

September 24, 2025

VIA ELECTRONIC FILING

Brinda Westbrook-Sedgwick
Commission Secretary
Public Service Commission
of the District of Columbia
1325 "G" Street, NW, 8th Floor
Washington, D.C. 20005

**Re: Formal Case Nos. 1179
[Washington Gas Supplemental Testimony PUBLIC]**

Dear Ms. Westbrook-Sedgwick:

Pursuant to Order No. 22716, transmitted for filing herewith please find Washington Gas Light Company's Supplemental Testimony of Ken E. Oliphant in the above-captioned proceeding.

Please do not hesitate to contact me if you have questions regarding this matter.

Sincerely,



John C. Dodge
Associate General Counsel and
Director, Regulatory Matters

cc: Per Certificate of Service



BEFORE THE
PUBLIC SERVICE COMMISSION OF THE DISTRICT OF COLUMBIA

FORMAL CASE No. 1179

IN THE MATTER OF THE INVESTIGATION INTO WASHINGTON GAS LIGHT COMPANY'S
STRATEGICALLY TARGETED PIPE REPLACEMENT PLAN

VOLUME 1 OF 1

PUBLIC

SUPPLEMENTAL TESTIMONY
WG (3E)

(WITNESS OLIPHANT)

SUPPORTING EXHIBITS
WG (3E)-1

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BY SPECIAL APPEARANCE

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ALICE WADE

POST AND SCHELL, P.C.

DATED: SEPTEMBER 24, 2025

1 BEFORE THE
2 PUBLIC SERVICE COMMISSION OF THE
3 DISTRICT OF COLUMBIA

4 IN THE MATTER OF)
5)

6 THE INVESTIGATION INTO WASHINGTON)
7 GAS LIGHT COMPANY'S STRATEGICALLY)
8 TARGETED PIPE REPLACEMENT PLAN)

FORMAL CASE NO.1179

9 WASHINGTON GAS LIGHT COMPANY
10 District of Columbia

11 **SUPPLEMENTAL TESTIMONY OF KEN E. OLIPHANT**
12 **Exhibit WG (3E)**
13 **(Page 1 of 1)**

14 **Public**

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19 Exhibits

	<u>Title</u>	<u>Exhibit No.</u>
21		
22	J-DIMP Risk Model Report Addendum A Confidential.....	Exhibit WG (3E)-1
23		
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WASHINGTON GAS LIGHT COMPANY
DISTRICT OF COLUMBIA
SUPPLEMENTAL TESTIMONY OF KEN E. OLIPHANT

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.

A. My name is Ken E. Oliphant. I work for JANA Corporation (“JANA”), which is an engineering software firm that provides probabilistic risk software to energy utilities. My business address is 305 Unit 1 Industrial Parkway South, Aurora, ON, Canada.

Q. DID YOU PREVIOUSLY SUBMIT TESTIMONY IN THIS PROCEEDING ON BEHALF OF WASHINGTON GAS?

A. Yes. I submitted my direct testimony, Exhibit WG (E), on September 27, 2024, which provided details on the JANA risk modeling software and methodology, and described how it is being deployed at Washington Gas Light Company (“Washington Gas” or the “Company”). I also addressed how JANA Lighthouse aids project prioritization in alignment with the District’s climate goals. In addition, I submitted rebuttal testimony, WG Exhibit (2E), on January 6, 2025, which responded to certain portions of the direct testimony submitted by the Office of the People’s Counsel for the District of Columbia (“OPC”), the District of Columbia Government (“DCG”), and the Sierra Club.

Q. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL TESTIMONY?

1 A. My supplemental testimony responds to the District of Columbia Public
2 Service Commission's ("Commission") request for additional information about
3 the JANA risk model, in Order No. 22716.¹ Specifically, I provide information
4 regarding: (1) the detailed inputs and underlying data used in the model's
5 calibration; (2) the specific correlation analysis used to validate its predictions
6 against actual leak data on Washington Gas's system; and (3) a full accounting
7 of the model's ongoing modifications, backtesting, or heuristics.
8

9 **Q. DO YOU HAVE ANY EXHIBITS WITH YOUR TESTIMONY?**

10 A. Yes, I do. Included with my testimony are CONFIDENTIAL Exhibit WG
11 (3E)-1, "J-DIMP Risk Model Report Addendum A: Likelihood of Failure Model
12 Description." This document describes: (1) the analysis process used to tune the
13 JANA DIMP Likelihood of Failure Model to Washington Gas's distribution piping
14 asset performance history; (2) Washington Gas's specific data used in the
15 analysis; and (3) analysis comparing the model's performance to Washington
16 Gas's recent asset leak history for piping.
17

18 **II. ORGANIZATION OF TESTIMONY**

19 **Q. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?**

20 A. In Section III of the testimony, I address the Commission's request to
21 provide additional information regarding the JANA model.
22
23

24 _____
25 ¹ Formal Case No. 1179, *In the Matter of the Investigation into Washington Gas Light Company's Strategically Targeted Pipe Replacement Plan*, Order No. 22716 (Sept. 15, 2025) ("Order No. 22716").

1 (i.e., calibrate) JANA Lighthouse to the Company's distribution asset performance
2 history, Section 2 describes the Company data used in this analysis process;
3 Section 3 of this exhibit compares the model's performance to Washington Gas's
4 recent asset leak history for piping (i.e., validates the probabilistic predictions
5 against actual Company data); and Section 4 of this exhibit discusses potential
6 data collection tasks that may improve the mode in the future (i.e., discusses
7 ongoing modifications to the model)³.

8 **Q. PLEASE DESCRIBE THE JANA LIGHTHOUSE CALIBRATION PROCESS, AS**
9 **REQUIRED BY ORDER NO. 22716.**

10 A. The JANA Lighthouse calibration process involves the calibration of two
11 underlying, models: the Likelihood of Failure Model, and the Scenario Probability
12 Model. The Likelihood of Failure Model forecasts the number of leaks that may
13 occur on the Washington Gas distribution system for each threat category defined
14 by the United States Department of Transportation's Pipeline and Hazardous Materials
15 Safety Administration ("PHMSA"). The Scenario Probability Model determines the
16 probabilities of different leak outcomes for each threat category (e.g., the chance
17 that a Grade 1 leak caused by corrosion leads to an ignition or explosion).

18 Both the Likelihood of Failure and the Scenario Probability Models are
19 calibrated to Washington Gas mains and service leak history primarily using the
20 statistical method of maximum likelihood estimation. CONFIDENTIAL Exhibit WG
21 3E-1 provides additional details on this process.

22
23 **Q. WHAT DATA INPUTS ARE USED WHEN CALIBRATING THE LIKELIHOOD**
24

25 ³ CONFIDENTIAL Exhibit WG (3E)-1 at 4 (Section 1.1, summarizing document structure).

1 **OF FAILURE AND THE SCENARIO PROBABILITY MODELS USED BY JANA**
2 **LIGHTHOUSE?**

3 A. Washington Gas's asset characteristics, location, and leak history are used
4 in the calibration of the Likelihood of Failure Model. The PHMSA incident report
5 database, for incidents specific to Washington Gas and natural gas operators
6 industry-wide, is used to calibrate the Scenario Probability Model. Both the
7 Likelihood of Failure and Scenario Probability Models perform calculations by
8 PHMSA threat category for each distribution main and service.

9 A detailed list of inputs for both the Likelihood of Failure Model and
10 Scenario Probability Model is provided below. See CONFIDENTIAL Exhibit WG
11 3E-1 for a detailed discussion of the Likelihood of Failure Model, including each
12 input, detailed below, and the associated parameter values used in the model.
13 Further detail regarding the JANA risk modeling approach and the model
14 development were also provided in Exhibit WG (E), Section IV.

15 **[BEGIN CONFIDENTIAL]**

16 [REDACTED]
17 [REDACTED]
18 [REDACTED]
19 [REDACTED]
20 [REDACTED]
21 [REDACTED]
22 [REDACTED]
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10 [REDACTED]

11 [END CONFIDENTIAL]

12
13 **Q. PLEASE DESCRIBE JANA'S MODEL VALIDATION METHODOLOGY, AS**
14 **REQUIRED BY ORDER NO. 22716.**

15 A. The Likelihood of Failure Model is validated annually during each model
16 refresh period. The leak forecast output of the Likelihood of Failure Model is
17 compared to the actual leak data on Washington Gas's system using a statistical
18 analysis. In the assessment of the overall model performance, the mean and
19 standard deviation for the annual number of leaks (historical) associated with
20 mains and services is calculated. Then, a standard statistical analysis, a t-test, is
21 applied to calculate the 90% confidence intervals for the mean annual number of
22 leaks. The model outputs are validated when they fall within the calculated
23 confidence interval which defines the acceptable limits. If model results fall
24 outside the confidence interval, the model can be modified or 'tuned' as described
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below. A model estimate that falls outside the interval can be considered acceptable if there is a reasonable explanation for the deviation (e.g., a known change in data collection practices).

Q. WHAT CONSTITUTES A SUCCESSFUL MODEL VALIDATION?

A. Models that produce results falling within the 90% confidence interval in the overall assessment are generally deemed acceptable. For the latest model refresh, performed in 2024, a leak dataset from 2018-2022 was first used to calibrate the model and 2023 leak data was used as a validation dataset for back-testing. To validate that the model was calibrated properly, the model's forecasted leaks for 2023 were compared to the historical observed leaks from 2018 through 2023. The confidence intervals were then established to determine if the forecasted leak values fall within acceptable limits. Table 1 shows the results of this assessment for the leaks within the Washington Gas distribution system. Since the JANA Lighthouse leak forecasts, by threat, all fall within the 90% confidence limits of observed leaks through the 2018 – 2023 time period, the validation was considered successful.

Table 1: Model Performance Review for Main and Service Assets within the Washington Gas Distribution System.

Threat	Annual Leaks (2018-2023)		90% Confidence Upper Bound	90% Confidence Lower Bound	Model Forecast (2023)	In 90% Confidence Interval
	Mean	Standard Deviation				
Corrosion	1,361	244	1,562	1,160	1,299	Yes
Equipment	371	58	418	324	391	Yes
Excavation Damage	734	48	773	695	769	Yes
Incorrect Operations	89	17	102	75	98	Yes
Join/Fitting Failure	3,731	987	4,543	2,920	3,498	Yes
Material Failure	67	13	77	56	74	Yes
Natural Force Damage	397	48	436	358	413	Yes
Other Outside Forces	23	6	27	18	26	Yes
Other Failure Mode	3	3	5	0	4	Yes
Total	6,774	1,287	7,833	5,716	6,571	Yes

Q. WHERE CAN THE COMMISSION FIND ADDITIONAL DETAIL REGARDING THE VALIDATION PROCESS FOR JANA LIGHTHOUSE?

A. As previously noted, this additional detail can be found in Section 3 of CONFIDENTIAL Exhibit WG (3E)-1, which contains detailed comparisons of the model’s performance to actual Washington Gas asset leak history.

Q. HOW DOES MODEL VALIDATION RELATE TO WASHINGTON GAS’S PROJECT SELECTION?

A. A successful validation indicates that the risk model correctly characterizes the leak behavior of Washington Gas’s distribution system. After a successful validation, the process of calculating risk begins for each distribution piping segment. Nearby segments are then grouped together into “bundles.” Bundles serve as an input to the replacement project selection process, one of the initial steps towards selecting projects for the Commission’s review and approval.

1 Witness Murphy's rebuttal testimony provides further discussion on project
2 selection.

3
4 **Q. IS THE MODEL SUBJECT TO ONGOING MODIFICATIONS?**

5 A. Yes, it is subject to modifications during the annual calibration process.

6
7 **Q. PLEASE DESCRIBE THE MODIFICATIONS MADE TO THE MODEL DURING**
8 **THE ANNUAL CALIBRATION PROCESS, AS REQUESTED BY ORDER NO.**
9 **22716.**

10 A. The performance of the Likelihood of Failure and Scenario Probability
11 Models is reviewed every year, and changes are made to model parameters to
12 better reflect recent asset performance across the network. Updates to the
13 models in each refresh period include additional years of leak data and updating
14 the model parameters during calibration until the model is validated successfully.

15
16 **Q. WHAT LIKELIHOOD OF FAILURE AND SCENARIO PROBABILITY MODEL**
17 **PARAMETERS ARE MODIFIED TO CALIBRATE THE MODEL ON AN**
18 **ANNUAL BASIS?**

19 A. [BEGIN CONFIDENTIAL] [REDACTED]
20 [REDACTED]
21 [REDACTED] [END CONFIDENTIAL] detailed in CONFIDENTIAL
22 Exhibit WG 3E-1, are modified in the annual calibration process.

23
24 **Q. WHAT CONSIDERATIONS ARE GIVEN WHEN MAKING ANNUAL**
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MODIFICATIONS TO THE MODEL?

A. The past model performance, model validations, and subject matter expert feedback are used to inform the modifications to the model. If a new threat to the Washington Gas system were to be identified and it is expected that incorporation of this threat would benefit the model's performance, the model can be modified to assess the threat.

IV. CONCLUSION

Q. DOES THAT CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?

A. Yes, it does.

EXHIBIT WG (3E) - 1

CONFIDENTIAL

ATTESTATION

I, KENNETH OLIPHANT, whose Testimony accompanies this Attestation, state that such testimony was prepared by me or under my supervision; that I am familiar with the contents thereof; that the facts set forth therein are true and correct to the best of my knowledge, information and belief; and that I adopt the same as true and correct.


KENNETH OLIPHANT


DATE

CERTIFICATE OF SERVICE

I, the undersigned counsel, hereby certify that on this 24th day of September 2025, I caused copies of the foregoing document to be hand-delivered, mailed, postage-prepaid, or electronically delivered to the following:

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