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October 26, 2021

Coalition to Reduce Electropollution
126-102 Forestbrook Place
Penticton, BC V2A 7N4

Attention: Mr. Hans Karow

British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

**Attention: Mr. Patrick Wruck,
Commission Secretary**

Dear Mr. Karow and Mr. Wruck:

Re: FortisBC Energy Inc. (FEI)

Project No. 1599211

**Application for a Certificate of Public Convenience and Necessity (CPCN) for
Approval of the Advanced Metering Infrastructure (AMI) Project (Application)**

**Response to Coalition to Reduce Electropollution (CORE) Information Request
(IR) No. 1**

On May 5, 2021, FEI filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-302-21 for the review of the Application, FEI respectfully submits the attached response to the Coalition to Reduce Electropollution (CORE)'s letter dated September 20, 2021 submitting certain information requests (IRs) in the above noted Application (Ex. C7-3).

Exhibit C7-3 includes references to and excerpts from various secondary source documents. In addition, CORE attached to its IRs approximately 350 pages of various additional documents, which it described as "testimonies and papers as a counter to" the Exponent RF Health Report included as Appendix F-2 to the Application. CORE IRs No. 26.1-26.17 request that Dr. Bailey and Exponent give their "position" on these "testimonies and papers". Certain of the referenced materials are, even apart from other issues, from individuals whose evidence the Panel commented on unfavourably in the FortisBC Inc. AMI proceeding, in its decision of July 2013 (Dr. Carpenter, at p. 22, and Dr. Kumar, at pp. 33-34). Further, certain of the IRs or accompanying "notes" assert various views that CORE appears to hold, embedding within them certain underlying assumptions or conclusions that are not in evidence and that FEI should also not be taken to accept.

Exhibit C7-3 is in many respects contrary to the BCUC's direction to interveners, in its letter of September 28, 2021 (Ex. A-15), regarding the appropriate style and substance of IRs

under Rules 13.01-13.02 of the *Rules and Practice and Procedure*. In particular, the BCUC stated as follows:

The BCUC reminds all interveners that the purpose of IRs is not to enable the author of the IR to introduce evidence. The purpose of IRs is to elicit relevant information on the evidentiary record or to clarify or test existing evidence to contribute to a better understanding by the BCUC of the relevant issues in the proceeding. Any statements that are included in the preamble to an IR should be restricted to providing context for a question relevant to the proceeding submitted by the party to whom the IR is directed.

Finally, whereas letters of comment are intended to provide for any member of the public to contribute views, opinions, and impact or potential impact, with respect to a matter before the BCUC, IRs must not be letters of comment.

FEI further notes that in granting intervener status to CORE (Ex. A-19), the BCUC stated that the “request to intervene is accepted on the ground of being ‘directly or sufficiently affected by the Commission’s decision in this matter’ rather than on the ground of ‘experience, information, or expertise relevant to this matter that would contribute to the Commission’s decision making’”, and further stated that “the Panel does not anticipate needing [CORE or Mr. Karow’s] experience, information or expertise for its decision making in this proceeding.”

Notwithstanding that Exhibit C7-3 contravenes the BCUC’s directions regarding IRs in Exhibit A-15, including, in particular, the inclusion of numerous secondary source documents and the request for FEI’s expert consultants at Exponent to take a “position” on them, FEI has sought to provide as much responsive information to CORE and other interveners as practicable. This includes responses from Exponent to CORE IRs No. 26.1-26.17. FEI’s objective in doing so is to enable a transparent and fulsome adjudication of the Application. However, in providing responses to CORE’s IRs, FEI should not be taken as accepting that the secondary source documents, references, comments and extracts in Ex. C7-3 should be or are properly part of the evidentiary record in this proceeding, nor does FEI waive the right to object to responding to future or other IRs that contravene the BCUC’s directions in Ex. A-15.

FEI and, in particular, Exponent may not have addressed all matters raised in the secondary source documents attached by CORE to Ex. C7-3 given the volume of material involved and the potential breadth of CORE IRs 26.1-26.17. FEI and Exponent’s silence on a particular point therein should in no way be taken as agreement with the substance of that point.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Registered Parties

FortisBC Energy Inc. (FEI or the Company) Application for a Certificate of Public Convenience and Necessity (CPCN) for Approval of the Advanced Metering Infrastructure (AMI) Project (Application)	Submission Date: October 26, 2021
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1 1.0 Please provide detailed specs of the proposed natural gas meter (smart meter) with
2 pictures of the meter and provide info about the housing material used for this meter.
3

4 **Response:**

5 Please refer to Attachment 1.0 (the Sensus Sonix IQ meter datasheet) for the requested
6 information. The housing of the meter is constructed from aluminum.

7

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2.0 Which batterie is being used, how long does it last and how is it replaced in case of malfunctioning or for other reasons.

Response:

Please refer to the response to BCSEA IR1 33.1.

2.1 Please explain how it is insured that the smart meter is not getting hot (except for the sun exposure) and eventually starting to burn, which happened with electric smart meters?

Response:

In order to validate the safety of the Sonix IQ meter design, Sensus has had the device certified as intrinsically safe for Class I, II, III, Division 2, Group D, F, G, T4 in accordance with ANSI/IAS 12.12.01/CSA C22.2 No 213 *Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.*

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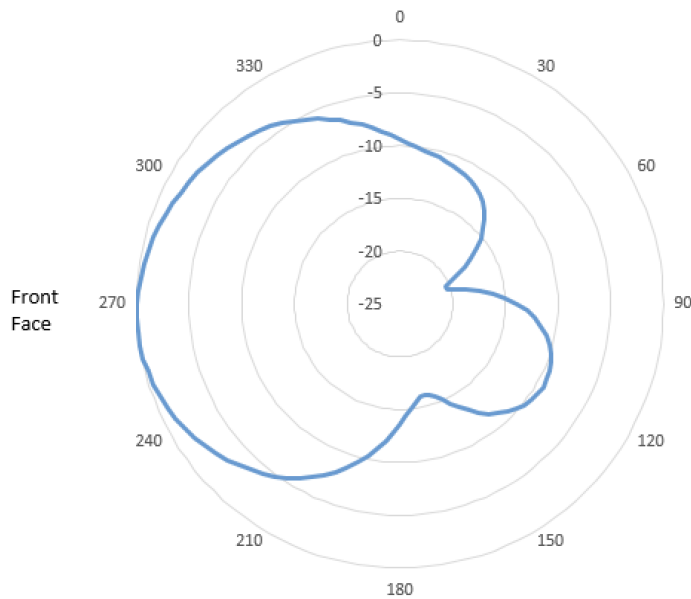
1 3.0 Please provide the propagation of the Fortis gas smart meter radiation beam, similar to
2 slide 12 & 13 of 50 in here:

3 https://www.buergerwelle.de/assets/files/workshop_on_cell_tower_radiation.pdf

4
5 **Response:**

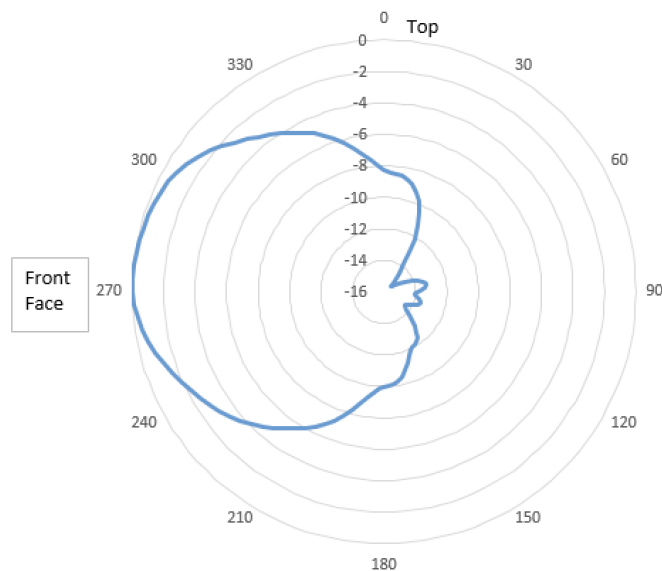
6 The horizontal and vertical plane antenna radiation patterns associated with the advanced meters
7 (these are not “radiation beams”) are provided below.

SonixIQ Horizontal Plane Radiation Pattern [dB]



8

SonixIQ Vertical Plane Radiation Pattern [dB]



9

10

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4.0 Please provide the **total radiation** exposure (expressed as microWatt per square meter, $\mu\text{W}/\text{m}^2$) from the smart meter for a sleeping bed, which is located: Fortis to please provide brand and specs of the electric and water smart meters.

4.1 0.5m from my own proposed new smart meter;

Response:

This response has been provided by Exponent.

As shown in Table B-2 in Exponent's report "*Radiofrequency Fields in the Environment and from Advanced Metering Infrastructure*," dated May 3, 2021, the total exposure inside a building (assuming that the wall is comprised only of plywood and drywall) for the maximum operational duty cycle of the SonixIQ gas meter at 0.25 meters from the meter would be approximately 0.0075% of the Health Canada SC6 limit ($210 \mu\text{W}/\text{m}^2$). Exposure at 0.5 meters from the meter would be less.

4.2 - in addition to the smart meter in 4.1 also with three smart meters in the neighborhood: 3m from the left, 10m from the right and 15m from across;

Response:

This response has been provided by Exponent.

As shown in Table B-2 in Exponent's report, "*Radiofrequency Fields in the Environment and from Advanced Metering Infrastructure*," dated May 3, 2021, the exposure under typical operation at a distance of 3 meters from the meter would be approximately 0.0000059% of the SC6 limit ($0.16 \mu\text{W}/\text{m}^2$), a negligible change from that of the meter described in response to CORE IR1 4.1. The contribution of any other similar unit at greater distances (e.g., 10 or 15 meters) also would be negligible, so the result would be the same as that described here.

4.3 in addition to smart meters in 4.1 & 4.2 also with six smart meters in the neighborhood: two smart meters 20m away, two smart meters 25m away, and two 30m located away from the sleeping bed.

Response:

This response has been provided by Exponent.

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As described in response to CORE IR1 4.2, the result would be the same as that of a single smart meter.

4.4 - in addition to smart meters 4.1, 4.2 and 4.3 a wireless telus modem, 1.5m from the sleeping bed, as well as one electrical smart meter 1.5m from the sleeping bed and one water meter 3m apart from the sleeping bed.

Response:

This response has been provided by Exponent.

The contribution of the Telus modem or water meter will vary by model number and manufacturer, respectively. Regardless of other sources, the maximum contribution to the total exposure of the SonixIQ gas meter at 0.25 meters from the meter would be approximately 0.0075% of the Health Canada SC6 limit (210 $\mu\text{W}/\text{m}^2$). Exposure at 0.5 meters from the meter would be less.

4.5 in addition to smart meters and modem in 4.1, 4.2, 4.3 & 4.4 also one neighboring collector electric smart meter 20m, and five electric smart meters: one 20m, two 25m and two 30m apart from the sleeping bed.

Response:

This response has been provided by Exponent.

Please refer to the responses to CORE IR1 4.4 and 4.3.

4.6 What is the least minimum possible power level still required for the smart meter communication? Explain in details, please.

Response:

This response has been provided by Exponent.

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- 1 The SonixIQ gas meters do not vary in power. As shown in Table 2 in Exponent's report
- 2 "*Radiofrequency Fields in the Environment and from Advanced Metering Infrastructure*," dated
- 3 May 3, 2021, the output power of the SonixIQ gas meter is approximately 0.982 watts.

4

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5.0 Please provide a diagram/chart of smart meter's microwave radiation intensity in case of average and in case of worst scenario as far 30m from the tower [in V/m and $\mu\text{W}/\text{m}^2$]

Response:

This response has been provided by Exponent.

As shown in Table B-2 in Exponent's report, "*Radiofrequency Fields in the Environment and from Advanced Metering Infrastructure*," dated May 3, 2021, the typical exposure level (outdoors directly in front of the SonixIQ gas meter) at 1 meter from the SonixIQ gas meter would be approximately 0.000057% of the SC6 limit ($1.6 \mu\text{W}/\text{m}^2$). At 0.25 meters from the SonixIQ gas meter, exposure during the one-time-only initial start-up period would be approximately 0.10% of the SC6 limit ($2,800 \mu\text{W}/\text{m}^2$). Exposure would decrease approximately in proportion to the square of the distance out to 30 meters from the SonixIQ gas meter.

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1 6.0 Please inform: can smart meter's output ($\mu\text{W}/\text{m}^2$) remotely be reduced or increased?

2

3 **Response:**

4 The Sensus Sonix IQ and SmartPoint transmitter output power cannot be adjusted.

5

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7.0 Please inform all the steps for communication to and from the smart meter to the various smart meter's communication points, including collecting smart meters, other neighboring smart meters, hydro-electric smart meters, any people cell phones, street antennas, cell towers, satellites and any other wireless gadgets involved.

Response:

The meters to be deployed in the proposed FEI AMI Project communicate directly with Sensus Flexnet base stations, without an intermediary. Other than these base stations, the proposed meters will not communicate with other gas meters, electric meters, cell phones, street antennae, cell towers, satellites, or other wireless devices.

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8.0 Please provide all the names of companies that provide any and all parts for manufacturing and separately also for assembling the smart meter.

Response:

FEI respectfully declines to provide this information as it is considered by Sensus to be confidential and proprietary vendor information.

Further, FEI notes that it routinely procures tools and equipment from both Canadian and worldwide vendors through a well-established supply chain. As such, FEI does not believe that specific information regarding individual components and/or their location of manufacture would assist the BCUC materially, if at all, in determining whether the Project is in the public interest.

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1 9.0 Please inform about the names of all companies who will have access and/or contribute
2 to the smart meter communication both ways.
3

4 **Response:**

5 Only Sensus, as the contracted operator, and FEI will have access to the proposed advanced
6 meter network.
7

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1 10.0 Please inform, whether Huawei will be directly or indirectly involved in manufacturing the
2 smart meter or taken part in what ever way with the two-way communication.
3

4 **Response:**

5 FEI has confirmed with Sensus that Huawei will not be directly or indirectly involved in
6 manufacturing the advanced meters. FEI has also confirmed with Sensus that Huawei will not be
7 directly or indirectly involved in manufacturing other network components.
8

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1 11.0 will the smart meter be able to handle 5G and 6G wireless communication, if so, please
2 provide approximate time and all the frequencies involved then.
3

4 **Response:**

5 The advanced meters do not have capabilities to utilize 5G or 6G wireless communication
6 networks.
7

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12.0 Please inform, whether any extra antennas (aka micro cells, laptop sized antennas) are needed to be installed for the smart meter wireless communication.

Response:

No extra antennas will be connected to the AMI meters or SmartPoints. Antennas to collect the signals from the AMI meters will be installed at each base station location.

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1 13.0 Please inform, whether basically the smart meter also could be operated wired instead of
2 wireless.

3

4 **Response:**

5 The advanced meter does not have a wired communications option.

6

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14.0 In case of any damage to the natural environment and any injury to any person or thing (building, gadgets) arising from the presence smart meter's electromagnetic radiation in connection with the company's use, if such damage was caused directly or indirectly, in whole or in part, in connection with the smart meter's communication transmitting and receiving of microwaves, who would be liable for compensation, whose insurance (which one, please name) will pay?

Response:

In the event that a person were to allege that damage or injury had been caused as described in the information request, FEI anticipates such a claim or complaint would be disputed. If, however, a court or regulatory authority considered the claim and determined that damage or injury had occurred and been caused as described in the information request, that court or regulatory authority, depending on the nature of the claim, would determine matters such as liability and compensation.

FEI believes that the AMI Project will be compliant with the applicable legal framework and does not expect that findings of liability would be made against it or that compensation would be awarded.

The question of any insurance coverage would be fact dependent and also may be affected by the court or regulatory determinations, if any, referred to above.

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1 15. Safety Code 6 (SC6)

2 15.1 referring to SC6 in the Application [DOC 62642 B-1-FEI-CPCN-AMI-Project-](#)
3 [Application.pdf \(bcuc.com\)](#), Appendix F-2 Exponent RF Health Report

4 Please confirm, that Exponent has not included a comment on the HESA
5 recommendations, please have Dr. Bailey take position to [C4ST reply to Minister](#)
6 [Philpott's response to HESA 2015 Report on Safety Code 6.docon Safety Code 6.](#)

7 Please have Dr. W. Bailey comment on that : [In 2015, the House of Commons](#)
8 [Standing Committee on Health \(HESA\) published a report entitled Radiofrequency](#)
9 [Electromagnetic Radiation and the Health of Canadians](#). The report received all-
10 party support and was tabled by the Conservative (2015) and Liberal (2016)
11 majority governments. None of the recommendations have been fully
12 implemented.

13
14 **Response:**

15 This response has been provided by Exponent.

16 Exponent's report "*Status of Research on Exposure to Radiofrequency Fields and Health in*
17 *Relation to Advanced Metering Infrastructure*," dated May 3, 2021 (Appendix F-2 of Exhibit B-1),
18 does not contain a citation to or comment on the letter dated February 17, 2021, from Frank Clegg
19 of C4ST to MP Bill Casey, Chair Parliamentary Standing Committee on Health (HESA), or to the
20 2015 HESA report "Radiofrequency Electromagnetic Radiation and the Health of Canadians." The
21 letter sent to the HESA Committee is not the type of evidence that scientists rely on for the
22 assessment of potential health effects. The report itself is a summary of comments from scientists
23 and non-scientists on the topic of RF and health and not issued as a comprehensive and
24 independent scientific assessment of the relevant research by experts such as performed by the
25 Expert Panel assembled by The Royal Society of Canada.

26
27

28
29 15.2 Please confirm that – independently from Exponent Testimony- SC6 does not
30 consider **non-thermal biological effects** associated with electromagnetic
31 radiation.

32
33 **Response:**

34 FEI does not have the qualified internal experts to comment specifically on the subject matter of
35 CORE IRs 15.2, 15.13, 15.14, 15.15 and 23. However, FEI follows all Health Canada and other
36 regulatory guidelines, standards and limits applicable to it. Furthermore, FEI notes that as
37 discussed in Section 6 of Appendix F-1 to the Application, typical exposure from the Sonix IQ
38 meters is 24 million times below the Safety Code 6 levels.

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1 The following response has been provided by Exponent.

2 The premise of the request is contrary to fact. Safety Code 6 states:

3 The exposure limits specified in Safety Code 6 have been established based upon
4 a thorough evaluation of the scientific literature related to the thermal and non-
5 thermal health effects of RF fields. Health Canada scientists consider all peer-
6 reviewed scientific studies, on an ongoing basis The exposure limits in Safety
7 Code 6 are based upon the lowest exposure level at which any scientifically
8 established adverse health effect occurs. Safety margins have been incorporated
9 into the exposure limits to ensure that even worst-case exposures remain far below
10 the threshold for harm. (p. 1, emphasis added)

11
12

13
14 15.3 Please confirm that SC6 also states that exogenous EMR can induce electric fields
15 and currents within biological tissue that can lead to nerve and muscle
16 depolarization

17
18 **Response:**

19 This response has been provided by Exponent.

20 Safety Code 6 states that its objectives are to prevent nerve stimulation or heating from direct
21 exposure to RF in the range of 100 kHz to 10 Megahertz (MHz) and avoidance of perception
22 (nerve stimulation), shocks, or burns from induced-current or contact-current at frequencies
23 between 3 kHz and 110 MHz. The likelihood and effects of exposure scale with the strength of
24 the RF field and other factors.

25
26

27
28 15.4 telecommunication's high frequencies are also modulated. Please state all those
29 modulated frequencies being used and riding on the high frequencies being used
30 in combination of the proposed tower.

31
32 **Response:**

33 Please refer to the response to BCUC IR1 2.4.

34 Base station sites will be identified during the Define phase of the Project implementation.
35 Therefore, FEI is unable confirm at this time which other frequencies may be in use by other co-
36 located equipment at each site. The Sensus FlexNet equipment transmits in the licensed 900
37 MHz frequency band.

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2
3
4 15.5 Is it correct to state, that the human body is an electrical conductor, and when
5 exposed to EMR, the human body acts like an antenna being able to receive a
6 broad range of frequencies and that humans exposed to EMR will result in
7 increased body voltage?
8

9 **Response:**

10 This response has been provided by Exponent.

11 The human body is an electrical conductor. Like other conductive objects, the exposure of the
12 human body to RF can result in induced voltages. The magnitude of these voltages scales with
13 the strength of the RF field and other factors.
14
15

16
17 15.6 referring to the May 3, 2021, 203 pages [EXPONENT RF TECHNOLOGY](#)
18 [REPORT "Radiofrequency Fields in the Environment and from Advanced Metering](#)
19 [Infrastructure"](#) (pages 310 – 513), please state when (date) Fortis has requested
20 to have that report prepared for the then planned subject hearing.
21

22 **Response:**

23 FEI engaged Exponent to prepare two reports for the AMI Project (provided as Appendix F to the
24 Application) in October 2019.
25
26

27
28 15.7 Please inform, how Fortis has considered possible interveners to have their own
29 experts invited to testify, and why has Fortis not requested from the Commission
30 for at least a second round of IR so interveners' invited experts can take position
31 to that REPORT, for which of course reasonable time must have been allowed for
32 those experts to get prepared?
33

34 **Response:**

35 BCUC Order G-269-21 established an amended regulatory timetable that includes one round of
36 IRs on the Application, followed by submissions on further process from all parties on November
37 5, 2021 (subsequently extended to November 9, 2021). Intervenors will have an opportunity to
38 submit comments on the appropriate process for further review of the Application for BCUC
39 consideration at that time.

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- 15.8 Please state (with references) EMR exposure limits/guidelines for:
- Canada
 - USA
 - any other country and their exposure limits that you are aware of.

9 **Response:**

10 FEI notes that the only RF exposure limits/guidelines relevant to the Project are in Canada's
11 Safety Code 6. Please refer to Section 2 of the Exponent RF Technology Report (Appendix F-1
12 to the Application) in this regard. FEI is not aware of the RF exposure limits/guidelines for any
13 other countries.

14
15

- 16
17 15.9 Does external EMR induce changes in cellular functions in human bodies? If yes,
18 please explain briefly. If not, please provide peer reviewed studies.

19
20 **Response:**

21 This response has been provided by Exponent.

22 The interaction of RF fields (also known as electromagnetic radiation [EMR]) with the human body
23 and potential effects on cellular functions depend upon the size, configuration, and
24 resistive/conductive properties of the body, and the waveform, frequency, and intensity of the RF
25 field delivered by direct deposition of RF energy or contact with conductive objects charged by
26 RF energy. Cellular functions at the lowest level of RF exposure, for example, may be responsive
27 to thermal effects (e.g., WHO, 1993; Health Canada, 2015; SCENIHR, 2015).

28
29

- 30
31 15.10 Please state the recommended threshold of induced AC body–voltage for humans
32 and cite your reference.

33
34 **Response:**

35 This response has been provided by Exponent.

36 The recommended limit will vary by frequency. SC6 states, "For frequencies from 3 kHz to 10
37 MHz ...[b]asic restrictions for the avoidance of NS [nerve stimulation] are specified in this safety

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code in terms of maximum internal electric field strength within the body,” and “[b]asic restrictions have been specified in this safety code for RF field exposures in the 100 kHz to 6 GHz frequency range, in terms of maximum whole-body SAR [specific absorption rate] (averaged over the whole-body) and peak spatially-averaged SAR (averaged over a small cubical volume).”

At a frequency of approximately 900 MHz, the relevant limit is specified in terms of SAR. As stated by SC6, the SAR limit “averaged over the whole body mass” is 0.08 W/kg [watts per kilogram], “The peak spatially-averaged SAR for the head, neck and trunk, averaged over any 1 g of tissue” is 1.6 W/kg, and “[t]he peak spatially-averaged SAR in the limbs, averaged over any 10 g[rams] of tissue” is 4 W/kg. Body voltage will be related to the basic restrictions described above and will vary with tissue properties (e.g., conductivity and permittivity).

15.11 Please state the minimum EMR energy exposure (in $\mu\text{Watts}/\text{m}^2$) at which excitable human biological tissue can be stimulated.

Response:

This response has been provided by Exponent.

Tissues contain a wide variety of cells that can be stimulated by environmental stimuli. The identity, location, and response of excitable cells may not be specified in some experiments. Given the diversity of tissues and thresholds of cells within these tissues, the best approach is to consider whole body exposure, which is the exposure that is associated with the proposed SonixIQ gas meters. Thus, the threshold for an integrated response to RF involving excitable cells may be taken from the lowest behavioral threshold which triggers autonomic and behavioral responses of human subjects. As stated by ICNIRP (2020):

Recent theoretical modeling and generalization from experimental research across a range of species predicts that exposures resulting in a whole-body average SAR of approximately 6Wkg^{-1} , within the 100 kHz to 6 GHz range, over at least a 1-hour interval under thermoneutral conditions (28°C , naked, at rest), is required to induce a 1°C body core temperature rise in human adults. A higher SAR is required to reach this temperature rise in children due to their more-efficient heat dissipation (Hirata et al. 2013). However, given the limited measurement data available, ICNIRP has adopted a conservative position and uses 4W kg^{-1} averaged over 30 min as the radiofrequency EMF exposure level corresponding to a body core temperature rise of 1°C (p. 488).

ICNIRP also has developed conservative Reference Levels which “have been derived from the basic restrictions to provide a more-practical means of demonstrating compliance with the guidelines.” The ICNIRP occupational exposure limit is 0.4 W/kg (a factor of 10 below this conservative threshold level of 4 W/kg) and the corresponding Reference Level for this 0.4 W/kg

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exposure at a frequency of 900 MHz is 22.5 $\mu\text{W}/\text{m}^2$ (22,500,000 microwatts per square meter [$\mu\text{Watts}/\text{m}^2$]). The corresponding value for a 4 W/kg exposure would be ten-fold higher.

15.12 Please provide the guideline/value for the recommended maximum allowable EMR stimulation of human biological tissue.

Response:

This response has been provided by Exponent.

Safety Code 6 specifies that whole body RF exposure of the general public at 900 MHz not exceed the Basic Restriction SAR value of 0.08 W/kg.

15.13 X-ray exposures have cumulative biological effects. Please state your position on whether telecommunication EMR exposures also have cumulative effects. Please provide references for your position.

Response:

This response has been provided by Exponent.

The scientific literature does not confirm that RF exposures have the same effects as x-rays.

15.14 Does Fortis agree that biological effects are associated EMR below the US and Canada regulatory limit as stated in the studies in [Biological Effects Of Microwave Below U.S. & Canada's Regulatory Limit](#)

If you do not agree, please state why not and provide independent peer reviewed studies.

Response:

This response has been provided by Exponent.

The mere existence of some papers that applied exposures below the reference level among the thousands of papers published on a panoply of biological responses in various species and reported changes is not sufficient to confirm that RF exposure was the cause of the effects

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1 reported. To have confidence that the reported effects are real, the role of other factors has to be
2 ruled out, including chance, bias, and confounding, the methods for assessment are appropriate
3 and effects attributed to RF are demonstrated to vary systematically with the intensity and duration
4 of exposure, and the reported effects have been replicated by other independent scientists.
5 Finally, most importantly, with regard to standard setting, that the effects were harmful to human
6 health.

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10 15.15 Does Fortis agree that the Royal Panel's report "[Review of the Potential Health](#)
11 [Risks of Radiofrequency Fields from Wireless Telecommunication Devices](#) admits
12 that Health Canada Safety Code 6 (SC6) does not apply to **non-thermal** biological
13 effect protection?

14 If not, please state where and how SC6 or any federal or provincial
15 guideline/standard does, indeed, take into account **non-thermal** effect protection.

16 Note: (Health Canada scientist, James McNamee, admitted in Quebec Superior
17 Court in Feb. 2013 that for frequencies between 100 kHz and 300 GHz **Safety**
18 **Code 6 is based only on heating.** ([http://www.magdahavas.com/health-canada-](http://www.magdahavas.com/health-canada-admits-safety-code-6-guideline-for-microwaveradiation-is-based-only-on-thermal-effects/)
19 [admits-safety-code-6-guideline-for-microwaveradiation-is-based-only-on-thermal-](http://www.magdahavas.com/health-canada-admits-safety-code-6-guideline-for-microwaveradiation-is-based-only-on-thermal-effects/)
20 [effects/](http://www.magdahavas.com/health-canada-admits-safety-code-6-guideline-for-microwaveradiation-is-based-only-on-thermal-effects/))
21

22 **Response:**

23 FEI notes that there were evidence and submissions in the BCUC proceeding regarding FBC AMI
24 regarding what James McNamee stated in the Quebec Superior Court. It is not correctly
25 described in the question above. The transcript of James McNamee's testimony from that court
26 hearing was filed by FBC on March 13, 2013 and it was part of the evidence (Exhibit B-46) that
27 was before the BCUC in the FBC AMI proceeding when it made its Decision. The Panel referred
28 to that evidence in its Decision as well.

29 This response has been provided by Exponent.

30 Regulations on RF are published to protect against established adverse effects of exposure with
31 adequate safety factors. If the adverse effect that occurs at the lowest level of exposure is
32 credited to thermal heating, then there is no basis to publish guidelines for exposures at still lower
33 exposure levels. Please refer to the responses to CORE IR1 15.2 and IR 15.14.
34

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37 15.16 Please have Dr. W. Bailey/Exponent take position on Dr. Magda Havas' April 15,
38 2020 testimony "[Warning about Future 5G Roll-Out in Municipalities and Adverse](#)

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1 [Consequences to Humans, Flora and Fauna](#)", in where SC6 assessed by Dr.
2 Havas as an independent renowned recognized expert.

3
4 **Response:**

5 This response has been provided by Exponent.

6 Please refer to the response to CORE IR1 26.1.

7

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16. **Reference:** Application [DOC 62642 B-1-FEI-CPCN-AMI-Project-Application.pdf \(bcuc.com\)](#) **Appendix H-7 page 550 of 783 Advanced Gas Meter Event Survey Results**

16.1 Please confirm that in this survey **only 15** participants **in whole BC** (with a population of 5,145,851, year 2020, source [British Columbia Population 2021 \(worldpopulationreview.com\)](#)) have taken part, and please confirm that those participants have no COI with Fortis or any other gas or electric companies.

Response:

FEI confirms that 15 participants responded to this survey. The survey was voluntary for information session attendees to complete at the conclusion of the information session, and provided attendees an opportunity to record their feedback. As the survey was anonymous, FEI is not able to confirm whether a conflict of interest exists from respondents. However, FEI can confirm that no surveys were completed by its employees or by anyone who is directly involved with the Project.

16.2 Based on what notification or invitation have those 15 participants (in whole BC) taken part in the survey, please give details.

Response:

Please refer to the response to CORE IR1 16.1.

16.3 Please take position why Fortis has not taken a better effort to get more responses so to get a good representative of the entire sample population.

Response:

As discussed in the response to CORE IR1 16.1, the survey was developed specifically for FEI's in-person information sessions throughout October and November of 2019 for attendees to provide their feedback at the conclusion of the information session. The survey was voluntary, so while FEI would have liked to obtain participation from all attendees, not all elected to complete the survey. Finally, as noted in Section 7 of the Application and in the Consultation, Engagement and Communication Plan (please refer to Attachment 36.2 in response to BCUC IR1 36.2 for an updated plan), FEI has planned a broad range of communications activities using various channels and will continue to seek feedback from customers through the life of the Project.

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16.4 Please inform whether in the survey the wireless electromagnetic radiation (EMR) issue has ever been mentioned, if so, please provide all copies for that.

Response:

The survey (Appendix H-7) did not specifically mention radiofrequency (RF) fields. The survey was developed to provide public information session attendees an opportunity to provide feedback at the conclusion of the information session.

16.5 Except for the Exponent Testimony [Appendix F-2](#), please inform whether Fortis has ever mentioned EMR involved with the proposed smart meter in

- public notices
- individual customer correspondences

If so, please provide all documentation to show so.

Response:

To date, customer communications and public notices about the Project did not speak directly to radiofrequency (RF) fields. However, FEI included a graphic in the February 2021 virtual information sessions (Appendix H-25) depicting the proposed meter emissions compared to other RF-emitting devices. This graphic is also found on the Project webpage under the Resources tab.

16.6 referring to 16.4 if Fortis has never addressed the EMR issue involved with the wireless smart meter in public notices, media reports and personal correspondences with individual customers (except for Exponent Testimony), please provide reasons why not.

Response:

Please refer to the response to CORE IR1 16.5. FEI has addressed customer inquiries regarding RF fields, including questions regarding customers' ability to choose a radio-off option, and will continue to do so as questions are raised throughout the Project.

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17. Please confirm that the PUBLIC NOTICE as depicted on [page 776](#) was **not once** published by Fortis in the daily newspaper **Penticton Herald**, covering the area between Osoyoos and Summerland and boundaries.

If that is the case, please provide reasons and the numbers of subscribers that therefor have not seen that notice,



Response:

The referenced public notice was not published in the Penticton Herald newspaper, but was instead published in four newspapers that have circulation in Penticton. These include:

- The Penticton Western News;
- Summerland Review;
- The Province; and
- The Vancouver Sun.

Combined, these outlets have a total circulation of 261,048.

FEI selected 50 newspapers on a regional basis to maximize coverage across its service territory. It is important to note that in addition to these newspaper inserts, Penticton customers would have also received notice through digital ads that were displayed on various online platforms and geo-targeted to FEI's service territory. FEI also published a notice on its Project webpage, and posted weekly notifications on its social media platforms from August 3 to September 9, 2021.

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18. Please inform in which BC papers did the PUBLIC NOTICE not appear, And if so provide reasons and the numbers of missed subscribers.

Response:

FEI interprets the question to refer to the public notice published in summer 2021 in relation to its CPCN application.

FEI published notice of its CPCN application for the Project in 50 BC newspaper publications once during the week of July 26. FEI notes that the exact day of publication during that week and the format of the ad was dependent on the specific outlet. FEI selected newspapers on a regional basis to maximize coverage across its service territory. The total circulation for the newspapers that published FEI's 2021 public notice is 905,164.

In addition to publishing notices in BC newspapers, FEI also provided notice on its website, social media platforms, and through geo-targeted digital ads.

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19. Please confirm that Fortis did not send out letters to individual homes with natural gas service, if so, please explain why.

Note: it is my understanding that nowadays customers, who are on pre-authorized automatic payment plan most likely do not check their digital bills, if however they do (as I do very seldom), customers will only have a quick glance at the \$-amount and not on the info section on the bill.

Response:

FEI understands the question to mean sending mailed notification letters to customers regarding the Project.

FEI did not mail individual customers a paper-based notification letter regarding the Project. To reduce environmental impacts associated with print notifications, and align the Project to the company's sustainability commitments, FEI contacted customers through a range of paperless communications channels.

For an extensive list of customer communications channels, please refer to Section 7.2.5 and Appendices H-1, H-6, H-8, H-9, H-10, H-12, H-14, H-15, H-16, H-20 and H-21 of the Application.

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20. Referring again to the [Exponent Testimony](#) : it was not updated by Dr. W. Bailey about :

“In a recent landmark ruling in a case brought by Children’s Health Defense against the Federal Communications Commission, the court ruled the commission’s 1996 health guidelines related to non-cancer harms from 5G and wireless-based technologies were capricious, arbitrary and not evidence-based”.....” On Aug. 13, the U.S. Court of Appeals for the D.C. Circuit ruled the FCC’s 2019 decision that its 1996 guidelines adequately protect the public from non-cancer harms from 5G and wireless-based technologies was capricious, arbitrary and not evidence-based.

In 2019, after an alleged six-year review of the science on the potential harms of 5G and wireless technology, the FCC concluded the evidence showed no harm and therefore its 1996 guidelines are sufficient to protect the public and no review of the guidelines was warranted.

In the U.S., as long as a wireless-based technology complies with FCC guidelines, it is considered safe, and no lawsuit can be filed for injuries.

However, CHD’s case revealed that while the FCC has been pushing 5G and forcing Wi-Fi-based technologies on our children, the safety assurances made by the FCC and the U.S. Food and Drug Administration (FDA) are not supported by evidence. As the court’s ruling indicates, the contrary is true...”

It is well known that SC6 is very much leaning towards FCC’s position and EMR guidelines. The landmark decision will have an impact on SC6.

Please have Exponent take position to the recent US court case (decision [here](#)) and in case if SC6 guidelines will be lowered, how can the smart meter be adjusted accordingly?

Response:

The recent US court decision referred to in the preamble above is a decision of the United States Court of Appeals for the District of Columbia Circuit in *Environmental Health Trust, et al. v. Federal Communications Commission*, No. 20-1025 (issued August 13, 2021). In its decision, the US Court of Appeals held, on grounds of administrative law, that the Federal Communications Commission (FCC) had not provided a sufficiently reasoned explanation for its determination that its existing guidelines for exposure to radiofrequency (RF) radiation adequately protect against the harmful effects of exposure to RF unrelated to cancer. Note that the US Court of Appeals, on the other hand, held that the FCC had adequately addressed and provided a reasoned response in support of its conclusion that the exposure to RF at levels below its guideline limits does not cause cancer.

The actual outcome of the case was that the US Court of Appeals remanded the matter back to the FCC “to provide a reasoned explanation for its determination that its guidelines adequately protect against the harmful effects of exposure to radiofrequency radiation unrelated to cancer”. The majority judgment also stated as follows:

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1 To be clear, we take no position in the scientific debate regarding the health and
2 environmental effects of RF radiation – we merely conclude that the Commission’s
3 cursory analysis of material record evidence was insufficient as a matter of law.

4 As the dissenting opinion indicates, there may be good reasons why the various
5 studies in the record, only some of which we have cited here, do not warrant
6 changes to the Commission’s guidelines. [Underlining added.]

7 As the US Court of Appeals decision referenced in the preamble expressly does not take any
8 position on the science regarding RF and was decided on grounds of administrative law, it is not
9 appropriate for Exponent to comment upon or “take a position” on the court decision.

10 FEI is also unaware of any basis for the statement in the question that the “landmark decision will
11 have an impact on SC6”. The decision is from a different jurisdiction and makes no determination
12 that the FCC guidelines should be changed or lowered.

13

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21. How would FORTIS respond if Fortis gas customers would complain about private nuisance EMR transmission's trespass etc.;

"private nuisance" I understand being something that interferes with "a person's interest in the private use and enjoyment" of his or her land and being free of any bodily injury.

Response:

FEI does not view the concept of "private nuisance" as being applicable, nor does it agree that there is a "trespass" by "EMR transmissions". Please also refer to the response to CORE IR1 14 with respect to a customer making a complaint or claim.

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1 22. Please inform whether any damages/harm or any negative effect whatsoever resulting
2 from wireless electromagnetic radiation emanating from, beaming to, the tower's
3 transmitters and/or receivers are insurance / liability covered.

4 If so, please give all details.

5 If not, please provide reasons why not.

6

7 **Response:**

8 Please refer to FEI's response to CORE IR1 14.

9

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23 Please give your position about the [International Association of Firefighters' \(IAFF\)](#)
[adopted Resolution No. 15](#), and explain why other objecting members of the general public
(including workers in industrial areas) should be discriminated, with the fact in mind, that
biological negative effects do result at very low exposures of **non-thermal** nature.

Response:

This response has been provided by Exponent.

While the Resolution by the IAFF can be understood as an expression of concern, its expertise
does not extend to the topic of RF and health effects.

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24 Please acknowledge attached **Page 4** of Dr. Andrew Mikrowski's [WiFi, Smart meters, wireless gadgets – are they safe?](#), section **BIOLOGICAL EFFECTS OF WIRELESS TECHNOLOGIES BELOW CANADA'S REGULATORY LIMIT** :

Where in the Exponent Testimony has this been addressed/considered and does Fortis acknowledge negative biological health effects are indeed associated (or not) with wireless electro-magnetic radiation below SC6, thus associated due to non-thermal effects as mentioned on Page 4.

Response:

This response has been provided by Exponent.

The document referenced was not cited in Exponent's report "*Status of Research on Exposure to Radiofrequency Fields and Health in Relation to Advanced Metering Infrastructure*," dated May 3, 2021 (Appendix F-2 of Exhibit B-1),. The document is not the type of evidence that scientists rely on for the assessment of potential health effects.

Andrew Michrowski, Ph.D., of The Planetary Association for Clean Energy, Inc., an "EMF Pollution Advocacy" group is listed as the author of the handout distributed at the Whole Life Expo in 2011, referred to in the preamble to this IR.¹ In this document, Mr. Michrowski lists "*Typical symptoms associated with SMART meter installation. SMART health complaints from occupants of installations correlate with known health effects associated with long-term exposure to low frequency, radio frequency and microwave emissions: heart, respiratory, sleep, hearing & visual and cognitive problems*" (p. 4). In support of this claim he provided a table titled "*Biological Effects of Wireless Technologies below Canada's Regulatory Limit*" in which he lists RF exposure levels in $\mu\text{W}/\text{cm}^2$, a few words to summarize the topic of the studies listed, and the author's name and a date.

First, it should be noted that the Health Canada regulatory limit he refers to is the Reference Level for public exposure to RF. That level, expressed in the same units as the RF levels in the table, is $274 \mu\text{W}/\text{cm}^2$. Most of the studies, as the title of the table suggests, refer to ordinary biological responses, not symptoms or adverse effects; the effects reported are not consistent with respect to species, intensity, or biological response; and no studies are cited as having been replicated by other scientists. Second, note that only the first study in the list applied an exposure that is less than $0.00016 \mu\text{W}/\text{cm}^2$, the exposure calculated to be produced 1 meter outdoors in front of the Sonix IQ Gas Meter. Third, the exposures were not as short as the 0.34 second daily signal sent by the meter. Finally, while all of the biologic responses are stated to occur at exposure levels below Health Canada's Reference Level for the general public, none provides clear or confirmed evidence for an adverse effect on human health.

¹ "Visiting the 25th annual Whole Life Expo at the Metro Toronto Convention Centre will open you up to a whole new [healthier] world. The natural health exhibition features vendors showcasing natural foods, supplements, natural skin and body care remedies and holistic health therapies, as well as speakers on a variety of topics such as natural treatments for Alzheimer's Disease, how not to take on other people's energy, how to grow sprouts, the importance of iodine in the diet and how to detoxify your pets." <https://torontonicity.com/2011/11/21/whole-life-expo-takes-place-nov-25-27-2011/>

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25 Please take note: The [Nuremberg Code](#) (1949) applies to all experiments on humans,
thus including the roll-out of 5G, 6G with new, higher RF- EMR exposure. All such
experiments:

"should be based on previous knowledge (e.g., an expectation derived from animal
experiments) that justifies the experiment. No experiment should be conducted, where
there is an a priori reason to believe that death or disabling injury will occur; except,
perhaps, in those experiments where the experimental physicians also serve as subjects."
(Nuremberg code pts 3-5).

Already published scientific studies show that there is "*a priori reason to believe*" in real
health hazards.

Please state and explain whether the EMR from smart meters onto humans without fully
informed consent do constitute an experiment on humans or not.

Response:

FEI does not agree with the characterizations suggested in the question and its preamble. FEI
recognizes and follows the guidelines, standards and limits outlined by Health Canada. This
includes Health Canada's Safety Code 6, which provides oversight for use of well-established
advanced metering technology such as that being proposed for this project.

FEI also notes that the majority of utilities globally have safely adopted advanced metering
technology, including BC Hydro and FBC.

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26. Fortis is requested that DR. Bailey/Exponent gives position to the following attached testimonies and papers as a counter to Dr. Bailey's 203 page [EXPONENT REPORT: EXPONENT RF TECHNOLOGY REPORT "Radiofrequency Fields in the Environment and from Advanced Metering Infrastructure"](#) (pages 310 – 513)

Those testimonies being:

Response:

This response has been provided by Exponent.

None of the documents attached to this request were prepared for or addressed the specific FortisBC Energy Inc. (FEI) application before the British Columbia Utilities Commission (BCUC), as is made clear in the responses to the documents below. None of the documents contain a scientifically valid assessment of the relevant scientific literature, and do not provide any valid basis for the conclusions that exposure to extremely low frequency (ELF) electric and magnetic fields (EMF) or radiofrequency (RF) fields below scientifically established exposure guideline levels cause any adverse health effects. In addition, none qualify as scientific research or testimony of the type that would typically be relied upon by scientists in their assessment of the state of the science.

Brief descriptions and assessments of the individual submissions are provided below.

26.1 Dr. Magda Havas Warning about Future 5G Roll-Out in Municipalities and Adverse Consequences to Humans, Flora and Fauna.

Response:

This response has been provided by Exponent.

The document titled "*Warning about Future 5G Roll-Out in Municipalities and Adverse Consequences to Humans, Flora and Fauna*," dated April 15, 2020, was prepared by Dr. Havas for some other proceeding. The document contains a hodgepodge of comments on a mixture of human epidemiology studies, *in vivo* animal studies, and *in vitro* studies of cells on topics of cancer, sperm quality, electrohypersensitivity (EHS), heart rate variability, self-identification and diagnosis of her own physiology ("My own blood becomes more viscous when I am exposed to MW radiation for 10 minutes and this can be observed under a microscope"), unsubstantiated claims made regarding her own interpretation of ad hoc observations of persons and their symptoms she attributes to RF, dirty EMF, electricity, (paragraphs 29-35), petitions by her and others to governments alleging health effects of electromagnetic energy, and attacks on national and international health and scientific agencies because they fail to acknowledge her beliefs and those of other adherents to the interpretations of research on EMF in the ELF and RF ranges.

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She attributes all disagreements between her beliefs and these agencies to industry influence on scientific publications and the members of other health and scientific agencies.

26.2 Dr. Heroux testimony

Response:

This response has been provided by Exponent.

CORE has appended an 8-page letter from Dr. Héroux prepared for another matter that argues against the rollout of new 5G communication technologies. The frequency range of these new technologies does not include the 900 MHz signals proposed by FEI Advanced Metering Infrastructure (AMI) gas meters. Dr. Héroux ends his letter with links to his website and two papers he published on 60 Hertz (Hz) magnetic fields in ELF range.

26.3 Dr. Hardell's letter to Switzerland 2020

Response:

This response has been provided by Exponent.

This letter was addressed to Mrs. Simonetta Sommaruga, President of the Swiss Confederation, in Berne, Switzerland, to complain about the report of the BERENIS - Swiss expert group on electromagnetic fields and non-ionising radiation initiated in 2014 and completed in 2019 (<https://www.bafu.admin.ch/bafu/en/home/topics/electrosmog/newsletter-of-the-swiss-expert-group-on-electromagnetic-fields-a/beratende-expertengruppe-nis-berenis.html>).

Dr. Hardell claims "This Swiss government evaluation is scientifically inaccurate." He further declaims that statements in news reports from Martin Röösli, one of 10 members of the Swiss expert group and a member of International Commission on Nonionizing Radiation Protection (ICNIRP), were evidence of scientific bias and "Röösli and others does not represent a true scientific evaluation of brain and head tumor risk associated with use of wireless phones and should be disregarded." In his letter, Dr. Hardell also objects to two articles that criticize his prior publications² and alleges scientific misconduct by the authors of these articles. Altogether the letter defends his studies and recommends that 5G and all other wireless technologies are unsafe.

² Röösli M, Lagorio S, Schoemaker MJ, Schüz J, Feychting M. Brain and salivary gland tumors and mobile phone use: Evaluating the evidence from various epidemiological study designs. *Annu Rev Public Health* 40:221-238, 2019; Aydin D, Feychting M, Schüz J, Tynes T, Andersen TV, Schmidt LS, Poulsen AH, Johansen C, Prochazka

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3
4 26.4 Dr. Miller Feb 4 2020 testimony
5
6 **Response:**
7 This response has been provided by Exponent.
8
9 This three-page letter to Penticton Mayor John Vassilaki and City Council members objects to the
10 placement of several cellular telephone antennas in Penticton, British Columbia. Dr. Miller also
11 states that “The removal of cell towers from the top of buildings and a moratorium on the roll-out
12 of 5G is essential.”
13
14
15 26.5 Dr. Carpenter Sage Public
16
17 **Response:**
18 This response has been provided by Exponent.
19 This submission is a copy of a paper published by Cindy Sage and Dr. David Carpenter in 2009.³
20 The paper sketches out reasons for their belief in the dangers of exposure to power frequency
21 EMF and RF fields based on their unpublished BioInitiative report⁴. Ms. Sage and Dr. Carpenter
22 recommend that levels of RF exposure be kept below 0.1 microwatt per centimeter square. This
23 recommendation was copied from their recommendation in the Bioinitiative report.⁵

M, Lannering B, Klæboe L, Eggen T, Jenni D, Grotzer M, Von der Weid N, Kuehni CE, Röösl M. Mobile phone use and brain tumors in children and adolescents: a multicenter case-control study. J Natl Cancer Inst 2011 103(16):1264-1276, 2011.

³ Sage C, Carpenter DO. Public health implications of wireless technologies. Pathophysiology 16(2-3):233-246. 2009. “A precautionary limit of 0.1µW/cm2 (which is also 0.614V per meter) should be adopted for outdoor, cumulative RF exposure” (p.10).

⁴ The “BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Fields (ELF and RF)”, co-edited by David Carpenter and Cindy Sage, was released 2007 and parts updated under a similar title “BioInitiative 2012; A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Radiation at www.bioinitiative.org, December 31, 2012, with later additions in 2014 and 2020.

⁵ “A cautionary target level for pulsed RF exposures for ambient wireless that could be applied to RF sources from cell tower antennas, WI-FI, WI-MAX and other similar sources is proposed. The recommended cautionary target level is 0.1 microwatts per centimeter squared (µW/cm2)**(or 0.614 Volts per meter or V/m)** for pulsed RF where these exposures affect the general public; this advisory is proportionate to the evidence and in accord with prudent public health policy. A precautionary limit of 0.1 µW/cm2 should be adopted for outdoor, cumulative RF exposure”(1. Summary, p. 24).

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1 The RF level typically produced at 1 metre behind the proposed FEI AMI meter (in the home) is
2 about 91,000 times lower (approximately 1.1×10^{-5} $\mu\text{W}/\text{cm}^2$) than the precautionary limit
3 recommended by Ms. Sage and Dr. Carpenter.

4
5
6
7 26.6 Dr. Girish Kumar Cell Phone / Tower Radiation Hazards and Solutions

8
9 **Response:**

10 This response has been provided by Exponent.

11 This is an undated power point presentation apparently prepared not later than 2014 that
12 discusses mobile phone towers and phone exposures focused on India. Both scientific and lay
13 sources are cited as sources. Dr. Kumar supports the Bioinitiative report's outdoor limit of 1
14 mW/m^2 [$0.1 \mu\text{W}/\text{cm}^2$] and cites a 2012 recommendation from the Austrian Medical Association
15 which states that RF exposures $\leq 1 \mu\text{W}/\text{m}^2$ [$0.0001 \mu\text{W}/\text{cm}^2$]...are within normal limits."

16
17
18
19 26.7 EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of
20 EMF-related health problems and illnesses

21
22 **Response:**

23 This response has been provided by Exponent.

24 A self-assembled group within the European Academy for Environmental Medicine
25 (EUROPAEM), Belayev et al. (2016) published a position paper on the "current state of the
26 scientific and political debate about EMF-related health problems" alleged to be caused by ELF
27 magnetic fields and RF fields and states that their diagnosis and treatment "recommendations are
28 preliminary and in large parts, although related to the whole body of evidence rooted in the
29 experience of the team, cannot in every detail be strictly considered evidence-based" (p. 13). The
30 document includes recommended exposure limits for "GSM (2G) 900/1800 MHz [exposures for
31 day, night, and sensitive persons of] $100 \mu\text{W}/\text{m}^2$, $10 \mu\text{W}/\text{m}^2$, and $1 \mu\text{W}/\text{m}^2$," respectively, based
32 on the Bioinitiative report. No scientific rationale is provided for the recommendation of these
33 levels.

34 The Bioinitiative report was originally issued on a website in 2007, with subsequent updates in
35 2012, 2014, and most recently in 2020. The original report and the updates are not based on
36 proper and rigorous evaluation of the scientific evidence. The Bioinitiative report suffers from
37 several deficiencies: 1) the report was authored by a self-organized group of individuals from

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1 academic institutions and public interest groups, and not under the auspices of any recognized
2 scientific organization; 2) the conclusions expressed in the individual chapters of the document
3 did not represent consensus opinions, rather they were the opinions of the individual contributors;
4 3) the authors did not follow a weight-of-evidence approach, and selectively reported on studies
5 that, in their opinions, showed some effect and supported their views; 4) the authors mostly
6 disregarded studies that did not show an effect, including the entire body of literature on long-
7 term animal bioassays; and 5) the authors did not thoroughly assess the quality of studies they
8 evaluated. These deficiencies likely explain why the Bioinitiative report's conclusions are
9 completely inconsistent with conclusions of other risk assessments that followed the generally
10 accepted scientific methods of weight-of-evidence evaluations.

11 Several scientific and governmental agencies strongly criticized the Bioinitiative report. The
12 Australian Centre for Radiofrequency Bioeffects Research wrote, "[a]s it stands it [the Bioinitiative
13 2007 report] merely provides a set of views that are not consistent with the consensus of science,
14 and it does not provide an analysis that is rigorous-enough to raise doubts about the scientific
15 consensus" (ACRBR, 2008). The EMF-NET Steering Committee of the European Commission
16 opined the report was "written in an alarmist and emotive language and the arguments have no
17 scientific support from well-conducted EMF research" and "[t]here is a lack of balance in the
18 report; no mention is made in fact of reports that do not concur with authors' statements and
19 conclusions" (EMF-NET, 2007). The Health Council of the Netherlands also questioned the
20 authors' motivation noting "[u]pfront, therefore, the reason for writing the report was not to give an
21 objective analysis of the current state of science that would subsequently lead to
22 recommendations. Instead, the aim was to present information to demonstrate why current
23 standards are inadequate" (HCN, 2008). All of these agencies concurred that Bioinitiative group
24 did not follow the methods of a standard weight-of-evidence review and, for this reason, its
25 conclusions and recommendations were not convincing. Over time, despite adding more text to
26 this online document, the absence of a rigorous scientific method for evaluating research studies
27 has not changed.

28
29
30
31 26.8 Eileen O'Connor EM Radiation Research Trust puts UK government on notice
32 26.10 Regarding 5G amidst profound world-wide health concerns
33

34 **Response:**

35 This response has been provided by Exponent.

36 Ms. O'Connor is President of this advocacy organization. "The aim of the organisation is to provide
37 the facts about electro-magnetic radiation and our health to the public and the media"
38 (www.radiationresearch.org). CORE submitted a letter to the BCUC that Ms. O'Connor originally
39 sent to the Ministry of Housing, Communities and Local Government in London in 2019 to protest
40 "proposed reforms to the permitted development rights for the deployment of 5G to extend mobile

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coverage.” A number of the web links cited in support of Ms. O’Connor’s arguments in her 2019 letter are now broken. This includes a broken link to a paper on Ms. O’Connor’s own website titled, “On the Clear Evidence of the Risks from Non-Ionizing Radio Frequency Radiation: The Case of Digital Technologies in the Home, Classroom and Society.”

26.9 Dr. Andrew Michrowski : Electromagnetic fields: High-level microwave technology concerns

Response:

This response has been provided by Exponent.

This unreferenced, undated document was posted to the Internet

(http://media.withtank.com/42391c31ef.pdf#:~:text=Electromagnetic%20fields%3A%20high-level%20microwave%20technology%20concerns%E2%80%93%20Planetary%20Association,has%20been%20reported%20by%20Olle%20Johansson%2C%20Karolinska%20Institute.)).

The document in form and content appears to be the same or similar to document referenced in CORE IR1 24. As such, please refer to the response to CORE IR1 24.

26.10 Dr. Lai 2018

Response:

This response has been provided by Exponent.

Dr. Lai states “This summary of the research literature on the neurological effects of exposure to radiofrequency radiation (RFR), a part of the EMF spectrum that is used in wireless communications, published between 2007- 2017. The database came from survey of the Medline and understandably does not include all the relevant papers published during the period.” The summary was not published in a peer-reviewed journal and the author stated that the results were similar to effects of ELF EMF he reported in the 2012 Bioinitiative report. The bulk of the chapter is a table that lists human and animal studies that reported either “no significant effects” or “significant” effects on behavior as characterized by Dr. Lai. The listing only included the authors and date of the study, a few words as to the behavior studied, some information as to the source

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of exposure and frequency of RF, and an indicator of exposure intensity and duration. The author performed no systematic review of the studies listed by frequency, RF intensity, or type of behavior. The conclusions from this ad hoc, undigested listing were only vague generalities (e.g., “A majority of the animal studies reported effects, whereas more human studies reported no significant effects than effects” [p. 18]). “Most of the studies were carried out with relatively high levels of RFR compared to environmental levels” (p. 20).

The author draws attention to problems in the literature reviewed:

A major concern is that in some of the studies details of the exposure setup and dosimetry are not provided. This is important, since details of the independent variables are very important in interpreting the validity of the experimental results, i.e., dependent variables. In many of these studies, a cell phone was used in the exposure of animals and humans. But information on how the cell phone was activated, in many instances, was not provided. Thus, the amount of energy deposited in the body was not known. Some studies used the phone in ‘stand-by’ mode. . . . It is very surprising that in all papers on the effects of RFR on EEG mentioned at the beginning of this paper, only two provided significant information on the exposure parameters. This is alarming. It may indicate that the researchers did not understand the properties of the entity that they were studying (pp. 19-20).

Altogether, this listing of studies, mostly of ordinary biological effects of no clear significance to health or well being, does not provide persuasive scientific evidence that RF signals from the FEI AMI meters would have harmful effects. The author raises more questions based upon his summary than conclusions. One important question he asked is:

Do the research data of 3G phone apply to 4G or 5G phone radiation? RFR is a complex entity. Its biological effects depend on many of its physical properties, e.g., frequency, direction of the incident waves relative to the object exposed, dielectric properties and size and shape of the exposed object, polarization of the waves, etc. Thus, it is unlikely that one can easily extrapolate the effects from one form of RFR to another (p. 21).

26.11 Dr. Lai 2019 free radical papers

Response:

This response has been provided by Exponent.

The document provided appears to be an unpublished listing of studies described as “Summary of papers on the effects of ELF-EMF on oxidative processes in cells and animals.” The exposures

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1 in the studies listed are to ELF EMF, principally at 50 or 60 Hz frequencies, not 900 MHz RF fields
2 associated with the operation of the proposed FEI AMI gas meters.

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4
5
6 26.12 Letter to Scientific American from IEMFA

7
8 **Response:**

9 This response has been provided by Exponent.

10 This letter to Scientific American from members of the International EMF Alliance
11 (www.iemfa.org) complains about a blog post to the magazine by David Robert Grimes: “Don’t
12 Fall Prey to Scaremongering about 5G ([https://blogs.scientificamerican.com/observations/dont-](https://blogs.scientificamerican.com/observations/dont-fall-prey-to-scaremongering-about-5g/)
13 [fall-prey-to-scaremongering-about-5g/](https://blogs.scientificamerican.com/observations/dont-fall-prey-to-scaremongering-about-5g/)) that responded to an opinion article by Dr Joel M.
14 Moskowitz “We Have No Reason to Believe 5G Is Safe”

15 ([https://blogs.scientificamerican.com/observations/we-have-no-reason-to-believe-5g-is-](https://blogs.scientificamerican.com/observations/we-have-no-reason-to-believe-5g-is-safe/?fbclid=IwAR1ubea0PTG2t8F-adla-XzEd7f7jNDu4Hz6Ym06k0rv5ccCiccNOt3nM8)
16 [safe/?fbclid=IwAR1ubea0PTG2t8F-adla-](https://blogs.scientificamerican.com/observations/we-have-no-reason-to-believe-5g-is-safe/?fbclid=IwAR1ubea0PTG2t8F-adla-XzEd7f7jNDu4Hz6Ym06k0rv5ccCiccNOt3nM8)
17 [XzEd7f7jNDu4Hz6Ym06k0rv5ccCiccNOt3nM8](https://blogs.scientificamerican.com/observations/we-have-no-reason-to-believe-5g-is-safe/?fbclid=IwAR1ubea0PTG2t8F-adla-XzEd7f7jNDu4Hz6Ym06k0rv5ccCiccNOt3nM8)).

18 Although both opinion pieces cite some scientific studies, neither provides information that would
19 inform a comprehensive assessment of potential effects of wireless communications on public
20 health.

21
22
23
24 26.13 Dr. Andrew Michrowski Pace letter Penticton City Council re wireless
25 communication rollout

26
27 **Response:**

28 This response has been provided by Exponent.

29 Dr. Michrowski’s letter to the Penticton Mayor and City Council in 2019 raises health concerns,
30 safety and accelerated corrosion concerns, and economic and insurance coverage concerns
31 principally about mesh-network electric smart meters, cell phones, and 5G communication
32 systems. He also appended his list of studies “Reported Biological Effects from Radiofrequency
33 Radiation at Low-Intensity Exposure (Cell tower, Wi-Fi, Wireless Laptop and ‘Smart’ Meter RF
34 Intensities)”, similar to what is in his paper referenced in CORE IR1 24. The document is not the
35 type of evidence that scientists rely on for the assessment of potential health effects.

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26.14 Dr. Panagopoulus – 2019 Mut.....

Response:

This response has been provided by Exponent.

This submission is a review of experiments conducted in the author's laboratory from 2006 until 2016 that compares DNA fragmentation induced by six different EMF types on the eggs of *Drosophila melanogaster* flies. The exposures of groups of 10 male and 10 female flies to RF fields included "Sham-Exposure to the GSM 900 or 1800 EMFs for 6 min[utes] every 24 h[ours] (36 min[utes] total) with the handset in 'talk' mode and in contact with the vials under identical conditions and procedures" at $\sim 0.378 \pm 0.059$ mW/cm². Other exposures compared to these RF fields were three intensities of 50-Hz magnetic fields and an 8 kilohertz electric field. Following exposure, the eggs were assayed for the fraction of eggs showing DNA fragments by the Tunel assay.

The author did not describe how exposures were measured or if the RF exposures increased the temperature of the vials. The author reports a much greater effect of RF exposure on the fraction of eggs exposed to RF than to the other four types of EMF. The author comments on this difference: "It is evident that real-life microwave telecommunication EMFs are very bioactive. The question arising is, which specific parameter(s) of this type of EMFs is mainly responsible for this intense bioactivity?" The most obvious factor he did not consider was that the RF exposures and the heat from the power drawn from the cell phone battery could be expected to increase the temperature of the flies. As only one level of exposure was tested at each frequency it was not possible to establish that the reported effects were in fact related to the intensity of the exposure by testing for a dose-response relationship across a range of RF field levels. The single RF exposure level tested was approximately 370,000 times greater than the RF level at one meter outdoors in front of the FEI Sonix IQ Gas Meter (0.00000016 mW/cm²).

26.15 Dr. Panagopoulus – 2019 UMTS

Response:

This response has been provided by Exponent.

The document submitted is a paper published by Dr. Panagopoulus in which blood samples were obtained from six volunteers, the cells cultured, and then "blood samples were either exposed to the UMTS MT EMF ('exposed samples') [at 1 centimeter from the mobile phone, 92 ± 27 μ W/cm²,

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at ~ 1,920–1,960 MHz] during the exposures in another room of the laboratory (called ‘exposure room’) ..., or simply transferred for the same time (sham-exposed) to the exposure room (‘control samples’)” for 15 minutes. The development of blood lymphocytes was arrested by chemical treatment and lyzed cells reviewed under a microscope for chromosomal aberrations. The author reported increased frequency of aberrations in the exposed cells compared to the unexposed cells. The crude nature of the exposure conditions using a mobile phone handset limits the conclusions drawn regarding the RF exposure. Despite references to methods in other papers for measuring and analyzing chromosome aberrations, the methods used by Dr. Panagopoulos were not standard and did not comply with the OECD Guideline for the Testing of Chemicals: In Vitro Mammalian Chromosome Aberration Test (1997). The negative (sham-exposed) cultures were not exposed at the same time as the exposed cultures—exposures were done sequentially. No positive controls were included. Criteria for determining a positive result in the chromosomal aberration assay is a concentration-related increase or a reproducible increase in the number of cells with aberrations; however, only one duration or strength of EMF exposure was utilized, excluding evaluation of a dose-response relationship. Statistical analysis was useful but should not be the only determining factor for a positive response—the biological relevance of the results should be considered first. In the study, biological relevance is not considered—only statistical results. Studies that report this effect are uncommon and not consistent with other similar studies reviewed by the Scientific Commission on Emerging and Newly Identified Health Risks in their 2015 report.

26.16 Dr. Panagopoulos Chrousos 2019

Response:

This response has been provided by Exponent.

Apart from the stated objective of this study presented below, and reference to a selected group of studies, we found no information that would be useful in the assessment of potential health effects of RF fields.

In the present study we explained how metals, especially ferromagnetic ones, can insulate space from external EMFs/EMR by electromagnetic coupling which is an inherent property of metals for their interaction with ambient EMFs. According to this property, we critically analyzed the effectiveness and safety of metal shielding in the form of grids, paints, garments, bed canopies, metal patches, “chips”, minerals etc.[,] offered in recent years by many private companies and individuals as EMF-shielding solutions. We provided representative EMF shielding measurements, in order to give an estimation of how much ELF and RF EMFs are reduced by a simple sparse grid made from galvanized iron. (p. 255).

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4 26.17 Dr. Hardell Penticton City Council

5 **Response:**

6 This response has been provided by Exponent.

7 This letter from Dr. Hardell to the Penticton Mayor and City Council contains a statement that:

8 ... our request for a moratorium on deployment of 5G is universal and does not

9 only relate to EU [European Union]. Thus the same situation exists also for

10 Canada. Furthermore it is recommended that current installations for RF radiation

11 are based on the precautionary principle as outlined in the BioInitiative Report

12 (<https://bioinitiative.org>). If these requirements are not fulfilled the base station(s)

13 should be dismantled.

14 This petition pertains to RF exposures from proposed 5G installations that are unrelated to the

15 RF signals produced by the FEI AMI gas meters. The recommended exposure limits and policies

16 were taken from a self-organized group of scientists who have not followed accepted scientific

17 methods.

18

Attachment 1.0



Sonix IQ™

For Residential Gas Meter Applications

The Sonix IQ ultrasonic gas meter provides pinpoint measurement of natural gas using ultrasonic technology. This solid state meter has no moving parts to replace or wear out over time. Featuring an available FlexNet® radio integrated inside the meter housing – the Sonix IQ packs in value within a compact size.

Unprecedented Flexibility

The Sonix IQ provides 250 CFH or 425 CFH within the same form factor. The pulse output, scalable by user configuration, supports third-party endpoints. The Sonix IQ with the optional SmartPoint® module provides full two-way communications when combined with the Sensus FlexNet communication network.

Built-in Intelligence

The Sonix IQ offers continuous health checks with system safety alerts, hardware alarms, and battery management alerts. The base LCD offers reading volume and alarms. Optional scrolling LCD items include uncorrected volume, temperature, pressure fixed, pressure monitor, and flow rate. The Sonix IQ logs hourly data and stores it for up to 90 days at a time.

Lifetime Value

The Sonix IQ offers an extended battery life of 20 years. Planning for maintenance and asset management costs has never been easier. The Sonix IQ has a compact footprint enabling utilities to deploy it where other traditional gas meters do not fit. The small size creates the added benefit of increased efficiency in shipping and storage.

FEATURES

- Dual-class metrology: 250 CFH or 425 CFH
- 90-day hourly data logs
- Built-in theft and tamper detection
- Available pulse output
- Optional FlexNet capability

BENEFITS

- Compact footprint
- Two-way communications when used with a Sensus FlexNet communication network
- Supports third party radios
- Continuous health checks through safety alerts and alarms
- Streamlined asset management with Sonix IQ's 20 year battery life

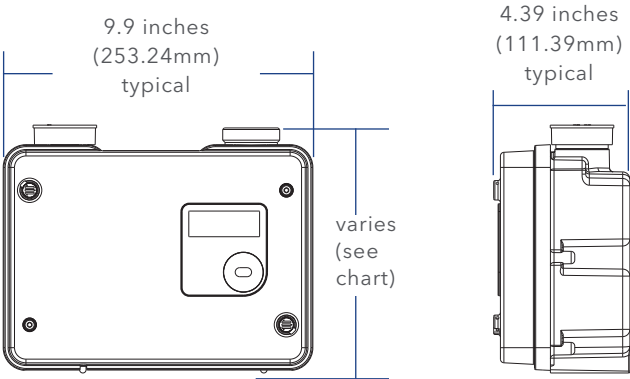


Sonix IQ™

For Residential Gas Meter Applications

HEIGHT

10 LT	7.93 in. (201.43mm)
20 LT	7.89 in. (200.39mm)
30 LT	8.23 in. (209.05mm)
Sprague #1A	7.99 in. (202.83mm)
1-1/4" NPT	7.99 in. (202.83mm)



SPECIFICATIONS

	250 Series	425 Series
Capacity	250 CFH at ½" differential	425 CFH at ½" differential
Range	250 CFH (7m3/hr) at ½" W.C. Differential ±1% from 10 CFH to Qmax 250 CFH with 0.6 specific gravity gas ±2% from 3 to 10 CFH, with 0.6 specific gravity gas	425 CFH (12m3/hr) at ½" W.C. Differential ±1% from 15 CFH to Qmax 425 CFH, with 0.6 specific gravity gas ±2% from 5 to 15 CFH, with 0.6 specific gravity gas.
Low Flow Cutoff	0.25 cfh (7 liters/hr)	
Connections	All available connections are on 6 in. (152mm) center to center. Recommended mounting with connections up.	
Maximum Allowable Operating Pressure	10 psig	
Dimensions (average)	9.94 in. L x 4.38 in. W x 7.89 in. H (252.5mm L x 111.3mm W x 200.4mm H)	
Weight	6.3 lb (2.86 kg)	
Pressure Compensation	User configurable fixed factored for operating, base, and atmospheric pressure.	
Operating Temperature	-30° to +130°F (-35° to +55°C) ±1.0% temperature or non temperature compensating options.	
Storage Temperature	-40° to +150°F (-40° to +66°C)	
Operating & Storage Humidity	0 to 95% external relative humidity (non-condensing and condensing). IP54. For clean dry natural gas applications.	
Accuracy	Complies with ANSI B109.1, PS-G-06.	
Intrinsic Safety	Class I, II, III, Division 2, Group D, F, G, T4 in accordance with IAS 12.12.01/CSA C22.2 No 213.	

