, Wexpro Drill Plan
- June 27, 2017-Technical Conference

Agenda

- Excess Flow Valve Update
- Contracting Update
- Liquefied Natural Gas (LNG) Update

What an Excess Flow Valve (EFV) Will Do

- **EFVs significantly reduce the flow of natural gas if a natural gas service line is severed.**

- **Rate of flow of gas exceeds the rated flow of the device.**

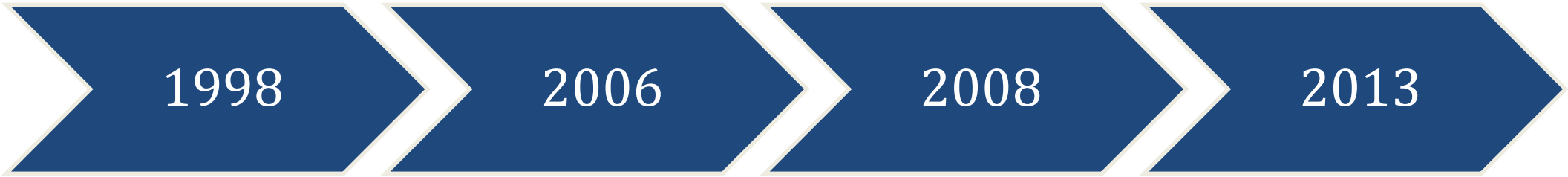
- **Prevents the build up of gas when activated reducing the risk of a natural gas fire, explosion, personal injury or property damage.**

- **Effective in areas where excavation is taking place.**
  - New subdivisions

What an EFV Will Not Do

- Activate when there is an earthquake, an EFV is different from an earthquake valve.
- Protect against leaks on service line or gas meter, such as those caused by corrosion, loose fittings, etc.
- Does not protect against leaks beyond the meter (e.g. leakage on gas fuel piping and appliances).

History



Customer Notification of EFV's on new and replaced service lines

-Required by PHMSA

QGC offered at cost of installation

QGC proactively began installing EFVs on all new and replaced services to single family residences

PHMSA rule requiring installation on all new and replaced services to single family residences effective 6/1/2008

QGC proactively began installing EFVs on services to 2" and smaller with usage of 5,000 CFH and under

Current Rule (49 CFR 192.383 and 385)

- **PHMSA Notice of Proposed Rulemaking released July 7, 2015.**

- **AGA comments**
  - Supports requirement of providing communication to existing customers of the availability of EFV's.
  - Revise final rule to include general information on the cost associated with retrofitting an existing service line to accommodate an EFV.

- **Current rule was released October 14, 2016.**

History

1998	2006	2008	2013	2017
Customer Notification of EFV's on new and replaced service lines -Required by PHMSA QGC offered at cost of installation	QGC proactively began installing EFVs on all new and replaced services to single family residences	PHMSA rule requiring installation on all new and replaced services to single family residences effective 6/1/2008	QGC proactively began installing EFVs on services to 2" and smaller with usage of 5,000 CFH and under	PHMSA rule requiring installation of EFVs on all services 1,000 CFH and smaller effective 4/14/2017

What the Rule Does

1. **Requires EFV's on all New and Replaced services 1000 SCFH and under. 49 CFR 192.383 (b)**

2. **Requires installation of manual shut off valve on all new and replaced services not having an EFV. 49 CFR 192.385 (b)**

3. **Requires operator to notify all customers in writing or electronically. 49 CFR 192.383 (e) (1)**

4. **Customer Right to Request EFV. 49 CFR 192.383 (d)**

5. **Rate-setter determines who pays. 49 CFR 192.383 (d)**

1. EFV's on all New and Replaced services 1000 SCFH and under.

- Currently installing on most services 2" and smaller with load of 5000 SCFH and lower.

- No changes needed.

2. Installation of manual shut off valve on all new and replaced services not having an EFV.

- Will begin installing manual shut off valve on all new or replaced services that do not contain an EFV beginning April 14, 2017.

- Manual valve cost ranges from $25 to $900.

3. Operator to notify all customers in writing or electronically.

- QGC is required to notify existing customers (<1000 SCFH) of the availability of EFV's.
- QGC will provide general notification on website by April 14, 2017
- QGC will also provide further notification in Gaslight news.
- Information will also be provided in new customer packets.

4. Customer Right to Request EFV.

- **On existing facilities without an EFV customer can request installation.**
  - Operator and customer determine mutually accepted date.

EFV Cost

- EFV installation on existing services is expensive; $1,000 to $2,500 per service line.
- Excavation and backfilling is costly.
- EFV cost is minimal.
- Installation of the valve takes time (labor costs).
- EFVs installed under hard surfaces are the most expensive.

5. Rate-setter determines who pays.

- **Rate setter determines how and to whom the costs of the EFV's are distributed.**
  - ***192.383 (D) The operator's rate-setter determines how and to whom the costs of the requested EFVs are distributed.***

- Option 1 - Customer pays entire cost.
- Option 2 - Customer pays part, LDC recovers remaining cost through rates. (Deferred Accounting Order)
- Option 3 - LDC recovers costs through rates. (Deferred Accounting Order)

Option 1 – Customer Pays Entire Cost

- **PHMSA suggests mandatory installation would not be cost effective.**
  - ***"Although PHMSA determined that mandatory installation on all existing lines would not be cost effective due to excavation labor costs, some individual households might have a high willingness-to-pay for EFV's due to differences in risk aversion, rate of time preference, and other factors." 49 CFR Part 192, Preamble, Page 70996.***

- **Low estimated participation**

- **Questar Gas Tariff currently requires new customers to pay for EFVs**
  - ***"Further it is PHMSA's understanding that customers would typically be required to pay for these installations." 49 CFR Part 192, Preamble, Page 70996.***

Utah Tariff Section 9.04

SERVICE LINE COSTS

Service Line Costs shall include, but are not limited to the following: pipe; trenching; fill; riser; use of special equipment and facilities; accelerated work schedules; special crews or overtime wages to meet the applicant's request; or difficult construction problems due to rock, frost, etc. Service Line Costs do not include, and the customer shall not be responsible to pay for meter costs up to the cost of a standard residential meter and bracket. Meter and bracket costs greater than the cost of a standard residential meter and bracket are included in Service Line Costs and are the responsibility of the customer. The customer will be given written notice of the Service Line Costs, which shall be due and payable prior to commencement of construction. If excess costs are incurred after commencement of construction, the costs will be paid by the customer.

Utah Tariff Section 8.01

METER RELOCATION AND/OR SERVICE LINE CHANGE AT CUSTOMER REQUEST

If the customer requests that the meter or service line be relocated, the Company will determine the feasibility of the move and provide a cost estimate for the work. The estimate will be based upon, but not limited to, the current cost of service line installation, meter resetting, permit fees and service deactivation if required. Upon acceptance of the estimate and payment by the customer, the work will be scheduled and completed.

Option 2 – Customer pays part, LDC recovers remaining cost through rates

- Need to determine specific amount paid by customer (25%-50%).
- Could require deferred accounting order and tariff change.
- Low estimated participation.

Option 3 – LDC recovers costs through rates

- **No initial cost to customer.**

- **Potential rate impact.**
  - ***Estimated cost $1,000 - $2,500 per customer.***
  - ***Potential overall cost of $600 million to $1.5 billion (assumes 600,000 existing customers participate).***

- **This option would require a deferred accounting order and tariff change.**

- **Highest expected participation.**

Action Items

- Questar Gas will continue to install EFVs on new and replaced service lines in compliance with PHMSA rule.

- QGC will provide general notification on website by April 14, 2017 and further notification in Gaslight news.

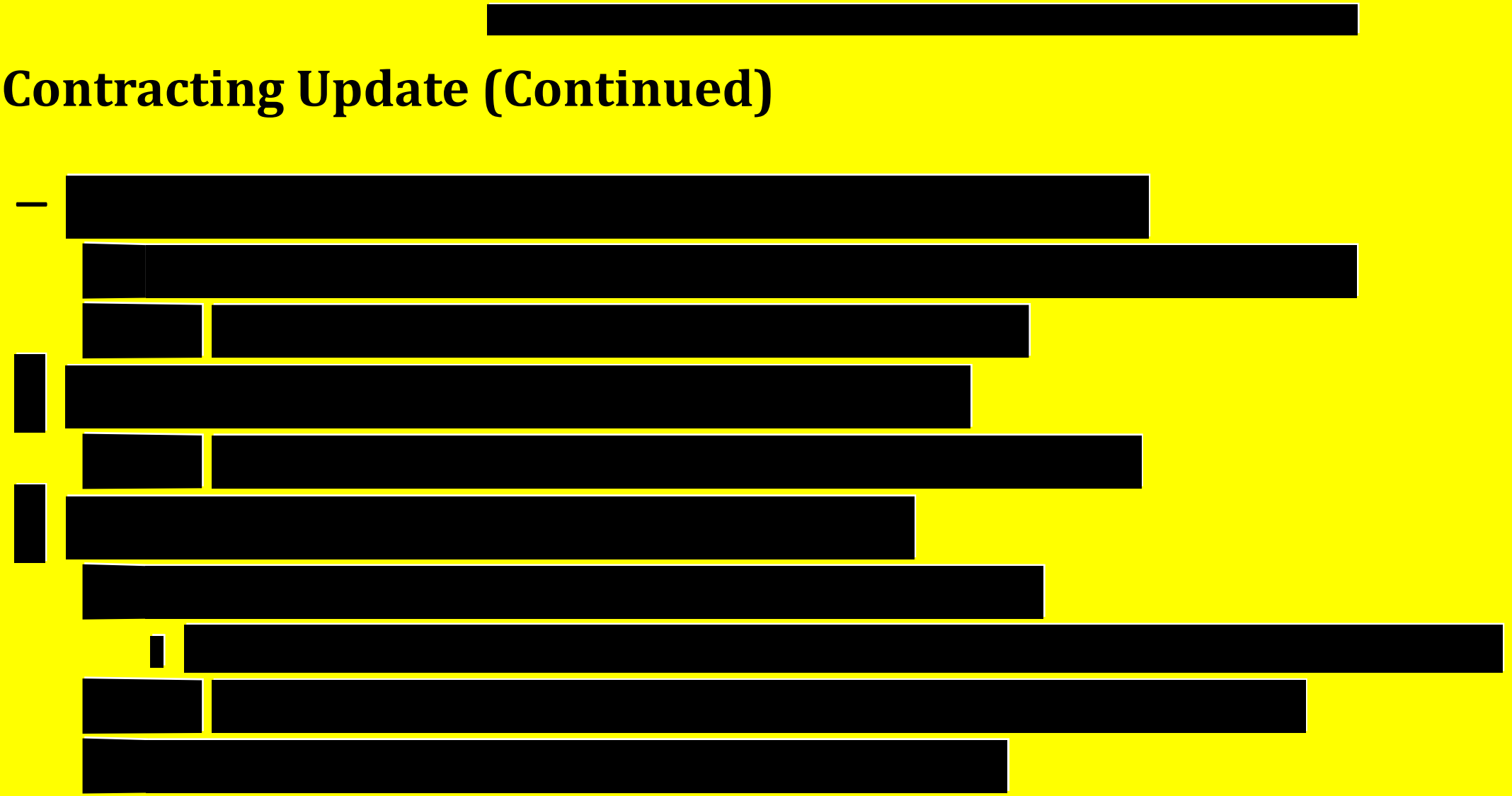
- QGC proposes to install EFVs at customer's cost (Option 1).

Contracting Update

Contracting Update

[redacted]

Contracting Update (Continued)



Liquefied Natural Gas

LNG Basics

What is LNG?

- Natural Gas in Liquid Form
- -260 degrees F
- Volume reduction of 1/600 of its original size

How is LNG made?

- Gas is transported via pipeline to a liquefaction facility
- Heavy components, water and odorant are removed from the gas
- Gas is run through a cooling process
- Two main types of refrigeration cycles available: Mix-refrigerant and Nitrogen

LNG Basics (Continued):

- **LNG Uses:**
  - Peak-shaving
  - Base load
  - Transportation fuel
- **LNG Safety:**
  - United States DOE- “The physical and chemical properties of LNG render it safer than other commonly used hydrocarbons”
  - LNG will not burn in liquid state
  - LNG vaporizes rapidly and the resulting vapor is only flammable within a narrow range of gas-air mixture
  - LNG spills rapidly evaporate leaving no residue on water or soil

Existing LNG facilities

In addition to onshore and offshore import terminals along the nation's coastline, more than 100 satellite facilities located in the United States store LNG and supply natural gas to rural areas, as well as serving as cost-effective peak shavers at times of high usage.

Everett, Massachusetts

Cove Point, Maryland

Lake Charles, Louisiana

Gulf Gateway Energy Bridge, Gulf of Mexico

Elba Island, Georgia

Source: EIA, *U.S. LNG Markets and Uses: June 2004 Update*

Western LDC Facilities

— NW Natural

- Operates two existing LNG peak-shaving plants
  - "Newport"-Newport, Oregon-1 Bcf storage capacity
  - "Gasco"-Portland, Oregon-0.6 Bcf storage capacity

— Puget Sound Energy

- "Gig Harbor" –Gig Harbor, Washington-10,500 Dth storage capacity

— Southwest Gas

- December 2014-Arizona Corporate Commission approved the construction of a new LNG peak-shaving facility (Construction has not yet started)

LNG Facilities

- **Waterbury, CT (LDC)**
  - Yankee Gas
  - 1.2 Bcf storage capacity
  - 6 mmscfd liquefaction
  - 60 mmscfd vaporization
  - $108,000,000 in 2008

- **Pine Needle, NC (FERC)**
  - Williams, Piedmont, Amerada Hess, PSNC, NCNG, MGAG
  - 4 Bcf storage capacity
  - 20 mmscfd liquefaction capacity
  - 400 mmscfd vaporization
  - $107,000,000 in 1999

LNG Facilities

- **Mt. Hayes, Vancouver BC (LDC)**
  - Fortis BC
  - 1.5 Bcf storage capacity
  - 7.5 mmscfd liquefaction
  - 150 mmscfd vaporization
  - $200,000,000 in 2011
- **Memphis, TN (LDC)**
  - Memphis Light, Gas and Water
  - 1 Bcf storage capacity
  - 5.5 mmscfd liquefaction capacity
  - 150 mmscfd vaporization

Peak-shaving Discussion

— Benefits:

- Peak-hour flexibility
- Supply and storage redundancy
- Summer Injection
- Consistent deliverability
- Potentially supply satellite locations to serve remote areas

Peak-shaving Discussion (Cont.)

- **Project Challenges:**
  - Siting
  - Permitting
- **Operating Parameters:**
  - Liquefaction of gas would occur approximately 180 days each year
    - April-September
  - Approximate 30 day transition window
    - October
  - Vaporization of gas approximately 150 days each year
    - November-March

[redacted]

Peak-shaving Discussion (Cont.)

- [redacted]

LNG Peak-Shaving Facility Construction Process

- 4 potential sites evaluated
- Preferred site selected
- Identified permitting
- Pre-FEED evaluation completed
- +/- 25% Cost estimate completed.

- Complete Front End Engineering and Design (FEED)
- Prepare technical specifications for owner-furnished equipment.
- Prepare Engineering Procurement and Construction (EPC) contract documents

- Inclusion in IRP
- Comparison of evaluated alternatives
- Regulatory technical conferences

- Secure EPC contractor
- Construct and commission facility

[redacted]

Site Evaluation and Pre-FEED Summary

[redacted]

[redacted]

Site Evaluation Summary

[redacted]

REDACTED

REDACTED

REDACTED

REDACTED

Pre-FEED Summary

[redacted]