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July 14, 2022

Residential Consumer Intervener Association
c/o Midgard Consulting Inc.
Suite 828 – 1130 W Pender Street
Vancouver, B.C.
V6E 4A4

Attention: Mr. Peter Helland, Director

Dear Mr. Helland:

Re: FortisBC Energy Inc. (FEI)

Application for a Certificate of Public Convenience and Necessity (CPCN) for the Tilbury Liquefied Natural Gas (LNG) Storage expansion (TLSE) Project (Application)

Response to the Residential Consumer Intervener Association (RCIA) Information Request (IR) No. 3 on Rebuttal Evidence

On December 29, 2021, FEI filed the Application referenced above. In accordance with the regulatory timetable established in Order G-132-22 for the review of the Application, FEI respectfully submits the attached response to RCIA IR No. 3 on Rebuttal Evidence.

For convenience and efficiency, FEI has occasionally provided an internet address for referenced reports instead of attaching lengthy documents to its IR responses. FEI intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

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1 **41. Reference: Exhibit B-46-1 Rebuttal pp.4,30; March 11, 2021 Workshop Transcript**
2 **p.98; Exhibit B-15 BCUC IR1 6.2; Exhibit B-22 RCIA IR1 8.6**

3 At page 4 of its Rebuttal Evidence, FEI states: “*FEI is, in fact, anticipating that most areas*
4 *of the system—where the segment is holding its pressure as gas is reintroduced (**which***
5 ***FEI refers to as a pressure check**)—a leak survey would occur at the same time FEI is*
6 *relighting appliances in that area.” [emphasis added]*

7 At page 30 of its Rebuttal Evidence, FEI states: “**REL states: “There is no need to**
8 **conduct leak surveys to prove the integrity of the system, and in fact such leak**
9 **surveys can only meaningfully take place once the distribution system has been**
10 **repressurized.”³⁷ Can you comment?**

11 “*FEI is already contemplating that the integrity of the system is verified, in the first instance,*
12 *by determining whether an isolated area of the system is holding pressure as expected as*
13 *gas is being reintroduced. The pressure check would reveal large leaks, such that in the*
14 *event that the system is holding pressure as expected FEI may be able to begin relighting*
15 *almost immediately while another crew conducted a leak survey in parallel.”*

16 41.1 Please explain where in FEI’s evidence filed prior to the Rebuttal Evidence that
17 FEI explains that it will conduct a pressure check to ascertain that its system is
18 tight, and that this pressure check will inform FEI as to whether it must complete
19 leak surveys of the pipelines within the segment being repressurized.
20

21 **Response:**

22 In light of RCIA’s focus on the specific steps in its intervener evidence, FEI’s Rebuttal Evidence
23 to the RCIA elaborated on and clarified the specific process of verifying the integrity of its system
24 and consequently introduced the term “pressure check” which was not explicitly referred to in its
25 earlier evidence. A pressure check is one method to verify system integrity. FEI would expect
26 that such a check is likely very similar to the process Centra conducted in the Otterburne service
27 restoration that resulted in identification of a commercial customer that had not previously been
28 isolated from the system, drawing large quantities of gas, and preventing normal system
29 pressures from being re-established.¹

30 In the response to BCUC Panel Confidential IR1 1.4.1 FEI did refer to the more general “integrity
31 check”, which, although not explicitly stated, would include a pressure check as explained in more
32 detail in its Rebuttal Evidence to the RCIA. Further, in the response to BCUC IR1 6.2 FEI
33 discussed “integrity validation” in which “integrity” referred to the ability of the system to provide

¹ Exhibit C1-10, Section 5.4 *Lessons Learned From the Otterburne No-Flow Incident* states: “As gas began to flow back into Centra’s transmission and distribution systems, Centra had one issue with repressurization. The gas service had been shut off to some but not all commercial customers. As the system began to repressurize, one large dairy farming operation began to draw so much gas that the pressure in the distribution system could not build. In hindsight, Centra stated it would have shut off more commercial services, specifically large loads in order to avoid this problem.”



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- 1 safe containment and flow of gas under pressure; again this would (implicitly) include a pressure
- 2 check.
- 3

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1 **42. Reference: Exhibit B-46-1 Rebuttal pp.5,12,24,39 Gas Safety Regulation**

2 At page 5 of its Rebuttal Evidence, FEI states: “*The Otterburne rupture event is not a*
3 *reasonable comparator. A key regulatory difference between Manitoba and BC is that FEI*
4 *would be precluded by the GSR from leaving customer meter valves open following a*
5 *system depressurization.*”

6 At page 24 of its Rebuttal Evidence, FEI states: “*As per the GSR, if the gas supply has*
7 *been turned off, then FEI must notify the customer before turning the gas supply back on*
8 *(s. 53(2)(b)) and ensure that no gas flows through to appliances or outlets in premises*
9 *unless they are checked to ascertain that they are relighted or turned off. Leaving that*
10 *aside, there is a profound difference in scope or scale of the outages that could result from*
11 *a T-South no-flow event impacting FEI’s Lower Mainland customers. Centra was faced*
12 *with a localized gas supply interruption affecting approximately 3600 customers in several*
13 *small communities. A Lower Mainland outage resulting from a no-flow event would involve*
14 *several hundred thousand FEI customers. This hundredfold difference in scale, combined*
15 *with factors like temperature and development activity in Lower Mainland climate itself,*
16 *introduces significantly greater operational and safety challenges that are not*
17 *appropriately reflected in the REL submission.*”

18 At page 12 of its Rebuttal Evidence, FEI states: “*Meters valves are always turned off prior*
19 *to restoration to comply with section 1 53(2) of the GSR.*”

20 At page 39 of its Rebuttal Evidence, FEI states: “*Further, REL does not appear to fully*
21 *acknowledge that the risks associated with a wide-scale event are significantly different*
22 *from the smaller examples provided in their submission. For example, a significant number*
23 *of customers in such an extended event would likely not be occupying their premise for*
24 *the duration of the event and may not be present to detect gas odours that indicate a*
25 *hazardous gas concentrations may be accumulating or already exist.*”

26 The Gas Safety Regulation (“GSR”) under *The Safety Standards Act* states:

27 *Turning gas supply on and off*

28 53 (1) *A person must not turn off a gas supply unless there is an imminent safety hazard*
29 *and the person notifies all affected consumers.*

30 (2) *If a gas supply has been turned off, a person must not turn the supply on again*
31 *until the person*

32 (a) *notifies all affected consumers, and*

33 (b) *carefully checks all outlets and pilots to ascertain that they are relighted or turned*
34 *off.*

35 42.1 Please confirm whether there are any situations where the GSR **requires** FEI to
36 turn the gas supply **off** at customer premises.

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1 42.1.1 If confirmed, please provide the reference to the applicable sections of
 2 the GSR that require FEI to turn the gas supply off.

3
 4 **Response:**

5 In the response to BCUC IR3 109.1, FEI explains why shutting off a meter valve at the premises
 6 is the only practical way in which FEI could comply with section 52(2)(b) of the GSR in the context
 7 of a widespread outage.

8 In addition, section 53(1) of the GSR, which deals with “Installation and Repair Procedures for
 9 Appliance and Gas Systems”, would require the gas supply to be turned off if there is an “imminent
 10 safety hazard” (e.g., a leak in the downstream piping, or an appliance that fails to shut off).

11
 12

13
 14 42.2 Please confirm whether FEI has confirmed with the applicable regulatory authority
 15 that FEI must turn off customer onsite (i.e., meter) valves in response to a zero-
 16 pressure event on FEI’s distribution system.

17
 18 **Response:**

19 FEI has relied on its own review of the GSR to determine its legal obligations. FEI has not sought
 20 specific confirmation from the applicable regulatory authority (Technical Safety BC) that FEI must
 21 turn off customer onsite (i.e., meter) valves in response to a zero-pressure event on FEI’s
 22 distribution system. Please also refer to the BCUC IR3 109 series for an explanation of why FEI
 23 regards turning off the meter valve at premises before repressurizing the adjacent portion of the
 24 distribution system is necessary to comply with section 53(2)(b) of the GSR in the context of a
 25 widespread outage.

26 FEI has provided Technical Safety BC with copies of FEI documentation such as its Shut Off and
 27 Relight procedure. This document makes reference to turning off meter sets as an action that
 28 would be required in a no-flow event on FEI’s distribution system. FEI has used this procedure
 29 over many decades and it has proven to be highly effective based on FEI’s safety record with
 30 respect to emergency response incidents and the associated shutdowns and relights. To date,
 31 FEI has not received opposition from Technical Safety BC on the contents of the above
 32 documentation and the associated emergency response practices.

33
 34

35
 36 42.3 Please provide details of any conversations FEI has had with the applicable
 37 regulatory authority on the situation envisioned in this CPCN application: a no-flow

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1 event that results in zero pressure to the entire, or nearly the entire, Lower
2 Mainland.

3

4 **Response:**

5 Please refer to the response to RCIA IR3 42.2.

6

7

8

9 42.4 Please explain whether the GSR applies to FEI's facilities that operate at pressures
10 in excess of 700 kPa.

11

12 **Response:**

13 As per section 3 of the GSR, the regulations do not apply to:

14 [...]

15 (b) any pipe in which anything is transmitted at a pressure of greater than 700 kPa
16 gauge, other than gas equipment installed in premises downstream of an outlet
17 of a gas company's service meter or gas equipment in a vehicle gas system or
18 vehicle fuel system

19 [...]

20 (e) a pipeline²

21 In other words, equipment downstream of FEI's meter set and operating at less than 700 kPa
22 gauge does fall under the GSR. This includes the vast majority of the several hundred thousand
23 residential and small commercial customers in the Lower Mainland. Further, regardless of the
24 cause of the outage to customers (i.e., even if the outage is caused by a loss of supply to FEI's
25 system operating in excess of 700 kPa or if the outage is caused by a loss of supply upstream of
26 FEI's system), the response to customers who lose gas service as a result of the upstream outage
27 is still governed by the GSR.

28

29

30

31 42.5 Please explain whether turning on the gas supply at FEI's pressure regulating
32 stations, which may not be subject to the GSR, requires FEI to notify all affected
33 customers and perform the checks in section 53(2)(b), if the customer meter valves
34 were never shut off in response to the zero- pressure event. Put another way, is it

² "pipeline" has the meaning in the *Oil and Gas Activities Act* and does not include "piping used to transmit natural gas at less than 700 kPa to consumers by a gas utility as defined in the *Gas Utility Act*."



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1 FEI's understanding that it must still follow the requirements of section 53(2) of the
2 GSR if it is not turning on the gas supply at individual customers' premises?
3

4 **Response:**

5 Please refer to the response to RCIA IR3 42.4.
6
7

8
9 42.5.1 Please confirm whether FEI has discussed this scenario with the
10 applicable regulatory authority for the GSR, in the context of the situation
11 envisioned in this CPCN application.
12

13 **Response:**

14 FEI has not discussed this specific scenario with Technical Safety BC (the applicable regulatory
15 authority for the GSR). A plain reading of the GSR indicates that the regulations apply to FEI's
16 customers supplied at less than 700 kPa, regardless of the cause of the outage event.
17
18

19
20 42.6 Please explain whether the difference between the Otterburne incident and a
21 Lower Mainland no-flow event is primarily related to the number of customers and
22 the resulting time to complete tasks for hundreds of thousands of customers
23 instead of 3,600 customers in Otterburne.
24

25 **Response:**

26 There are a number of differences between the Otterburne incident and a potential Lower
27 Mainland no-flow event, with the scale of the event being a significant one. In its Rebuttal
28 Evidence to the RCIA, FEI provided many examples of issues that occur, but occur infrequently,
29 during a system restoration and that if left unmitigated could result in a significant safety hazard
30 being created that could then result in a fire or explosion causing injury or death. As noted, the
31 much larger number of customers exposed is a significant factor. Extrapolation of the response
32 during the Otterburne incident suggests that the likelihood for unsafe situations is much higher in
33 the Lower Mainland given that the number of customers exposed is almost 200 times larger,
34 particularly when combined with the fact that the outage would be occurring in a heavily urbanized
35 area (the Lower Mainland) which has a generally milder climate that is more conducive to year-
36 round excavation activities (and consequent potential system damages).
37
38

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1
2 42.7 Please explain the “temperature” factor that distinguishes Otterburne from a Lower
3 Mainland event. Is FEI stating that the temperature in the Lower Mainland
4 contributes to significantly greater operational and safety challenges than Centra
5 experienced with the Otterburne incident?

6 42.7.1 If so, please explain why FEI sees greater operational and safety
7 challenges with the Lower Mainland than with the -26°C to - 34°C
8 temperatures (not wind chills) experienced during the Otterburne
9 incident.

10
11 **Response:**

12 FEI’s reference to “temperature” as a factor is in the context that milder wintertime temperatures
13 in the Lower Mainland region contribute to a greater level of year-round construction and
14 excavation activity than would be the case in Manitoba during winter months. This was illustrated
15 in FEI’s Rebuttal Evidence to the RCIA (pages 46 to 49) where it is evident the historical
16 wintertime drop-off of excavation activity (and the consequential number of system damages) is
17 much more pronounced in Manitoba than it is in the Lower Mainland.

18 Therefore, driven by this higher level of year-round ground disturbance activity, FEI expects its
19 system to be exposed to a higher risk of third-party damage than Centra was expecting during
20 their response to the Otterburne incident. FEI considers that this historical evidence must factor
21 into its recovery actions and timelines following a widescale extended outage.

22
23

24
25 42.8 Considering a significant number of residential customers were not at home when
26 Centra repressurized the system (due to the fact that these homes were without
27 heat for nearly three days in extreme temperatures), how is the risk for each
28 residence different between the Otterburne and Lower Mainland zero-pressure
29 incidents?

30 42.8.1 Is the risk for each residence the same and the difference in risks
31 identified by FEI a function of the same risk repeating more times for a
32 Lower Mainland incident?

33
34 **Response:**

35 FEI considers that the safety risks associated with a repressurization following a wide-scale
36 system outage would be unique to each residence and would be related to such factors as the
37 type of equipment installed, the maintenance history, the presence or absence of an occupant to
38 detect issues such as escaping gas, and so on.



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- 1 Regardless, as discussed in the responses to the BCUC IR3 109 series, FEI is precluded by the
- 2 GSR from restoring gas supply to customers (following a loss of system pressure) and simply
- 3 relying on appliance safety switches to function properly and assuming occupants are present in
- 4 all premises to detect escaping gas.
- 5

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1 **43. Reference: Exhibit B-46-1 Rebuttal pp.9**

2 At page 9 of its Rebuttal Evidence, FEI states: “*An uncontrolled outage is chaotic because,*
3 *as customers continue to consume gas within a wide geographical region, some locations*
4 *would randomly experience critical low pressures creating dangerous fluctuations in*
5 *supply during the collapse that cannot be controlled or predicted in advance. These*
6 *unpredictable fluctuations can result in customers losing, then temporarily regaining, and*
7 *then losing supply during the collapse, which creates a more dangerous situation than if*
8 *FEI is able to shut down the system methodically.*”

9 43.1 Please provide details of FEI’s experience with uncontrolled shutdowns where the
10 system experienced pressure fluctuations as described by FEI. Please confirm
11 whether customers lost and then regained supply, and what the impacts were to
12 these customers.

13
14 **Response:**

15 FEI’s description on page 9 of its Rebuttal Evidence to the RCIA describes in general terms how
16 the system behaves when the demand from connected customers exceeds the available supply,
17 leading to the system pressure declining towards zero. At low delivery pressures, appliance pilots
18 and appliances would flame-out and appliance safety devices would operate, thus reducing
19 demand. This would then lead (if the customers have not been isolated from the system) to the
20 system pressure rebuilding somewhat allowing some appliances to restart, beginning the process
21 of pressure decline again. This would result in the dangerous pressure fluctuations described in
22 FEI’s Rebuttal Evidence to the RCIA.

23 Such an event is dynamic and unpredictable. FEI does not have adequate real-time telemetry
24 from its distribution system to allow it to identify if, or where, these situations are occurring. FEI’s
25 response to indications of a supply shortage would be to isolate the downstream system quickly
26 and strategically until the supply shortage is resolved. As a result, in these instances, FEI
27 confirms that some customers would lose supply but would also be protected from regaining
28 supply in an uncontrolled and potentially hazardous manner due to pressure fluctuations. FEI
29 does not have experience with large-scale outage incidents (i.e., the loss of tens of thousands or
30 more customers) or where FEI did not respond by isolating the distribution system. As such, FEI
31 does not have record of events where customers’ appliances have been allowed to experience
32 ongoing pressure fluctuations.

33
34

35
36 43.1.1 If FEI was unable to shut off the meter valves to these customers during
37 these pressure fluctuations, did these customers resume consuming gas
38 through their appliances?
39



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1 **Response:**

2 The situation described in FEI’s Rebuttal Evidence to the RCIA is a scenario that would be
3 expected to occur during a pressure collapse affecting a wide geographical region. FEI does not
4 have experience with a sudden and widespread interruption affecting tens of thousands or more
5 customers, but the pressure fluctuations described would be an expected outcome. In such
6 circumstances, FEI’s approach would be to adopt the safest course of action, which is to
7 proactively shut down the system in a methodical manner to mitigate the safety risks associated
8 with unpredictable fluctuations in pressure.

9
10

11

12 43.1.2 Was FEI required to respond to any gas leaks or odor calls in these
13 situations? If so, please provide details.

14

15 **Response:**

16 FEI has limited experience in wide-scale, uncontrolled outages. As discussed in the response to
17 RCIA IR3 43.1, FEI would seek to avoid an uncontrolled pressure collapse by proactively shutting
18 in the vulnerable system.

19 If FEI did experience an uncontrolled outage as described on page 9 of its Rebuttal Evidence to
20 the RCIA (i.e., losing and regaining supply) FEI would expect that some customers would
21 experience gas odours and loss of supply to some or all appliances.

22

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1 **44. Reference: Exhibit B-46-1 Rebuttal pp.9**

2 At page 9 of its Rebuttal Evidence, FEI states: “*First, large commercial and industrial*
3 *customers will not have AMI, such that they will continue to draw down the pressure in the*
4 *isolated segment until the meter valve can be turned off manually (which may take 3 to 4*
5 *days).*”

6 44.1 Please confirm whether FEI’s estimate to disconnect large commercial and
7 industrial customers assumes FEI staff perform these disconnections, or whether
8 FEI can request that these customers, who likely have trained staff such as
9 facilities management personnel and power engineers, turn off their own gas
10 supplies.

11
12 **Response:**

13 FEI’s assumption is that it would use existing Lower Mainland field employees to disconnect large
14 commercial and industrial customers in the Lower Mainland. Note that the vast majority of these
15 include large commercial customers such as multi-family developments and commercial buildings
16 who operate medium-sized boilers for space heating purposes. As such, many do not have on-
17 site “facilities management personnel and power engineers” as this type of equipment is highly
18 automated in normal operations.

19 Also, for the reasons stated in the response to BCUC IR3 109.6, even if some customers were
20 able to turn off their gas supply, FEI would still ensure their service is re-gasified as per the GSR
21 requirements when the system is restored.

22
23
24

25 44.2 Please confirm whether the automated metering at these customer sites provides
26 real-time consumption data so that FEI can confirm these customers have shut
27 down.

28
29 **Response:**

30 If AMI is installed at a premises, the near real-time metering capability could be used to confirm if
31 the customer is consuming gas.

32

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1 **45. Reference: Exhibit B-46-1 Rebuttal pp.13**

2 At page 13 of its Rebuttal Evidence, FEI states: “As an illustration of the potential risks,
3 FEI is aware of reports of two gas explosions occurring in Fort McMurray when ATCO Gas
4 repressurized its system following the 2016 wildfire in that community. The
5 depressurization had affected approximately 20,000 ATCO Gas customers. According to
6 CBC News, ‘the blasts damaged neighbourhoods that were untouched by May’s wildfire.’¹⁶
7 The homes were apparently empty at the time, as the general evacuation order had not
8 yet been lifted.”

9 45.1 Please confirm whether the cause or causes of the gas leaks that caused the
10 explosions was due to failed appliance valves or appliance safety systems.

11
12 **Response:**

13 As indicated in the response to Q12 of FEI’s Rebuttal Evidence to the RCIA, ATCO did not dispute
14 that the explosion was caused by natural gas or that it occurred upon repressurization of the
15 adjacent system. FEI is not aware of the specific causes of the explosions and, to FEI’s
16 knowledge, the cause has not been publicly disclosed or determined by a court.

17

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1 **46. Reference: Exhibit B-46-1 Rebuttal pp.13**

2 At page 13 of its Rebuttal Evidence, FEI states: “*It is reasonable to expect that many*
3 *premises in the Lower Mainland would similarly be empty during a gas outage for various*
4 *reasons.*”

5 46.1 Please explain why FEI expects many Lower Mainland premises to be vacant
6 during a gas outage.

7 46.1.1 Is this assumption valid for gas outages at all times of the year?

8 46.1.1.1. If not, during which months or seasons would FEI expect
9 customers to be vacant from the homes during an extended gas
10 outage.

11
12 **Response:**

13 It is commonly known that there are vacant homes within the Lower Mainland under normal
14 circumstances year-round. In fact, in recent years the BC Provincial Government introduced a
15 Speculation and Vacancy Tax in many urban areas because of the impact of the relative
16 abundance of vacant homes perceived to be held for speculative purposes in BC. Further, in 2017
17 the City of Vancouver introduced the Empty Homes tax to encourage under-utilized or vacant
18 homes into the rental market.

19 FEI expects that in a gas outage lasting for weeks, in addition to the normally occurring vacancies
20 (i.e., vacant homes and/or occupants away for business travel, short-term and seasonal
21 vacations, or other reasons), some additional portion of those occupants without gas for heat, hot
22 water, and possibly cooking, may temporarily relocate into regions that can provide that service
23 or to local shelters where heat and hot water can be provided to larger groups. FEI expects that
24 the tendency to relocate for these reasons would be greater during colder weather and lesser in
25 warmer weather when residing in a premises without heat would be more comfortable. However,
26 some baseline home vacancy rate would likely remain relatively constant year-round.

27

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1 **47. Reference: Exhibit B-46-1 Rebuttal pp.15,17**

2 At page 15 of its Rebuttal Evidence, FEI states: “*REL’s descriptions of FEI’s approach to*
3 *purging and leak surveys oversimplifies the process. As discussed in Section 6 below, FEI*
4 *expects that leak surveys would be prioritized to certain areas of the system that have an*
5 *elevated risk of third-party damage or have been depressurized for an extended period.*
6 *Purging and leak surveys can be conducted as part of repressurizing a collapsed system*
7 *and do not significantly delay relighting customer appliances.”*

8 At page 17 of its Rebuttal Evidence, FEI states: “*Conducting leak surveys if the newly*
9 *pressurized segment does not hold pressure as expected, if there is elevated risk of third-*
10 *party damage, or if the area has been without pressure for a prolonged period.”*

11 47.1 Please explain the criteria and metrics FEI would use to prioritize leak surveys,
12 including how FEI determines whether there is an elevated risk of third-party
13 damage.

14
15 **Response:**

16 Please refer to the response to BCUC IR3 110.1.
17

18
19

20 47.2 Please explain the criteria and metrics FEI would use to prioritize purging of mains
21 and services.
22

23 **Response:**

24 Please refer to the response to BCUC IR3 110.2.
25
26

27

28 47.3 What does FEI consider to be “*a prolonged period*” for the system to be without
29 pressure?
30

31 **Response:**

32 Please refer to the response to BCUC IR3 110.1.
33
34
35



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1 47.4 Please explain why purging does not significantly delay relighting customer
2 appliances, considering purging may require excavation of mains, installation of
3 purge points (injections and flare points), purging with nitrogen, and finally the time
4 to conduct the purging operation.
5

6 **Response:**

7 FEI's approach for purging that was used to develop the timeline in Figure 1 of FEI's Rebuttal
8 Evidence to the RCIA did not assume having to excavate mains, install purge points (injections
9 and flare points), or nitrogen purging.

10 By way of explanation, as outlined in the response to BCUC IR3 110.2, the initial purging approach
11 would consist of temporarily dismantling the required number of meter sets located at system
12 end-points and purging gas through these locations. As more experience is obtained on how
13 much air has entered FEI's system, FEI may adjust its purging approach as additional system
14 segments are repressurized.

15 By using accessible meter sets as purge points and initially limiting the number of purge points to
16 determine the amount of air in the depressurized segment of the gas system, FEI expects the
17 initial purging process would take approximately one to two hours per section and hence would
18 not materially delay repressurizing the Lower Mainland gas system. However, FEI agrees that in
19 the event it proved necessary in a particular system segment to take the steps contemplated in
20 the question then it would take longer than is reflected in FEI's time estimates.

21

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1 **48. Reference: Exhibit B-46-1 Rebuttal pp.15**

2 At page 15 of its Rebuttal Evidence, FEI states: “REL says that FEI sees potential to
3 conduct relights “remotely with customer telephone” once AMI is in place. The potential to
4 reopen the automated gas valve remotely still requires someone to relight all downstream
5 appliances in the premises. As discussed in Section 8 below, based on historical
6 experience, FEI expects that a majority of Lower Mainland customers will still need on-
7 site assistance from a professional. As REL later notes, even with AMI “...the relight
8 process may still be as onerous.”¹⁹

9 48.1 Please explain the differences between the remote relight process with AMI
10 envisioned by FEI and a relight process where FEI has provided instructions to
11 customers to safely conduct their own relights.

12
13 **Response:**

14 The AMI remote reconnect process is still in the conceptual development stage. The final process
15 will need to meet the regulatory requirements of section 53(2) of the GSR if it is to proceed. In
16 Exhibit B-26 of FEI’s AMI CPCN application,³ FEI’s response to Q4, quoted below, outlines how
17 a remote reconnect process could achieve the requirements of GSR. The AMI Remote Reconnect
18 process will not provide instructions to customers on how to safely conduct their own relights, as
19 this information is available in the appliance instructions, or from the manufacturer’s website.

20 For ease of reference, the relevant passage from the FEI AMI CPCN application states:

21 “As stated in FEI’s IR responses in this proceeding and in its response to RCIA
22 IR1 8.15 in the TLSE Application process, the AMI remote reconnect process has
23 not been finalized, but the possible steps under consideration are:

- 24 • FEI gains verbal confirmation from the customer that all appliance feed
25 valves have been positioned in the off position;
- 26 • FEI then remotely opens the internal valve within the advanced meter;
- 27 • The advanced meter would monitor for any gas flow for the next three
28 minutes;
- 29 • If gas flow is detected by the advanced meter during this three-minute
30 dial check, the meter would automatically close its internal valve and
31 send a signal back to the FEI employee, indicating the situation is not
32 safe to perform the appliance relight(s).

33 At this step in the process, the potential of a leaking gas safety valve or
34 a gas cooktop that was left ‘on’ would be quickly identified and the

³ Rebuttal Evidence to CORE: https://docs.bcuc.com/Documents/Proceedings/2022/DOC_66964_B-26-FEI-RebuttalEvidence-CORE.pdf.



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1 advanced meter's firmware would automatically stop the remote
2 reconnect process by closing its internal valve.

3 • If the advanced meter does not detect gas flow during these three
4 minutes, then the remote dial check has confirmed it is safe to relight
5 the appliance(s) and the FEI employee will inform the customer they
6 can proceed and relight their appliance(s).

7 • FEI could offer the customer the option of having a qualified person
8 remotely support (via a video link) the customer during the relight, or, if
9 necessary, an FEI Customer Service Technician could provide onsite
10 support.

11 As has been outlined in this response, today FEI meets the requirements of section
12 53(2)(b) of the GSR by performing a dial check immediately after manually opening
13 the meter set valve. With the implementation of AMI, FEI will continue to meet its
14 responsibilities under section 53(2) of the GSR by having the advanced meter
15 perform a dial check and automatically close its internal valve if an unexpected
16 flow occurs as a result of a defective gas safety valve or a gas cooktop (or similar
17 appliance) being left in the 'on' position."

18
19

20

21 48.2 Please explain the basis for FEI's historical experience that the majority of
22 customers will still need on-site assistance from a professional.

23

24 **Response:**

25 Please refer to the response to BCUC IR3 112.1.

26

27

28

29 48.2.1 Does FEI have knowledge of how many customers relight their own
30 appliances as opposed to calling FEI or contractors to do so?

31

32 **Response:**

33 The data provided in the response to BCUC IR3 112.1 is the information that FEI has available to
34 it.

35

36

37

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1 **49. Reference: Exhibit B-46-1 Rebuttal pp.16**

2 At page 16 of its Rebuttal Evidence, FEI states: “*FEI’s process assuming the absence of*
3 *AMI’s automated meter valve shut off consists of three overlapping phases: **Shutdown***
4 *(Residential, Commercial and Industrial) ... Repressurization... Relights”*

5 Appendix B identifies the timelines for restoration of service following a no-flow event for
6 the scenarios with AMI and without AMI.

7 49.1 If FEI’s applications for CPCNs for TLSE and AMI are not approved, please explain
8 what changes FEI would make to the steps FEI would take both prior to and after
9 a no-flow event to reduce the duration of the outage that is shown in Appendix B.

10
11 **Response:**

12 FEI has already put significant effort into developing realistic and actionable plans that would best
13 allow it to respond so as to minimize harm to customers and the public generally. The advance
14 planning and steps are set out in the BCUC-approved System Preservation and Restoration Plan
15 and related emergency procedures, and are discussed in FEI’s Rebuttal Evidence to the RCIA.
16 These plans are already premised on the status quo (no AMI and no TLSE Project). As a result,
17 the rejection of both the TLSE and AMI Projects would be unlikely to trigger revisions to these
18 plans.

19
20

21

22 49.2 If FEI’s application for a CPCN for TLSE is not approved but the CPCN for AMI is
23 approved, please explain how the steps FEI would take to restore service would
24 change from what is provided at page 16 and what changes FEI would make to
25 the steps FEI would take both prior to and after a no-flow event to reduce the
26 duration of the outage that is shown in Appendix B.

27

28 **Response:**

29 Without the TLSE Project but following the implementation of the AMI Project, the steps that FEI
30 would take to shut down, repressurize, and then relight customers are outlined in Section 4.4 of
31 FEI’s Rebuttal Evidence to the RCIA.

32 The System Preservation and Restoration Plan, and FEI’s emergency procedures are based on
33 the status quo (i.e., a scenario where the TLSE Project does not exist and AMI is not in place).
34 AMI will provide the ability to remotely disconnect and reconnect customers as well as efficiently
35 and cost-effectively provide near real-time customer consumption and system performance data.
36 FEI’s existing plans and processes will need to evolve over time as the deployment of AMI
37 progresses. Consequently, FEI will review its plans and processes if the AMI Project application



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- 1 is approved to determine how AMI's additional capabilities could be utilized to augment FEI's
- 2 steps prior to and after a no-flow event.

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1 **50. Reference: Exhibit B-46-1 Rebuttal pp.16**

2 At page 16 of its Rebuttal Evidence, FEI states: “*Repressurization: FEI expects that*
3 *repressurization would begin approximately three days after gas flow resumes on the T-*
4 *South system (which is reflected in Figure 1 below). Before repressurization could start,*
5 *FEI would have started to segment its system into manageable sizes (typically a few*
6 *thousand customers per segment) and would have turned off the customers in the isolated*
7 *segments... Developing a detailed restoration plan for the sequencing of restoring supply*
8 *(planning would commence early and concurrently with the shutdown activities). While*
9 *much of this work has been done during the development of FEI’s Preservation and*
10 *Restoration Plan, there would still be a need to tailor the plans for the specific*
11 *circumstances of the event.”*

12 50.1 Please explain why repressurization would only begin three days after gas flow
13 resumes on T-South.

14 50.1.1 Please explain why FEI would not already have several plans for
15 repressurization depending on various scenarios for the volumes and
16 pressures that Enbridge is able to supply upon restart of T-South, such
17 that FEI could select the appropriate plan during the time that T- South is
18 shut down and Enbridge is preparing to restart.

19 50.1.2 Explain what other factors would need to be considered for which FEI
20 could not reasonably foresee and plan to address by having multiple
21 restoration plans tailored to each set of circumstances.
22
23

24 **Response:**

25 On page 16 of its Rebuttal Evidence to the RCIA, FEI describes the general sequence of events
26 following a T-South no-flow event and the corresponding wide-scale outage of FEI’s Lower
27 Mainland gas distribution system. FEI intentionally used the words “approximately three days
28 after” in its evidence to signify that there is no specific set of requirements or tasks that would
29 take exactly three days to accomplish following the restoration of gas supply. Rather, the estimate
30 reflects that FEI will not repressurize a portion of the distribution system that is not fully isolated
31 at the meter sets; it is unlikely that the repressurization effort would begin until several days after
32 that isolation effort has begun and a number of customers in the initial priority areas had been
33 isolated. The estimate of three days is thus a reasonable parameter to use in the context of
34 estimating the overall duration of a Lower Mainland outage.

35 It is not possible to provide a more definitive time before initiating repressurization. When gas
36 supply on T-South resumes there would be numerous possibilities on how that supply is restored
37 (i.e., the initial gas volumes available and any increases over time). Correspondingly, there are
38 numerous possibilities on how much of FEI’s system could be supported and therefore be
39 repressurized. It is not feasible for FEI to attempt to identify all of these possible variations and
40 develop a myriad of plans in advance of an event, but rather would tailor the restoration as



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1 necessary if and when required. Since FEI already has systems and tools in place to refine the
2 repressurization plan in the early days of an event to address the specific circumstances of the
3 incident, this effort to refine the plans would not delay the execution of the repressurization effort.

4
5

6

7 50.2 Into approximately how many segments would FEI divide the Lower Mainland as
8 part of its restoration plans?

9

10 **Response:**

11 FEI would target a customer count of approximately 3000 customers per segment on average
12 resulting in just under 220 segments for the Lower Mainland region.

13 FEI notes that the total number of customers impacted in the Otterburne incident cited in the
14 RCIA's evidence (3623 customers) is approximately the size of a single Lower Mainland segment.
15 On this basis alone, recovering from an outage impacting the entire Lower Mainland would be
16 approximately 200 times larger in scope than the Otterburne incident.

17

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1 **51. Reference: Exhibit B-46-1 Rebuttal pp.17,18,21,41**

2 At pages 17 and 18 of its Rebuttal Evidence, FEI states: “*Customer relight productivity*
3 *rates are at their highest during the first few weeks in Figure 1 as FEI crews address the*
4 *most readily accessible premises.*”²² *It assumes (for reasons discussed later) that 25*
5 *percent of customers will perform their own relights.”*

6 At page 21 of its Rebuttal Evidence, FEI states: “*Relighting: AMI would not materially*
7 *change the total time for FEI to perform relights, as the closure of the meter valve results*
8 *in depressurization of the pipes within the customer premises and the pilots in all*
9 *appliances extinguish.”*

10 At page 41 of its Rebuttal Evidence, FEI states: “*FEI’s experience and data supports that*
11 *the vast majority of customers require assistance relighting appliances when FEI restores*
12 *service to a premises after outages due to a local gas emergency, lock-off, or routine*
13 *meter exchange... FEI believes it would be highly unrealistic to expect that the majority of*
14 *the hundreds of thousands of Lower Mainland customers would undertake that work*
15 *themselves even with published instructions.”*

16 51.1 Please explain the steps FEI could take to increase the percentage of customers
17 completing their own relights.

18
19 **Response:**

20 Please refer to the response to BCUC IR3 112.1.

21
22

23
24 51.2 Please provide further explanation of FEI’s experience that indicates only 25% of
25 customers would conduct their own relights following an outage.

26
27 **Response:**

28 Please refer to the response to BCUC IR3 112.1.

29
30

31
32 51.3 Please provide FEI’s data that supports the position that the vast majority of
33 customers would not conduct their own relights following an outage.

34
35 **Response:**

36 Please refer to the response to BCUC IR3 112.1.



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51.4 Please provide any survey data from FEI’s customers that indicate their ability, propensity, or willingness to conduct their own relights following a wide-scale outage when FEI may not be able to relight them for days or weeks.

Response:

FEI has not surveyed its customers for the requested information. FEI expects that it would be very difficult to reliably predict what actions customers would take subsequent to a widespread outage event that has never happened before and is far out of their normal experience. As such, FEI considers that relying on its historical operating experience is a reasonable basis for estimating the approximate total duration of the outage. FEI recognizes that there is judgment involved in this estimate, which is why FEI included the sensitivity analysis. The sensitivity analysis scenarios demonstrate that there is no reasonable scenario in which service to the entire Lower Mainland could be restored within a short period of time as suggested by REL.

51.5 Please provide any data or details of FEI’s experience that support FEI’s assertion that only 25% of customers would conduct their own relights following a prolonged, wide-scale outage.

Response:

Please refer to the response to BCUC IR3 112.1 for the basis of FEI’s 25 percent projection. While FEI considers this projection to be reasonable even for a prolonged, wide-scale outage, in Figure 6 of FEI’s rebuttal evidence to the RCIA FEI provided additional sensitivities considering the much less credible scenarios of 50 or 75 percent of customers relighting their own appliances. Even in these scenarios it would still take more than a month to fully restore service to Lower Mainland customers.

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1 **52. Reference: Exhibit B-46-1 Rebuttal pp.17,41; Appendix B**

2 At page 17 of its evidence, FEI explains its restoration and relighting process. Appendix B
3 shows the progression of repressurization, with complete repressurization occurring at
4 Day 31 absent AMI and at Day 7 with AMI. Appendix B shows progression of relights with
5 all relights completed by Day 73 without AMI and by Day 62 with AMI.

6 At page 41 of its Rebuttal Evidence, FEI states: “*Second, since the system will be*
7 *repressurized on an area-by-area basis concurrent with FEI’s crews visiting individual*
8 *premises, customers in the earlier areas being re-gasified would save little time by*
9 *performing their own relights rather than waiting for a crew in the neighbourhood to reach*
10 *them.*”

11 52.1 Please provide further justification or explanation for why FEI is of the view that,
12 with access to gas at Day 7 (in the AMI scenario), only 25% of customers would
13 perform their own relights while 75% of customers would wait until potentially Day
14 62 for FEI to perform the relights, instead of:

- 15 i. Performing their own relight
- 16 ii. Asking a neighbour to help with the relight
- 17 iii. Hiring a heating contractor to complete the relight

18
19 **Response:**

20 FEI’s historical experience supports the assumption that 25 percent of its customers would be
21 comfortable relighting their own appliances, as discussed in response to BCUC IR3 112.1. As
22 indicated in Figure 4 of FEI’s Rebuttal Evidence to the RCIA, FEI expects that these 25 percent
23 would relight their appliances shortly after their system has been repressurized.

24 FEI has not made a projection on how effective neighbours may or may not be at helping with
25 relighting neighboring customers’ appliances. FEI does not expect this possibility would materially
26 reduce the overall time to complete all relights.

27 In Sections 4.3 and 4.4 of FEI’s Rebuttal Evidence to the RCIA, FEI has already projected all
28 available Lower Mainland gas contractors would be engaged by FEI to assist with appliance
29 relights. As such, retaining a contractor would likely not be an option.

30 FEI recognizes that there is judgment involved in this estimate of 25 percent, which is why FEI
31 included the sensitivity analysis. It shows that there is no reasonable scenario in which service
32 to the entire Lower Mainland could be restored within the short period of time suggested by REL.
33 Figure 6 of FEI’s rebuttal evidence to the RCIA FEI provided additional sensitivities considering
34 the much less credible scenarios of 50 or 75 percent of customers relighting their own appliances.
35 Even in these scenarios it would still take more than a month to fully restore service to Lower
36 Mainland customers.



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- 52.1.1 With AMI, would customers be prevented from performing their own relights without FEI first turning the internal meter shutoff valve back on?
- 52.1.2 Does the AMI system as proposed by FEI in its CPCN Application before the BCUC offer the ability for a customer to actuate the internal meter shutoff valve and turn the gas back on?

Response:

The proposed AMI meters have no capability for local manual operation of the shutoff valve. The internal valve can only be operated by FEI technicians using appropriate field tools or from the AMI head-end system. This is to ensure safety and security of the AMI network. As such, customers would be prevented from performing their own relights until FEI has first reopened the internal meter shutoff valve.

- 52.2 Please provide further justification or explanation for why FEI is of the view that, with access to gas at Day 31 (in the no-AMI scenario), only 25% of customers would perform their own relights while 75% of customers would wait until potentially Day 73 for FEI to restore gas service and perform relights, instead of:
 - iv. Performing their own relight, using instructions and videos supplied by FEI or made available on FEI's website
 - v. Asking a neighbour to help with the relight
 - vi. Hiring a heating contractor to complete the relight

Response:

Please refer to the response to RCIA IR3 52.1.

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1 **53. Reference: Exhibit B-46-1 Rebuttal pp.18**

2 At page 18 of its Rebuttal Evidence, FEI states: “*Sectionalizing FEI’s Lower Mainland*
3 *distribution system consists of closing main valves and in some cases crimping mains*
4 *within the distribution system.*”

5 53.1 Please explain why FEI would not install sectionalization valves in advance at the
6 locations it knows would need to be crimped to sectionalize its distribution system.

7 53.1.1 Please identify the time savings to the restoration process that this would
8 entail as FEI crews could be redeployed that would otherwise be
9 excavating, crimping, installing permanent valves at the crimp locations
10 (as the crimping tools cannot be relied upon for extended periods),
11 backfilling, and then re-excavating to expose and open the permanent
12 valves to repressurize.

13
14 **Response:**

15 FEI considers that it has sufficient existing valves within its distribution system to sectionalize the
16 system for the purpose of repressurizing and use of these valves would be FEI’s preferred option
17 to expedite the sectionalization process. The reference to crimping is not an indication that FEI’s
18 distribution system lacks sufficient valving to accomplish the task of sectionalizing the system.
19 FEI would only undertake crimping or otherwise isolating distribution mains if it was determined,
20 in particular circumstances, that this would be a more expedient solution and would make the
21 response more efficient and effective. Since these decisions would be made in real-time during
22 an incident, FEI is unable to speculate on any time savings during the restoration process
23 associated with crimping activities at this time.

24

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1 **54. Reference: Exhibit B-46-1 Rebuttal pp.18**

2 At page 18 of its Rebuttal Evidence, FEI states: “*By Day 8, FEI has finished sufficiently*
3 *sectionalizing the system and completing customer shutdowns at the meterset that some*
4 *areas of the Lower Mainland system can now start to be repressurized. The*
5 *repressurization work is performed segment-by-segment and in Figure 1 below, re-*
6 *gasifying a segment and purging and leak surveying the same segment are all conducted*
7 *on the same day.*”

8 *By Day 10, FEI has repressurized enough of the Lower Mainland gas system and begins*
9 *relighting customer appliances in large groups. Relights would continue until Day 72.”*

10 Appendix B spreadsheet shows approximately half of the customers would have access
11 to the repressurized system (reference cell V20 on the No AMI tab) by Day 20 following
12 the start of the no-flow incident.

13 54.1 Please confirm whether the interruption scenarios in the PricewaterhouseCoopers
14 (“PwC”) report in Appendix B of the Updated Application take into account the
15 restoration plan where some customers begin to receive service 8 days and up to
16 half of the critical customers have service restored at Day 20 (assuming the most
17 critical customers are the first to be restored when a segment is repressurized, and
18 Day 20 approximately marks the point where half the segments could be
19 energized).

20 54.1.1 If the scenarios in the PwC report do not consider the progressive
21 restoration plan and instead assume interruption to all customers for the
22 full specified scenario durations, please explain how the economic
23 impacts in the PwC report would change.

24
25 **Response:**

26 The following response was provided by PwC:

27 Although reference here is made to specific systems, PwC's assessment did not evaluate the
28 potential causes (or circumstances) of disruption events, and was not constrained to FEI specific
29 systems or customers. PwC's analysis focused on the impact that would be experienced should
30 a disruption event occur during (and resulting in) the scenario conditions described in the report.
31 Directionally, all other things being equal, a longer duration outage increases the impact, whereas
32 a shorter duration outage decreases the impact.

33 It is important to note that PwC's report and related analysis must be considered as a whole.
34 Selecting only portions of the analysis or the factors considered by PwC, without considering all
35 factors and analysis together, could create a misleading view of the findings.

36 Exploring the assumptions across scenarios for key dimensions illustrates some of this
37 complexity:

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- 1 • Temperature Assumptions
- 2 ○ **Scenario 1 & 3** assume temperatures are sufficiently warm not to trigger
- 3 temperature related impacts.
- 4 ○ **Scenario 2** assumes temperatures are sufficiently low to trigger the 16°C OH&S
- 5 office minimum for no work which would impact commercial and office type
- 6 businesses.
- 7 • Duration and Magnitude Assumptions
- 8 ○ **Scenario 1** assumes:
- 9 Total Duration of impact - 6 weeks
- 10 Initial Outage - 100% outage (i.e., no demand met) across all segments for week
- 11 1
- 12 Restoration - Supply restoration commences following week 1.
- 13 Full Restoration of Service - End of week 6
- 14 Restoration occurs at constant (i.e. linear) pace
- 15 ○ **Scenario 2 & 3** assumes:
- 16 Total Duration of impact - 120 days
- 17 Initial Outage - Partial outage (i.e., some demand met) across all segments for
- 18 month 1 as follows:
- 19 ▪ 15% of Residential demand met
- 20 ▪ 15% of Commercial / Institutional demand met
- 21 ▪ 25% of Industrial demand met
- 22 Restoration - Supply restoration commences following month 1
- 23 Full Restoration of Service - End of 120 days
- 24 Restoration occurs at constant (i.e. linear) pace
- 25
- 26
- 27
- 28 54.2 Please confirm whether the risk of third-party damages going undetected in each
- 29 segment is eliminated (or returned to a pre-incident state) once each segment is
- 30 repressurized.
- 31



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1 **Response:**

2 FEI confirms the risk of third-party damages going undetected in each segment is returned to a
3 pre-incident state once each segment is repressurized.

4

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1 **55. Reference: Exhibit B-46-1 Rebuttal pp.19**

2 At page 19 of its Rebuttal Evidence, FEI states: “*FEI would expect to start to perform*
3 *relights during Week 2 but expects that it would be resource limited because a percentage*
4 *of the field resources who are qualified to relight appliances would still be closing meter*
5 *valves.*”

6 55.1 Please identify the qualifications FEI requires for personnel to conduct relights and
7 why these qualifications are necessary.

8 55.1.1 If FEI requires ticketed gas fitters to conduct relights, please explain
9 would the timelines in Appendix B would change if additional resources
10 without gas fitter tickets (e.g., other FEI personnel, FortisBC electric
11 operations staff) could be trained to conduct relights and directed to the
12 mass relighting effort.

13
14 **Response:**

15 The framework for appliance relight qualification is based on clause 4.4.2 of the CSA B149 *Natural*
16 *gas and propane installation code* standard which states: “Personnel performing installation,
17 operation, and maintenance work shall be properly trained in such functions.”

18 There are significant safety considerations, and thus associated liability exposures, associated
19 with relighting customer appliances. As such, FEI requires personnel conducting this activity to
20 have a certain amount of practical field experience in gas system construction and operations in
21 addition to 10 days of internal training and field mentoring specific to relighting a wide variety of
22 appliances to demonstrate the necessary competencies involved in safely working with customer
23 equipment.

24 Given these requirements, and the need to confirm these competencies on an ongoing basis, it
25 is not feasible to have other FEI or FortisBC Inc. (electric) staff available to perform this activity to
26 reduce the durations of the timelines in Appendix B.

27
28

29
30 55.2 Please explain why FEI would be using resources qualified to conduct relights to
31 close meter valves, which requires minimal training (turning the meter shut off
32 valve with a crescent wrench).

33
34 **Response:**

35 FEI has a finite number of properly equipped and sufficiently knowledgeable resources that could
36 participate in the Lower Mainland Shutdown, Regasification and Relight effort and these
37 resources are shown in the Appendix B Shutdown and Relight Resources tables.



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1 To ensure all the required meter valves are closed before a segment of the gas system is
2 repressurized, FEI would have to allocate its finite resources between closing meter valves and
3 relighting appliances until Day 30. From Day 31 to Day 73 (assuming the last relight is performed
4 on Day 73) all available qualified resources would be performing appliance relights.

5
6

7

8 55.3 How would the timelines in Appendix B change if more qualified resources could
9 be directed to relighting instead of turning off meter valves?

10

11 **Response:**

12 As outlined in the response to RCIA IR3 55.2, there are a finite number of resources available to
13 support FEI's effort to shutdown, regasify, and relight the Lower Mainland gas system. In
14 Appendix B, these finite resources have been optimally allocated between the tasks of closing
15 meter valves and appliance relighting. In this timeline projection, FEI already assumes that a
16 significant number of resources will be available from local gas contractors and through mutual
17 aid agreements.

18

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1 **56. Reference: Exhibit B-46-1 Rebuttal pp.24, 43**

2 At page 24 of its Rebuttal Evidence, FEI states: “As per the GSR, if the gas supply has
3 been turned off, then FEI must notify the customer before turning the gas supply back on
4 (s. 53(2)(b)) and ensure that no gas flows through to appliances or outlets in premises
5 unless they are checked to ascertain that they are relighted or turned off...Once AMI is in
6 place for residential customers, FEI will be able to use the automated meters to perform
7 this ‘careful check’ remotely.”

8 At page 43 of its Rebuttal Evidence, FEI states: “Regardless, FEI has confirmed both
9 through discussions with equipment manufacturers, and through its own testing of typical
10 equipment, that electronic ignition appliances will likely not perform as described by REL
11 in its submission. This is because in most cases, appliances with electronic ignition will
12 automatically “lock out” for safety reasons when they attempt (and fail) to automatically
13 light during the period while gas supply to the customer is disrupted.⁵³ This lock-out
14 condition will persist indefinitely, even after gas supply is restored to the appliance. This
15 expected behaviour requires action on the part of the customer or occupant to reset the
16 appliance. In some cases, this reset can be accomplished by cycling the power to the
17 furnace; some vendors have indicated that the lock-out can only be reset through the
18 appliance control panel. Given this behaviour, FEI expects that many customers will either
19 be incapable or uncomfortable with resetting appliances on their own to clear the lock-out,
20 and hence these customers will still require a technician to visit their premises for
21 assistance.”

22 56.1 If electronic ignition appliances lock out for safety reasons, please explain whether
23 the remote relight process could be amended to perform a remote dial check
24 without participation by the customer.
25

26 **Response:**

27 Section 53.2(a) of the GSR states: “If a gas supply has been turned off, a person must not turn
28 the supply on again until the person notifies all affected consumers”. Consequently, any future
29 remote reconnect process will require the participation of the customer. Also, while the AMI
30 remote reconnect process has not been finalized, FEI does not expect it will remotely open an
31 advanced meter’s internal valve without the customer being home and being able to confirm they
32 are capable of safely relighting their gas appliance(s).

33
34

35
36 56.2 If FEI is confident that the appliances will be locked out, then please confirm
37 whether AMI could be automated to conduct mass remote dial tests, with AMI
38 turning the gas off if the dial test fails and a normal relight being subsequently
39 scheduled.



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1

2 **Response:**

3 Please refer to the response to RCIA IR3 56.1.

4

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1 **57. Reference: Exhibit B-46-1 Rebuttal pp.25**

2 At page 25 of its Rebuttal Evidence, FEI states: “*Over 517 of the defects associated with*
3 *Red Tags issued by FEI in that one-year period (the rows shown in boldface in Figure 5)*
4 *were related to leaks in customer appliances (320 occurrences), defective control valves*
5 *(68 occurrences), or pilot safety controls (29 occurrences).”*

6 57.1 Please explain why the red tags related to leaks in customer appliances are related
7 to the loss and restoration of gas supply as contemplated to result from a zero-
8 pressure incident (or to the scenarios envisioned in this CPCN application).

9
10 **Response:**

11 In the response to Q20 of its Rebuttal Evidence to the RCIA, FEI offered information regarding
12 leaks in customer appliances to provide context for why closing meter valves at customer
13 premises can prevent imminent safety hazards. There are numerous ways that defects in
14 customer piping and appliances can allow gas entry into customer premises. The Red Tag listings
15 related to leaks in customer appliances provides some indication of the frequency of incidence of
16 these types of defects found by FEI or reported by the customer that are serious enough for the
17 technician to isolate and tag the appliance for safety. As demonstrated by this listing, there are
18 hundreds of such leaks detected each year. Were FEI to allow a repressurization of its gas
19 distribution system without isolating the customer at the meter set to comply with the GSR these
20 leaks could present another mechanism for an unsafe gas/air mixture that could accumulate
21 within a premises. If a widespread outage event results in larger number of premises being
22 unoccupied due to a lack of heating/hot water, there would be an higher likelihood for leaks to
23 remain undetected and potentially result in a hazardous situation. It is for this reason that FEI
24 included information related to leaks in customer appliances to support its proposed response
25 following a zero-pressure incident.

26
27

28
29 57.1.1 Does FEI apply red tags for non-hazardous leaks (leaks categorized as
30 non-hazardous and expected to remain non- hazardous, or leaks that are
31 categorized as non-hazardous but could become hazardous)?

32
33 **Response:**

34 FEI’s Red Tag process complies with sections 54(1)(a) and (b) of the GSR (which are also
35 referenced on tag itself) to report all unsafe conditions and equipment that is beyond repair. That
36 subsection provides:

37 54 (1) A person who finds any appliance or gas equipment beyond repair or in an
38 unsafe condition must



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- 1 (a) place the appliance or gas equipment out of service, and
- 2 (b) promptly notify a safety officer of its condition and location.

3
4

5
6 57.2 Does FEI have more information on the defective control valves? Do the defects
7 relate to failure of the valve to turn on, failure to turn off, or failure to control the
8 pilot? If so, please provide details on the 68 red tagged defective control valves.

9

10 **Response:**

11 FEI provided the information on pages 25 and 26 of its Rebuttal Evidence to the RCIA to
12 emphasize that there are legitimate safety issues that can occur at customer appliances and
13 present a hazard if the reintroduction of the gas supply is done without the careful checking of
14 appliances as required by the GSR. FEI technicians would not Red Tag an appliance as a result
15 of valves that fail to open (as this is a not an immediate safety hazard), but would instead refer
16 the owner to have the appliance serviced without placing a tag.

17 FEI's computer records with respect to Red Tags do not contain the specific details that RCIA is
18 requesting. The filing and submission of details from FEI to the appropriate safety authority
19 (Technical Safety BC or the Municipality) is a manual process and would require a time-
20 consuming manual search of files documenting the communication in each region. FEI has
21 provided some examples of "defective control valves" and an example of "no pilot / safety control"
22 submissions to the safety authority that were included in the Red Tag statistics presented in FEI's
23 Rebuttal Evidence to the RCIA. Excerpts of the information are summarized below.

24 **Location 1:**

Gas Off At	Appliance
Appliance	Furnace (ARMSTRONG,), Fireplace (REGENCY,)
Other	
Hazards Found	Defective control valve, No pilot safety/ control
Comment	No pilot control on Fireplace, Pilot flame in excess of 6", Furnace is elec ign and did not have anypower

25

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1 **Location 2:**

Gas Off At Appliance Other Hazards Found Comment	Appliance Furnace (CARRIER,NEWER) Defective control valve this was a call from yesterday, computer issues prevented completion; gas control valve was bypassing volume readings down first burner tube when no call for heat and causing gas readings in whole house.
------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

2

3 **Location 3:**

Gas Off At Appliance Other Hazards Found Comment	Appliance Furnace (NOT LISTED,) Defective control valve customer's furnace control valve was constantly releasing gas into the house and the customer had their furnace fan constantly circulating air. which was causing the odour and readings in the ambient air in the house and it was causing the odour and readings in the neighbours house. shut off furnace and dial tested the meter for 30 minutes and there was no movement
------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

4

5 **Location 4:**

Gas Off At Appliance Other Hazards Found Comment	Appliance Hot Water Heater (NOT LISTED, TRIANGLE TUBE) Obstructed flue/vent, Defective control valve, Defective Heat Exchanger, Plugged heat exchanger CO readings in room and vent exhaust coming out of bottom of unit - unit was making odd noises and vibrating. shut off unit; further inspection noted venting totally disconnected from HWH - unit full of condensate and floor partially flooded from disconnected condensate line. unit red tagged and shut off of gas and power.
------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

6

7

8

9

10 57.3 Does FEI have more information on the 29 red tags related to no pilot/ safety controls? If so, please provide details on these 29 red tags. Do these defects relate to failure to shut off the main valve or pilot valve in the event of a loss of flame?

12

13

14 **Response:**

15 Please refer to the response to RCIA IR3 57.2.

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1 **58. Reference: Exhibit B-46-1 Rebuttal pp.32-34**

2 At page 32 of its Rebuttal Evidence, FEI states: “*Further, in FEI’s experience, even with a*
3 *live and pressurized gas system, damages occur that are not reported with the incident*
4 *location left in an unsafe condition. An instance where a contractor tried to hide line*
5 *damage is shown in Photos 4 to 7 below. Photos 8 and 9 below also illustrate actual*
6 *discoveries by FEI of attempted makeshift repairs during previous damages to its system.*
7 *FEI expects that with an unpressurized system the likelihood of unreported incidents*
8 *would only increase.*”

9 58.1 Explain how FEI became aware of the incidents shown in the photos if these were
10 attempts by the excavator to hide the damage from FEI.

11
12 **Response:**

13 The illustrated scenarios were discovered because of a gas leak reported to FEI for investigation
14 and repair.

15 With respect to Photos 4 to 7, the owner of the excavating company called FEI and explained that
16 his employee damaged the line and left the site. The owner claimed he noticed a “rotten egg”
17 smell around the area that was backfilled and that his employee was no longer on-site.

18 Photo 8 was reported to FEI by the public (a passerby) who smelled an odour of natural gas.

19 In Photo 9, the damager attempted to stop the gas flow, but was unsuccessful in fully controlling
20 the escaping gas and called FEI for assistance.

21
22

23
24 58.2 Is it FEI’s view that the examples in photos 8 and 9 demonstrate efforts on the part
25 of the excavator to conceal the damage from FEI on a permanent basis, or whether
26 these were attempts to temporarily delay or avoid the need for FEI to interrupt the
27 excavator’s work until after the excavator was finished?

28
29 **Response:**

30 FEI is unable to speculate on the mindset of the third-party damagers in the photos. It is possible
31 that the third-parties may have been attempting to conceal damage from FEI either permanently,
32 or until some later time.

33 Regardless, these instances demonstrate that third-parties cause damage to FEI’s system and in
34 some cases attempt to conceal it. In the case of a wide-scale, prolonged system depressurization
35 it is reasonable to expect that instances like these would only become more prevalent. There are
36 two reasons for this expectation: a) the lack of escaping gas at the time of the incident could
37 prevent the third-party from realizing that they have damaged FEI’s system, and b) given that



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1 there are no immediate repercussions (i.e., there is no escaping gas which needs to be dealt with)
2 the third-party may choose to not report the incident to avoid the costs and reputational impacts
3 associated with FEI’s emergency response. Those unreported system damages would result in
4 public safety risks during FEI’s subsequent repressurization of its system, which FEI’s measures
5 are intended to address.

6
7

8

9 58.3 Does FEI utilize excess flow valves on its service lines in order to stop the flow of
10 gas when a full-bore breach is detected as shown in photos 4 to 7? If not, explain
11 how a contractor was able to bury a fully pressurized gas line with a full-bore
12 breach.

13

14 **Response:**

15 FEI does not utilize excess-flow valves on its service lines.

16 The cited third-party damage was investigated by an FEI Damage Investigator, whose post-
17 damage investigation report noted:

18 The depth of the gas line was 24 inches below ground level. Damager utilized an
19 excavator to backfill with a significant amount of wet soil. The broken off tee was
20 pointing downward causing gas to blow downward and then sideways, as opposed
21 to it blowing upward. This caused the gas to travel underground and migrate into
22 utilities and nearby homes.

23



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59.2 Please confirm that if a gas regulator is completely destroyed in a fire, and the meter shutoff valve was left open, it will likely result in the gas riser being open to the atmosphere and therefore provides a pathway for gas to leak out and air to be entrained?

Response:

Confirmed. Please also refer to the response to RCIA IR3 59.1.

59.2.1 Please confirm whether FEI would expect any of its gas meters, regulators, and risers to be similarly destroyed following a no-flow event, such that large scale air entrainment would be expected as was found in Fort McMurray.

Response:

In a wide-scale prolonged outage in the Lower Mainland, FEI expects that third-party damage to the depressurized distribution system would be the most likely reason to expect air entrainment. Please also refer to the response to RCIA IR3 59.1.

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1 **60. Reference: Exhibit B-46-1 Rebuttal pp.42; Exhibit C1-16-1 BCUC IR1 2.4**

2 At page 42 of its Rebuttal Evidence, FEI states: “*There are many appliances in use in the*
3 *Lower Mainland that predate 2010 when electronic ignition was mandated for new high-*
4 *efficiency furnaces.*”

5 60.1 Please confirm whether there are appliances older than 2010 which have
6 electronic ignition.

7
8 **Response:**

9 FEI confirms that there likely is equipment having electronic ignition that pre-dates 2010; however,
10 FEI expects these to be present in limited numbers. Further, FEI has no information on where
11 these appliances would be located.

12
13

14
15 60.2 Has FEI surveyed its customers to determine the types and age of their gas
16 appliances, similar to the Residential Energy Use Survey periodically conducted
17 by Manitoba Hydro (Centra Gas) and excerpted in RCIA’s response to BCUC IR1
18 2.4?

19 60.2.1 If so, please provide FEI’s data that indicate the prevalence of electronic
20 ignition on gas appliances.

21
22 **Response:**

23 FEI conducts a Residential End Use Survey (REUS) on a four-to-five-year cycle, with the last
24 survey completed in 2017.⁴ The REUS survey samples a representative population of FEI
25 residential customers and for legislated privacy reasons, FEI cannot match the survey responses
26 with addresses.

27 The REUS collects information regarding the customer’s: dwelling; space and water heating
28 appliances; lifestyle appliances; energy use behaviour, and attitudes regarding energy. While the
29 questionnaire is comprehensive, FEI is aware that there is a limit to the amount of information the
30 customer may be willing or able to provide. Regarding natural gas boilers, furnaces and hot water
31 tanks, FEI does not ask if the appliances have electronic ignition or a standing pilot light. For these
32 appliances other information is queried (e.g., efficiency level for boilers and furnaces, and age for
33 water heaters) to estimate the likelihood that the appliance has a pilot light or electronic ignition.
34 FEI does ask in the survey if natural gas fireplaces have a pilot light. Further, FEI notes that the
35 percentages below only directly apply to the surveyed customers who responded; the actual
36 percentages for the overall Lower Mainland customer base are unknown.

⁴ The 2022 survey is currently in progress, with data expected to be available in September 2022.



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- 1 In 2017, of the approximately 74 percent of FEI residential customers who have a gas furnace,
2 about 10 percent of customers reported that they had a low-efficiency furnace (implying the
3 presence of a pilot light). This is down from 14.5 percent in 2012 and 30.6 percent in 2008. For
4 the 11 percent of customers with natural gas boilers, in 2017, two percent reported that they had
5 a low-efficiency boiler.
- 6 For hot water tanks in 2017, approximately 12.7 percent of customers reported having a natural
7 gas hot water (storage) tank, 10 years or older (again which would likely imply the presence of a
8 pilot light).
- 9 In 2017, 70 percent of customers sampled reported having a natural gas fireplace of which 43
10 percent had a pilot light.
- 11 Assuming that only furnaces and boilers which are mid- or high-efficiency would be expect to
12 have electronic ignition, there remains a substantial number (hundreds of thousands) of pilot-
13 ignition appliances in the Lower Mainland.
- 14

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1 **61. Reference: Exhibit B-46-1 Rebuttal pp.43**

2 At page 43 of its Rebuttal Evidence, *FEI states: “Regardless, FEI has confirmed both*
3 *through discussions with equipment manufacturers, and through its own testing of typical*
4 *equipment, that electronic ignition appliances will likely not perform as described by REL*
5 *in its submission. This is because in most cases, appliances with electronic ignition will*
6 *automatically “lock out” for safety reasons when they attempt (and fail) to automatically*
7 *light during the period while gas supply to the customer is disrupted.⁵³ This lock-out*
8 *condition will persist indefinitely, even after gas supply is restored to the appliance. This*
9 *expected behaviour requires action on the part of the customer or occupant to reset the*
10 *appliance. In some cases, this reset can be accomplished by cycling the power to the*
11 *furnace; some vendors have indicated that the lock-out can only be reset through the*
12 *appliance control panel. Given this behaviour, FEI expects that many customers will either*
13 *be incapable or uncomfortable with resetting appliances on their own to clear the lock-out,*
14 *and hence these customers will still require a technician to visit their premises for*
15 *assistance.”*

16 REL’s understanding from discussions with residential heating contractors and utility
17 technicians is that most furnaces either reset themselves after a period of time or can be
18 reset by interrupting the power to the furnace.

19 61.1 Please confirm whether it is a requirement of the building code in B.C. for furnaces
20 to have an accessible disconnect (i.e., a switch), thus permitting interruption of the
21 power to the furnace using a standard wall switch.

22
23 **Response:**

24 FEI confirms that, as per the *Canadian Electrical Code, Part I* Clause 26-806, a suitable
25 disconnecting means (typically a wall switch), must be provided for heating equipment such as
26 gas furnaces.

27 However, based on the field experience of FEI’s customer service technicians, a significant
28 proportion of occupants (who may or may not be the property owner) are either not aware of the
29 location or existence of this switch, and/or are not comfortable with operating it (as they are not
30 aware of its function). In many cases the switch is not labeled (in spite of the code requirement
31 for this) and there is no standard location for the switch, beyond that it must be located between
32 the furnace and an egress route.

33 For these reasons, and as cited in the preamble, FEI expects that many customers will either be
34 incapable or uncomfortable with resetting appliances on their own to clear the lock-out, and hence
35 these customers will still require a technician to visit their premises for assistance.

36