

**BEFORE THE STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF DAKOTA ACCESS, LLC CONSOLIDATED APPLICATION
FOR AN AMENDED CERTIFICATE OF CORRIDOR COMPATIBILITY
AND AMENDED ROUTE PERMIT; DAKOTA ACCESS PIPELINE PUMP STATION -
EMMONS COUNTY SITING APPLICATION**

CASE. NO. PU-19-204 | OAH FILE. NO. 20190280

**PRE-FILED TESTIMONY OF RICHARD KUPREWICZ
ON BEHALF OF INTERVENOR STANDING ROCK SIOUX TRIBE**

November 1, 2019

1 **INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND POSITION.**

3 A. My name is Richard B. Kuprewicz. I am the President of Accufacts Inc.
4 ("Accufacts") which is located at 8151 164th Ave NE, Redmond, Washington
5 98052.

6 **Q. PLEASE DESCRIBE ACCUFACTS.**

7 A. Accufacts provides pipeline safety expertise in gas and liquid pipeline
8 investigation, auditing, risk management, siting, construction, design, operation,
9 maintenance, training, Supervisory Control and Data Acquisition, leak detection,
10 management review, emergency response, and regulatory development and
11 compliance.

12
13 In my role as President, I provide independent consulting services and expert
14 advice on pipeline matters. My clients are local, state and federal agencies, non-
15 governmental organizations, members of the public, and pipeline industry
16 representatives. In particular, my work is focused on pipeline operations in
17 unusually sensitive areas, such as areas of high population density or significant
18 environmental sensitivity.

19
20 For example, following several pipeline failures and tragedies, I was appointed to
21 represent the public interest in developing the U.S. Department of Transportation
22 Pipeline and Hazardous Materials Safety Administration's ("PHMSA") federal
23 regulations for both liquid and gas transmission integrity management (often

24 known as transmission integrity management programs or TIMP). I also was
25 involved—again on the public side—in the development of safety regulations for
26 distribution pipelines (also known as distribution integrity management programs
27 or DIMP).

28

29 I have testified to Congress and various Public Utility Commissions (“PUCs”) /
30 Public Service Commissions (“PSCs”) on pipeline matters, and authored many
31 papers concerning pipeline issues in both the U.S. and Canada. I am experienced
32 and knowledgeable concerning various state and federal pipeline safety
33 regulations, as well as their Canadian counterparts.

34

35 **Q. PLEASE SUMMARIZE YOUR WORK EXPERIENCE AND EDUCATIONAL**
36 **BACKGROUND.**

37 **A.** I have over 46 years of experience in the energy industry, including operations,
38 engineering, process safety management, and in recent decades, have been
39 involved in many pipeline failure investigations. I hold B.S. degrees in Chemistry
40 and Chemical Engineering from the University of California, Davis, and an MBA
41 from Pepperdine University.

42

43 My c.v. is attached to this document. It summarizes my background and includes
44 a list of papers I have authored that address pipeline technical matters and are in
45 the public domain; they support my qualifications to testify on this matter before
46 the North Dakota Public Service Commission (“Commission”).

47

48 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

49 A. I am testifying on behalf of Standing Rock Sioux Tribe ("SRST"). The SRST has
50 retained me to assist them in this matter and I am being compensated for my time
51 at a rate of \$400 per hour.

52

53 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION PREVIOUSLY?**

54 A. No.

55

56 **Q. HAVE YOU TESTIFIED BEFORE OTHER STATE OR DISTRICT UTILITY**
57 **COMMISSIONS?**

58 A. Yes. I have testified:

- 59 • before the Nevada PUC on behalf of the Nevada Office of the Attorney
60 General Bureau of Consumer Protection concerning Southwest Gas
61 Corporation's new and accelerated pipeline replacement proposals (totaling
62 almost \$770 million) (Docket Nos. 12-02019 and 12-04005);
- 63 • before the Mississippi PSC on behalf of the Mississippi Public Utilities Staff
64 regarding Atmos Energy Corporation's capital request for about \$300
65 million for system integrity improvements (Docket No. 2015-UN-049);
- 66 • before the Minnesota Office of Administrative Hearings for the Minnesota
67 PUC on behalf of Friends of the Headwaters regarding an Enbridge Energy,
68 Limited Partnership proposal to replace and reroute an existing Line 3 with
69 a new, approximately \$7.5 billion liquid transmission pipeline to move

70 Canadian dilbit¹ (Docket No. MPUC PL-9/CN-14-916 and MPUC PL-9/PPL-
71 15-137);

- 72 • before the District of Columbia Public Service Commission on behalf of the
73 Office of the Attorney General, providing Testimony on an Accufacts' Safety
74 Review of Washington Gas Light ("WGL") DC gas system related to an
75 AltaGas-WGL holdings merger (DC PSC FC 1142, DOEE OGC case #3609
76 Proposed Settlement Agreement),
- 77 • in hearings before a Pennsylvania Public Utilities Commission, or "PAPUC,"
78 Administrative Law Judge concerning matters related to the Energy
79 Transfer/Sunoco pipeline companies' highly volatile liquid transmission
80 pipelines, known as the Mariner East Pipeline Projects, on behalf of West
81 Goshen Township, PA, Docket No. C-2017-2589346 July 18, 2017.
82 Submitted testimony to the PAPUC on pipeline safety matters concerning
83 the Proposed Joint Settlement, between the Pennsylvania Bureau of
84 Inspection and Enforcement ("BI&E") and Sunoco Pipeline L.P. ("SPLP"),
85 Docket No C-2018-3006534, dated August 15, 2019 on behalf of West
86 Goshen Township, and

¹ Dilbit is short for "diluted bitumen." Bitumen is diluted with a lighter petroleum liquid to allow it flow through pipelines.

87 • before the State of Illinois Commerce Commission on behalf of Save Our
88 Soil Land and the Sierra Club providing testimony regarding the Joint
89 Petition of Dakota Access, LLC and Energy Transfer Crude Oil Company,
90 LLC to install additional pumping stations and pumping facilities on existing
91 certified pipelines in the State of Illinois, (Docket No. 19-0673), October 1,
92 2019.

93

94 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

95 A. I was asked to review the potential impacts of increasing flow capacity via adding
96 a pump station and pumping equipment near Linton, ND on the existing 30-inch
97 Dakota Access Pipeline within North Dakota (“DAPL”).

98

99 **Q. DID YOU PREPARE OR DIRECT THE PREPARATION OF THIS TESTIMONY
100 AND THE ACCOMPANYING EXHIBITS?**

101 A. Yes.

102

103 **SUMMARY OF TESTIMONY**

104 **Q. PLEASE SUMMARIZE YOUR TESTIMONY.**

105 A. Dakota Access Pipeline, LLC (“Applicant”) is proposing to nearly double the
106 capacity of the DAPL pipeline from approximately 570,000 barrels per day (“bpd”)
107 to 1,100,000 bpd by adding a pump station, as well as injecting Drag Reducing

108 Agent ("DRA"),² on the existing pipeline (the "DAPL Capacity Expansion").³ The
109 DAPL Capacity Expansion will increase the flow velocity of the pipeline to extreme
110 levels, magnifying DAPL's risks to the environment and to the welfare of the
111 citizens of North Dakota.

112

113 I will summarize several major areas of concern that I recommend the Commission
114 require Applicant to address before allowing Applicant to proceed further with the
115 DAPL Capacity Expansion:

116 1. To date, Applicant has not provided the Commission with sufficient
117 information regarding the design and operation of, or the potential risks
118 associated with, the DAPL Capacity Expansion. The Commission should
119 require Applicant to supplement the record in the manner explained below
120 before taking any further action.

121 2. Based on the limited information that Applicant has provided to the
122 Commission to date, the risks posed by the DAPL Capacity Expansion's
123 increased flow velocities and operating pressures fail to ensure that it will
124 produce minimal adverse effects on the environment and upon the welfare
125 of the citizens to North Dakota.

² DRA is an additive, usually injected at the part per million level, that reduces the energy loss along a liquid pipeline associated with flow turbulence, allowing higher capacity and actual liquid velocities.

³ While Applicant's application states that the current capacity of the pipeline is 600,000 bpd, other records indicate a capacity of 570,000 bpd. *See, e.g.*, In the matter of the application of Dakota Access, LLC for an amendment to certificate and permit in accordance with the Dakota Access Pipeline Optimization in Emmons County, North Dakota, Case No. PU-14-842, "Application of Dakota Access, LLC for Waiver or Reduction of Procedures and Time Schedules," p. 3.

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Q. WHAT SPECIFIC AREAS ARE YOU CONCERNED ABOUT IN YOUR TESTIMONY TODAY?

A. I have several specific areas of concern related to the DAPL Capacity Expansion:

1. By substantially increasing the actual flow velocities of the oil pumped through DAPL, the DAPL Capacity Expansion significantly increases the risks of surge overpressure. This increased risk of surge overpressure in turn significantly increases the risk of spills from DAPL: it makes spills more likely, and, coupled with the increased volume of oil that will be pumped through the pipeline, it makes the potential impact of any spill significantly greater. Specifically, the DAPL Capacity Expansion will substantially increase the risk that surge overpressures in excess of 110% of maximum operating pressure ("MOP") will occur, which is prohibited under Federal law.
2. A proper transient surge analysis will likely show that expanding pipeline capacity in the manner proposed by the DAPL Capacity Expansion will increase potential oil spill volumes. I understand that the Applicant has prepared such a transient surge analysis for other State regulators, but not provided it to the Commission. Applicant should be required to produce this transient surge analysis to the Commission and to SRST as Intervenors so they may independently assess the adequacy of the controls and protective equipment Applicant propose to employ to eliminate the risk surge overpressure in excess of 110% MOP.

149 3. In addition to the increased risk of surge overpressure, the DAPL Capacity
150 Expansion increases the risk of additional pipeline failures occurring due to
151 the higher operating pressures that will be experienced along the mainline.

152

153 **DETAILS OF CONCERNS**

154 **Q. DO YOU HAVE A MAIN CONCERN REGARDING THE DAPL CAPACITY**
155 **EXPANSION?**

156 A. Yes, the DAPL Capacity Expansion will increase the capacity on the existing 30-
157 inch pipeline segment by installing a new pump station facility approximately five
158 miles west of Linton, North Dakota. The new pump station facility will contain five
159 electric driven motors and pumps, each with 6,000 horse-power, and DRA injection
160 facilities. No other changes have been identified for the mainline pipeline outside
161 of this new pump station and DRA injection protocol. In other words, Applicant
162 seeks to use additional motors, pumps, and DRA to pump approximately twice as
163 much oil at approximately twice the velocity through its existing pipeline. This will
164 result in oil being pumped through DAPL at extremely high velocities, which in turn
165 increases the risk of surge overpressure and pipeline failure. The Commission
166 should require Applicant to provide technical details that can be independently
167 verified as to how Applicant plans to prevent and mitigate the risks associated with
168 surge overpressure and pipeline failure before the DAPL Capacity Expansion is
169 allowed to proceed any further.

170 **Q WHAT ARE YOUR SPECIFIC CONCERNS RELATED TO THE MAINLINE**
171 **PIPELINE AND SURGE OVERPRESSURE?**

172 A. Surge is the change in pressure in liquid pipelines caused by a major change in
173 flow, such as a pump shutdown/startup or inadvertent remotely operated mainline
174 valve closure. These are common occurrences on hazardous liquid transmission
175 pipelines. Surge pressure increases occur within large diameter liquid
176 hydrocarbon pipelines in microseconds and can move up and down many miles
177 along a pipeline system at slightly under one mile per second. Surge overpressure
178 can cause pipelines to burst.

179
180 Typical crude oil pipelines I am familiar with operate with flow velocities
181 substantially below 15 feet per second (ft/sec). Here, however, a simple calculation
182 from information in the public domain indicates that the DAPL Capacity Expansion
183 will result in actual liquid velocities in excess of 15 ft/sec. This is an extreme
184 velocity for crude oil pipelines, and it significantly increases the risk of surge
185 overpressure.⁴

186
187 The Applicant has indicated that DRA will be utilized on the pipeline. I have
188 considerable operational experience with DRA injection on crude oil pipelines.
189 DRA injection can increase the efficiency of a pipeline by reducing energy loss
190 associated with flow turbulence along the pipeline, permitting higher flow rates for

⁴ Public documents indicate that the bulk of the DAPL 30-inch diameter pipeline has a wall thickness of 0.429 inches.

191 a particular horsepower addition. DRA injection can thus result in increased
192 pipeline capacity and higher actual liquid velocities compared to a similar pipeline
193 operating without DRA. However, by permitting higher velocities for a given
194 horsepower addition, DRA injection can also increase the risk of surge. Further,
195 the loss of DRA effectiveness can also exacerbate surge pressures as the
196 durability of DRA within a pipeline is very limited and can disappear quickly,
197 especially if shear forces become present.

198
199 DAPL's assertion that "The [DAPL Capacity Expansion] will not alter the existing
200 maximum operating pressure of DAPL" does not adequately frame the risks posed
201 by the DAPL Capacity Expansion.⁵ The issue is not that the DAPL Capacity
202 Expansion will alter DAPL's maximum operating pressure; the issue is that the
203 DAPL Capacity Expansion will (1) increase the risk that surge overpressures
204 greater than 110% of DAPL's MOP will occur and (2) result in DAPL transmitting
205 oil at an operating pressure that is closer to DAPL's maximum operating pressure,
206 which increases the risks of pipeline failure.

207
208 Federal regulations are clear: "No operator may permit the pressure in a pipeline
209 during surges or other variations from normal operations to exceed 110 percent of
210 [MOP]. Each operator must provide adequate controls and protective equipment

⁵ In the matter of the application of Dakota Access, LLC for an amendment to certificate and permit in accordance with the Dakota Access Pipeline Optimization in Emmons County, North Dakota, Case No. PU-14-842, "Application of Dakota Access, LLC for Waiver or Reduction of Procedures and Time Schedules." p. 3.

211 to control the pressure within this limit.”⁶ At 1,100,000 bpd, the DAPL Capacity
212 Expansion will result in actual flow velocities within the 30-inch mainline pipeline in
213 excess of 15 ft/sec. 15 ft/sec is an extremely high velocity for crude oil, especially
214 for a large diameter pipeline such as DAPL. Such high velocities can easily cause
215 pipeline surge overpressures well above 110% MOP within microseconds.

216
217 Applicant has not identified for the Commission the controls and protective
218 equipment it intends to use in order to ensure that no surge overpressure events
219 in excess of 110% MOP will occur. In a filing by Dakota Access, LLC and Energy
220 Transfer Crude Oil company, LLC in the Illinois Commerce Commission
221 proceeding on the request to increase the capacity of the DAPL pipeline, the
222 Applicant has produced a confidential transient surge analysis that contains some
223 of this information. The Commission should require Applicant to produce the
224 transient surge analyses (both for the base and increased capacity cases) in this
225 proceeding so that the Commission, and the SRST as Intervenors, can engage in
226 informed discussions as to whether additional safety equipment modifications
227 might be necessary to adequately mitigate the risks of surge overpressure.
228 Applicant should not expect the Commission to approve the DAPL Capacity
229 Expansion without first providing its transient surge analysis, along with any other
230 related safety information that may be necessary to independently verify the
231 soundness of Applicant’s transient surge analysis and overpressure risk mitigation
232 plans.

⁶ 49CFR§195.406(b).

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Specifically, Applicant should describe its surge overpressure protection approach(es) and the specific safety equipment placement and setpoints. Such information is especially vital as it relates to mainline valve design and pump station installation at the higher flow rates to assure surge pressures will not exceed 110% MOP on the 30-inch mainline spanning North Dakota. Based on my extensive experience, surge protection equipment placed only at pump stations is inadequate to prevent surge overpressures on the mainline pipeline. Additional surge overpressure safety equipment must be installed on the mainline valves in order to adequately mitigate surge overpressure risks.

Q ARE THERE GREATER RISKS OF PIPELINE FAILURE ASSOCIATED WITH INCREASING OPERATING PRESSURES FROM MAJOR INCREASES IN FLOW RATES?

A. Yes, and they can only be adequately assessed by evaluating two categories of information that should be in Applicant's possession: hydraulic profiles of the system, and how those hydraulic profiles overlap with High Consequence Areas (HCAs).

By way of background, there is no such thing as an invincible steel pipeline. All steel pipelines contain anomalies, imperfections in pipe steel or welds, or weld heat affected zones (aka HAZs), for various reasons. Higher operating pressures increase the risk that such anomalies and imperfections will become points of

256 failure. That is precisely why federal minimum pipeline safety regulations require
257 operators to periodically reassess the integrity of hazardous liquid pipeline sections
258 where an inadvertent release would affect populated areas, drinking water
259 sources, or unusually sensitive ecological resources – which are deemed “High
260 Consequence Areas,” or HCAs. DAPL’s Lake Oahe Crossing is one such HCA,
261 but there are likely many other HCAs in North Dakota that Applicant has failed to
262 identify to the Commission or Intervenors. The Commission should require
263 Applicant to rectify this.

264
265 Following several recent liquid transmission pipelines ruptures, it was discovered
266 that more than one pipeline operator had failed to identify pipeline segments that
267 were obviously in HCAs and thus should have been subject to prudent periodic
268 integrity assessment in those areas. Given the proposed increased operating
269 pressures associated with the DAPL Capacity Expansion, the Commission should
270 require the Applicant to identify all HCAs by milepost for the 30-inch pipeline within
271 North Dakota to assure they are indeed properly classified and that DAPL fulfills
272 its integrity reassessment obligations.

273
274 In order to assess whether Applicant has adequately identified all HCAs and
275 developed adequate integrity reassessment measures, Applicant should also be
276 required to produce hydraulic profiles for the system.

277

278 Adding major horsepower to a pipeline system increases the flow rate/capacity of
279 a pipeline system especially when a new pump station raises the operating
280 pressure of the system in various locations of the system. The increased operating
281 pressure associated with such a flow/capacity increase can be demonstrated via
282 hydraulic profile graphs. Hydraulic profiles are considered the "soul" of a liquid
283 pipeline system because they present in clear, easy-to-understand graphic form
284 the main pressure/flow dynamics of a pipeline system.

285
286 In order to site pump stations and calculate horsepower needs associated with the
287 DAPL Capacity Expansion, the Applicant should have already prepared hydraulic
288 profiles for the entire pipeline system for both the lower rate base and higher rate
289 cases. Comparing the hydraulic profiles of the 30-inch pipeline system within both
290 before and after the new pump station addition will show the Commission how the
291 DAPL Capacity Expansion will increase operating pressures throughout the
292 system, and the segments most at risk of failure due to substantial operating
293 pressure increases.⁷

294
295 By analyzing the system's hydraulic profile and Applicant's delineation of HCAs
296 and integrity reassessment measures the Commission will be able to assess the

⁷ Hydraulic profile for a liquid pipeline is a simple plot/graph of pressure (usually in psig. and in feet of head) on the y-axis, versus approximate milepost along the pipeline on the x axis, while stating the gravity of the fluid and flow rate case depicted. Such plots usually also include the approximate elevation profile and MOP along the pipeline to aid in evaluating mainline valve location, remote release detection approaches, and worst case release estimates and spill plan effectiveness.

297 degree to which the DAPL Capacity Expansion will produce adverse effects on the
298 environment and welfare of the citizens of North Dakota.

299
300 Applicant should not expect the Commission to approve the DAPL Capacity
301 Expansion without first identifying all HCAs by milepost and disclosing its plans for
302 periodically reassessing the integrity of its pipeline in areas where an inadvertent
303 release would impact those HCAs. Nor should the Commission be expected to
304 approve the DAPL Capacity Expansion without first reviewing hydraulic profiles for
305 the system so that the Commission may make an informed decision as to the
306 effects the DAPL Capacity Expansion will have on the environment and welfare of
307 North Dakota citizens.

308
309 For the avoidance of doubt, the following critical information should be included in
310 the hydraulic profiles that Applicant produces to the Commission:

- 311 • Pressure (usually in psig. and in feet of head) on the y-axis;
- 312 • Approximate milepost along the pipeline on the x axis;
- 313 • Gravity of the fluid and flow rate case depicted;
- 314 • Approximate elevation profile along the pipeline;
- 315 • MOP along the pipeline; and
- 316 • Approximate milepost location of all mainline valves along the pipeline.

317

318 **Q HOW DO THE PROPOSED INCREASE IN THE VELOCITY AND CAPACITY OF**
319 **THE PIPELINE IMPACT THE SEVERITY OF A SPILL?**

320 A. In many of the recent liquid pipeline ruptures I have investigated, often in HCAs,
321 the oil release that had been predicted by the operator was gravely understated.
322 This clearly demonstrates and underscores the numerous deficiencies in oil spill
323 response planning. My investigative experience is that most worst case discharge
324 ("WCD") estimates are significantly too low as release rates and the time for remote
325 identification of a release, even a pipeline rupture, are often seriously understated
326 by over optimistic computer remote monitoring identification times.

327
328 Ruptures are high rate releases from high pressure pipelines when imperfections
329 reach the level of a "defect," causing pipe fracture failure in microseconds either
330 within the pipe or at welds, such as girth welds, or their heat affected zones, that
331 hold pipe segments together. Pipeline overpressure from surge is one mechanism
332 to cause a pipeline to rupture. The rate of oil release from a liquid pipeline rupture
333 is more than just a function of pipeline daily capacity, as oil is released from the
334 pumping end of a pipeline but also from the downstream segment of the break as
335 the pipeline depressurizes out of the rupture from both ends of the pipeline system.
336 In addition, millions of tons of pipeline inventory unpacks, or swells, from pressure
337 loss as the pipeline depressurizes, pushing further barrels of oil out the rupture site
338 (even after mainline valves are eventually closed). Personnel experienced in
339 transient pipeline fluid dynamics can easily model the markedly increased rate of

340 a pipeline rupture release along a pipeline that easily exceeds “capacity” pumping
341 rate.

342
343 Given this, the Commission should require the Applicant to analyze information
344 from transient flow modeling and from the hydraulic profiles for the 30-inch pipeline
345 at the higher flow rates to ensure that Applicant’s planning estimates for an oil
346 release volume and location are reasonable. The Commission should further
347 require Applicant to produce this analysis to the Commission and to SRST as
348 Intervenor so that Applicant’s analysis can be independently verified.

349
350 Given the higher volume the Applicant is proposing to transport and the higher
351 velocities I discussed above, it is important for the Commission to understand how
352 the DAPL Capacity Expansion will exacerbate releases from the pipeline.

353
354 To begin with, the Commission should understand that Applicant’s claims of being
355 able to remotely detect leaks is in all probability unrealistic based on my extensive
356 experience in investigating many pipeline releases, and my working knowledge of
357 pipeline release detection systems. It is challenging enough for “state of the art”
358 release detection systems to remotely and timely identify rupture releases, and
359 almost impossible for such systems to reliably identify the much harder to spot
360 lower rate “leak” releases. Leak detection claims for small opening releases (such
361 as pitting or punctures), even on well-monitored systems, are often seriously
362 overstated. The reality demonstrated time and time again, is that such remote leak

363 detection approaches are very difficult and challenging. It is a grave
364 misrepresentation of pipeline rupture transient dynamics to claim that ruptures for
365 a crude oil pipeline can be rapidly identified via pressure loss. For ruptures, by the
366 time a pressure loss shows up on a remote system, considerable oil has been
367 released. Most leaks are not determined by remote detection, but by field
368 observations of hydrocarbon releases where the amount of oil released can be
369 considerable before its discovery.

370

371 **Q. WHAT DO YOU RECOMMEND THE COMMISSION ORDER?**

372 A. The Commission should not approve the DAPL Capacity Expansion based on the
373 incomplete record Applicant has developed at present. Instead, the Commission
374 should order Applicant to produce the following documents and data to the
375 Commission and to SRST as Intervenors to allow for independent verification and
376 assessment before proceeding further:

- 377 1. The transient surge analyses that Applicant produced to the Illinois
378 Commerce Commission in relation to the DAPL Capacity Expansion.
- 379 2. Hydraulic profiles of the 30-inch pipeline system within North Dakota both
380 before and after the DAPL Capacity Expansion sufficient to show how the
381 DAPL Capacity Expansion will increase operating pressures throughout the
382 system. These hydraulic profiles should include: pressure on the y-axis;
383 approximate pipeline milepost on the x-axis; the gravity of the fluid and flow
384 rate case depicted; approximate elevation profile by milepost; MOP by
385 milepost; and approximate location of all mainline valves by milepost.

386 3. An identification of all HCAs by milepost within North Dakota and Applicant's
387 plans for periodically reassessing the integrity of its pipeline in areas where
388 an inadvertent release would impact those HCAs.

389 4. Applicant's analysis of estimated oil release volumes and locations based
390 on and as informed by its transient flow modeling and the pipeline's
391 hydraulic profile.

392 I suspect that Applicant will assert that some or all of this information is "highly
393 sensitive" in an attempt to avoid disclosure. The Commission should scrutinize
394 such claims. To the extent the Commission concludes such claims are valid, the
395 Commission should order the Applicant to confer with the SRST as Intervenors
396 and the Commission to agree to a protocol for producing such information in a
397 manner that permits the Commission and SRST as Intervenors to independently
398 assess the DAPL Capacity Expansion in light of this critical information while
399 protecting it from full public disclosure.

400
401 **Q. DO YOU HAVE AN OPINION ON THE RISKS WITHIN NORTH DAKOTA**
402 **ASSOCIATED WITH APPLICANT'S PROJECT?**

403 Yes. Without properly addressing the issues I identified above, given:

- 404 1. the extremely high velocities associated with the major horsepower
405 addition/expansion/DRA injection;
- 406 2. the failure to properly demonstrate how the DAPL pipeline is prudently
407 designed to prevent surge overpressure, in excess of 110% MOP,
408 especially at the extremely high crude oil velocities;

- 409 3. the apparent overreliance on so called "state of the art" CPM leak
410 detections, similar claims I have seen in other pipelines that ruptured, and
411 were not timely remotely identified by such systems; and
- 412 4. the reliance on federal worst case discharge regulations without
413 demonstrating this approach is truly worst case for this pipeline within North
414 Dakota;

415 I must conclude, based on my extensive operating/regulatory experience and
416 many pipeline failure investigations, that the DAPL Capacity Expansion will
417 significantly increase the risks of pipeline rupture and oil spill on the pipeline within
418 North Dakota. Not only is the probability of a pipeline failure greater, but given the
419 higher rates and other contributing factors, an oil release after the expansion is
420 most likely to be significantly greater in magnitude. Based on these facts and the
421 record before it, there is no basis to conclude that the DAPL Capacity Expansion
422 will have a minimal adverse impact on the environment and citizens of North
423 Dakota. In fact, just the opposite is true: based on the record before the
424 Commission at present, the DAPL Capacity Expansion will have a substantial
425 adverse impact on the environment and citizens of North Dakota.

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427 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

428 **A. It does.**

Curriculum Vitae.

Richard B. Kuprewicz

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Redmond, WA 98052

Tel: 425-802-1200 (Office)

E-mail: kuprewicz@comcast.net

Profile:

As president of Accufacts Inc., I specialize in gas and liquid pipeline investigation, auditing, risk management, siting, construction, design, operation, maintenance, training, SCADA, leak detection, management review, emergency response, and regulatory development and compliance. I have consulted for various local, state and federal agencies, NGOs, the public, and pipeline industry members on pipeline regulation, operation and design, with particular emphasis on operation in unusually sensitive areas of high population density or environmental sensitivity.

Employment:

Accufacts Inc.

1999 – Present

Pipeline regulatory advisor, incident investigator, and expert witness on all matters related to gas and liquid pipeline siting, design, operation, maintenance, risk analysis, and management.

Position: President
Duties: > Full business responsibility
> Technical Expert

Alaska Anvil Inc.

1993 – 1999

Engineering, procurement, and construction (EPC) oversight for various clients on oil production facilities, refining, and transportation pipeline design/operations in Alaska.

Position: Process Team Leader
Duties: > Led process engineers group
> Review process designs
> Perform hazard analysis
> HAZOP Team leader
> Assure regulatory compliance in pipeline and process safety management

ARCO Transportation Alaska, Inc.

1991 - 1993

Oversight of Trans Alaska Pipeline System (TAPS) and other Alaska pipeline assets for Arco after the Exxon Valdez event.

Position: Senior Technical Advisor
Duties: > Access to all Alaska operations with partial Arco ownership
> Review, analysis of major Alaska pipeline projects

ARCO Transportation Co.

1989 – 1991

Responsible for strategic planning, design, government interface, and construction of new gas pipeline projects, as well as gas pipeline acquisition/conversions.

Position: Manager Gas Pipeline Projects
Duties: > Project management
> Oil pipeline conversion to gas transmission
> New distribution pipeline installation
> Full turnkey responsibility for new gas transmission pipeline, including FERC filing

Four Corners Pipeline Co.

1985 – 1989

Managed operations of crude oil and product pipelines/terminals/berths/tank farms operating in western U.S., including regulatory compliance, emergency and spill response, and telecommunications and SCADA organizations supporting operations.

Position: Vice President and Manager of Operations

- Duties:**
- > Full operational responsibility
 - > Major ship berth operations
 - > New acquisitions
 - > Several thousand miles of common carrier and private pipelines

Arco Product CQC Kiln

1985

Operations manager of new plant acquisition, including major cogeneration power generation, with full profit center responsibility.

Position: Plant Manager

- Duties:**
- > Team building of new facility that had been failing
 - > Plant design modifications and troubleshooting
 - > Setting expense and capital budgets, including key gas supply negotiations
 - > Modification of steam plant, power generation, and environmental controls

Arco Products Co.

1981 - 1985

Operated Refined Product Blending, Storage and Handling Tank Farms, as well as Utility and Waste Water Treatment Operations for the third largest refinery on the west coast.

Position: Operations Manager of Process Services

- Duties:**
- > Modernize refinery utilities and storage/blending operations
 - > Develop hydrocarbon product blends, including RFGs
 - > Modification of steam plants, power generation, and environmental controls
 - > Coordinate new major cogeneration installation, 400 MW plus

Arco Products Co.

1977 - 1981

Coordinated short and long-range operational and capital planning, and major expansion for two west coast refineries.

Position: Manager of Refinery Planning and Evaluation

- Duties:**
- > Establish monthly refinery volumetric plans
 - > Develop 5-year refinery long range plans
 - > Perform economic analysis for refinery enhancements
 - > Issue authorization for capital/expense major expenditures

Arco Products Co.

1973 - 1977

Operating Supervisor and Process Engineer for various major refinery complexes.

Position: Operations Supervisor/Process Engineer

- Duties:**
- > FCC Complex Supervisor
 - > Hydrocracker Complex Supervisor
 - > Process engineer throughout major integrated refinery improving process yield and energy efficiency

Qualifications:

Served for over fifteen years as a member representing the public on the federal Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC), a technical committee established by Congress to advise PHMSA on pipeline safety regulations.

Committee members are appointed by the Secretary of Transportation.

Served seven years, including position as its chairman, on the Washington State Citizens Committee on Pipeline Safety (CCOPS).

Positions are appointed by the governor of the state to advise federal, state, and local governments on regulatory matters related to pipeline safety, routing, construction, operation and maintenance.

Served on Executive subcommittee advising Congress and PHMSA on a report that culminated in new federal rules concerning Distribution Integrity Management Program (DIMP) gas distribution pipeline safety regulations.

As a representative of the public, advised the Office of Pipeline Safety on proposed new liquid and gas transmission pipeline integrity management rulemaking following the pipeline tragedies in Bellingham, Washington (1999) and Carlsbad, New Mexico (2000).

Member of Control Room Management committee assisting PHMSA on development of pipeline safety Control Room Management (CRM) regulations.

Certified and experienced HAZOP Team Leader associated with process safety management and application.

Education:

MBA (1976)
BS Chemical Engineering (1973)
BS Chemistry (1973)

Pepperdine University, Los Angeles, CA
University of California, Davis, CA
University of California, Davis, CA

Publications in the Public Domain:

1. "An Assessment of First Responder Readiness for Pipeline Emergencies in the State of Washington," prepared for the Office of the State Fire Marshall, by Hanson Engineers Inc., Elway Research Inc., and Accufacts Inc., and dated June 26, 2001.
2. "Preventing Pipeline Failures," prepared for the State of Washington Joint Legislative Audit and Review Committee ("JLARC"), by Richard B. Kuprewicz, President of Accufacts Inc., dated December 30, 2002.
3. "Pipelines - National Security and the Public's Right-to-Know," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated May 14, 2003.
4. "Preventing Pipeline Releases," prepared for the Washington City and County Pipeline Safety Consortium, by Richard B. Kuprewicz, dated July 22, 2003.
5. "Pipeline Integrity and Direct Assessment, A Layman's Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated November 18, 2004.
6. "Public Safety and FERC's LNG Spin, What Citizens Aren't Being Told," jointly authored by Richard B. Kuprewicz, President of Accufacts Inc., Clifford A. Goudey, Outreach Coordinator MIT Sea Grant College Program, and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated May 14, 2005.
7. "A Simple Perspective on Excess Flow Valve Effectiveness in Gas Distribution System Service Lines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated July 18, 2005.
8. "Observations on the Application of Smart Pigging on Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated September 5, 2005.
9. "The Proposed Corrib Onshore System - An Independent Analysis," prepared for the Centre for Public Inquiry by Richard B. Kuprewicz, dated October 24, 2005.
10. "Observations on Sakhalin II Transmission Pipelines," prepared for The Wild Salmon Center by Richard B. Kuprewicz, dated February 24, 2006.
11. "Increasing MAOP on U.S. Gas Transmission Pipelines," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2006. This paper was also published in the June 26 and July 1, 2006 issues of the Oil & Gas Journal and in the December 2006 issue of the UK Global Pipeline Monthly magazines.
12. "An Independent Analysis of the Proposed Brunswick Pipeline Routes in Saint John, New Brunswick," prepared for the Friends of Rockwood Park, by Richard B. Kuprewicz, dated September 16, 2006.
13. "Commentary on the Risk Analysis for the Proposed Emera Brunswick Pipeline Through Saint John, NB," by Richard B. Kuprewicz, dated October 18, 2006.
14. "General Observations On the Myth of a Best International Pipeline Standard," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated March 31, 2007.
15. "Observations on Practical Leak Detection for Transmission Pipelines – An Experienced Perspective," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated August 30, 2007.
16. "Recommended Leak Detection Methods for the Keystone Pipeline in the Vicinity of the Fordville Aquifer," prepared for TransCanada Keystone L.P. by Richard B. Kuprewicz, President of Accufacts Inc., dated September 26, 2007.
17. "Increasing MOP on the Proposed Keystone XL 36-Inch Liquid Transmission Pipeline," prepared for the Pipeline Safety Trust by Richard B. Kuprewicz, dated February 6, 2009.
18. "Observations on Unified Command Drift River Fact Sheet No 1: Water Usage Options for the current Mt. Redoubt Volcano threat to the Drift River Oil Terminal," prepared for Cook Inletkeeper by Richard B. Kuprewicz, dated April 3, 2009.

19. "Observations on the Keystone XL Oil Pipeline DEIS," prepared for Plains Justice by Richard B. Kuprewicz, dated April 10, 2010.
20. "PADD III & PADD II Refinery Options for Canadian Bitumen Oil and the Keystone XL Pipeline," prepared for the Natural Resources Defense Council (NRDC), by Richard B. Kuprewicz, dated June 29, 2010.
21. "The State of Natural Gas Pipelines in Fort Worth," prepared for the Fort Worth League of Neighborhoods by Richard B. Kuprewicz, President of Accufacts Inc., and Carl M. Weimer, Executive Director Pipeline Safety Trust, dated October, 2010.
22. "Accufacts' Independent Observations on the Chevron No. 2 Crude Oil Pipeline," prepared for the City of Salt Lake, Utah, by Richard B. Kuprewicz, dated January 30, 2011.
23. "Accufacts' Independent Analysis of New Proposed School Sites and Risks Associated with a Nearby HVL Pipeline," prepared for the Sylvania, Ohio School District, by Richard B. Kuprewicz, dated February 9, 2011.
24. "Accufacts' Report Concerning Issues Related to the 36-inch Natural Gas Pipeline and the Application of Applevue, LLC Premises: 7009 and 7010 River Road, North Bergen, NJ," prepared for the Galaxy Towers Condominium Association Inc., by Richard B. Kuprewicz, dated February 28, 2011.
25. "Prepared Testimony of Richard B. Kuprewicz Evaluating PG&E's Pipeline Safety Enhancement Plan," submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012.
26. "Evaluation of the Valve Automation Component of PG&E's Safety Enhancement Plan," extracted from full testimony submitted on behalf of The Utility Reform Network (TURN), by Richard B. Kuprewicz, Accufacts Inc., dated January 31, 2012, Extracted Report issued February 20, 2012.
27. "Accufacts' Perspective on Enbridge Filing to NEB for Modifications on Line 9 Reversal Phase I Project," prepared for Equiterre Canada, by Richard B. Kuprewicz, Accufacts Inc., dated April 23, 2012.
28. "Accufacts' Evaluation of Tennessee Gas Pipeline 300 Line Expansion Projects in PA & NJ," prepared for the Delaware RiverKeeper Network, by Richard B. Kuprewicz, Accufacts Inc., dated June 27, 2012.
29. "Impact of an ONEOK NGL Pipeline Release in At-Risk Landslide and/or Sinkhole Karst Areas of Crook County, Wyoming," prepared for landowners, by Richard B. Kuprewicz, Accufacts Inc., and submitted to Crook County Commissioners, dated July 16, 2012.
30. "Impact of Processing Dilbit on the Proposed NPDES Permit for the BP Cherry Point Washington Refinery," prepared for the Puget Soundkeeper Alliance, by Richard B. Kuprewicz, Accufacts Inc., dated July 31, 2012.
31. "Analysis of SWG's Proposed Accelerated EVPP and P70VSP Replacement Plans, Public Utilities Commission of Nevada Docket Nos. 12-02019 and 12-04005," prepared for the State of Nevada Bureau of Consumer Protection, by Richard B. Kuprewicz, Accufacts Inc., dated August 17, 2012.
32. "Accufacts Inc. Most Probable Cause Findings of Three Oil Spills in Nigeria," prepared for Bohler Advocaten, by Richard B. Kuprewicz, Accufacts Inc., dated September 3, 2012.
33. "Observations on Proposed 12-inch NGL ONEOK Pipeline Route in Crook County Sensitive or Unstable Land Areas," prepared by Richard B. Kuprewicz, Accufacts Inc., dated September 13, 2012.
34. "Findings from Analysis of CEII Confidential Data Supplied to Accufacts Concerning the Millennium Pipeline Company L.L.C. Minisink Compressor Project Application to FERC, Docket No. CP11-515-000," prepared by Richard B. Kuprewicz, Accufacts Inc., for Minisink Residents for Environmental Preservation and Safety (MREPS), dated November 25, 2012.
35. "Supplemental Observations from Analysis of CEII Confidential Data Supplied to Accufacts Concerning Tennessee Gas Pipeline's Northeast Upgrade Project," prepared by Richard B. Kuprewicz, Accufacts Inc., for Delaware RiverKeeper Network, dated December 19, 2012.

36. "Report on Pipeline Safety for Enbridge's Line 9B Application to NEB," prepared by Richard B. Kuprewicz, Accufacts Inc., for Equiterre, dated August 5, 2013.
37. "Accufacts' Evaluation of Oil Spill Joint Investigation Visit Field Reporting Process for the Niger Delta Region of Nigeria," prepared by Richard B. Kuprewicz for Amnesty International, September 30, 2013.
38. "Accufacts' Expert Report on ExxonMobil Pipeline Company Silvertip Pipeline Rupture of July 1, 2011 into the Yellowstone River at the Laurel Crossing," prepared by Richard B. Kuprewicz, November 25, 2013.
39. "Accufacts Inc. Evaluation of Transco's 42-inch Skillman Loop submissions to FERC concerning the Princeton Ridge, NJ segment," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated June 26, 2014, and submitted to FERC Docket No. CP13-551.
40. Accufacts report "DTI Myersville Compressor Station and Dominion Cove Point Project Interlinks," prepared by Richard B. Kuprewicz for Earthjustice, dated August 13, 2014, and submitted to FERC Docket No. CP13-113-000.
41. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz for the Princeton Ridge Coalition, dated September 3, 2014, and submitted to FERC Docket No. CP13-551.
42. Accufacts' "Evaluation of Actual Velocity Critical Issues Related to Transco's Leidy Expansion Project," prepared by Richard B. Kuprewicz for Delaware Riverkeeper Network, dated September 8, 2014, and submitted to FERC Docket No. CP13-551.
43. "Accufacts' Report to Portland Water District on the Portland – Montreal Pipeline," with Appendix, prepared by Richard B. Kuprewicz for the Portland, ME Water District, dated July 28, 1014.
44. "Accufacts Inc. Report on EA Concerning the Princeton Ridge, NJ Segment of Transco's Leidy Southeast Expansion Project," prepared by Richard B. Kuprewicz and submitted to FERC Docket No. CP13-551.
45. Review of Algonquin Gas Transmission LLC's Algonquin Incremental Market ("AIM Project"), Impacting the Town of Cortlandt, NY, FERC Docket No. CP14-96-0000, Increasing System Capacity from 2.6 Billion Cubic Feet (Bcf/d) to 2.93 Bcf/d," prepared by Richard B. Kuprewicz, and dated Nov. 3, 2014.
46. Accufacts' Key Observations dated January 6, 2015 on Spectra's Recent Responses to FERC Staff's Data Request on the Algonquin Gas Transmission Proposal (aka "AIM Project"), FERC Docket No. CP 14-96-000) related to Accufacts' Nov. 3, 2014 Report and prepared by Richard B. Kuprewicz.
47. Accufacts' Report on Mariner East Project Affecting West Goshen Township, dated March 6, 2015, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.
48. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing on the Proposed System Integrity Projects ("SIP") to the Mississippi Public Service Commission ("MPSC") under Docket No. 15-UN-049 ("Docket"), prepared by Richard B. Kuprewicz, dated June 12, 2015.
49. Accufacts' Report to the Shwx'owhamel First Nations and the Peters Band ("First Nations") on the Trans Mountain Expansion Project ("TMEP") filing to the Canadian NEB, prepared by Richard B. Kuprewicz, dated April 24, 2015.
50. Accufacts Report Concerning Review of Siting of Transco New Compressor and Metering Station, and Possible New Jersey Intrastate Transmission Pipeline Within the Township of Chesterfield, NJ ("Township"), to the Township of Chesterfield, NJ, dated February 18, 2016.
51. Accufacts Report, "Accufacts Expert Analysis of Humberplex Developments Inc. v. TransCanada Pipelines Limited and Enbridge Gas Distribution Inc.; Application under Section 112 of the National Energy Board Act, R.S.C. 1985, c. N-7," dated April 26, 2016, filed with the Canadian Nation Energy Board (NEB).
52. Accufacts Report, " A Review, Analysis and Comments on Engineering Critical Assessments as proposed in

- PHMSA's Proposed Rule on Safety of Gas Transmission and Gathering Pipelines," prepared for Pipeline Safety Trust by Richard B. Kuprewicz, dated May 16, 2016.
53. Accufacts' Report on Atmos Energy Corporation ("Atmos") filing to the Mississippi Public Utilities Staff, "Accufacts Review of Atmos Spending Proposal 2017 – 2021 (Docket N. 2015-UN-049)," prepared by Richard B. Kuprewicz, dated August 15, 2016.
 54. Accufacts Report, "Accufacts Review of the U.S. Army Corps of Engineers (USACE) Environmental Assessment (EA) for the Dakota Access Pipeline ("DAPL")," prepared for Earthjustice by Richard B. Kuprewicz, dated October 28, 2016.
 55. Accufacts' Report on Mariner East 2 Expansion Project Affecting West Goshen Township, dated January 6, 2017, to Township Manager of West Goshen Township, PA, and prepared by Richard B. Kuprewicz.
 56. Accufacts Review of Puget Sound Energy's Energize Eastside Transmission project along Olympic Pipe Line's two petroleum pipelines crossing the City of Newcastle, for the City of Newcastle, WA, June 20, 2017.
 57. Accufacts Review of the Draft Environmental Impact Statement for the Line 3 Pipeline Project Prepared for the Minnesota Department of Commerce, July 9, 2017, filed on behalf of Friends of the Headwaters, to Minnesota State Department of Commerce for Docket Nos. CN-14-916 & PPL-15-137.
 58. Testimony of Richard B. Kuprewicz, president of Accufacts Inc., in the matter West Goshen Township and Concerned Citizens of West Goshen Township v. Sunoco Pipelines, L.P. before the Pennsylvania Public Utilities Commission, Docket No. C-2017-2589346, on July 18, 2017, on Behalf of West Goshen Township and Concerned Citizens of West Goshen Township.
 59. Direct Testimony of Richard B. Kuprewicz, president of Accufacts Inc., on Behalf of Friends of the Headwaters regarding Enbridge Energy, Limited Partnership proposal to replace and reroute an existing Line 3 to the Minnesota Office of Administrative Hearings for the Minnesota Public Utilities Commission (MPUC PL-9/CN-14-916 and MPUC PL-9/PPL-15-137), September 11, 2017 and October 23, 2017.
 60. Direct Testimony of Richard B. Kuprewicz On Behalf of The District of Columbia Government, before the Public Service Commission of the District of Columbia, in the matter of the merger of AltaGas Ltd. and WGL Holdings, Inc., Formal Case No. 1142, September 29, 2017.
 61. Report to Mississippi Public Utilities Staff ("MPUS"), "Accufacts Review on Atmos Energy Corporation's Proposed Capital Budget for Fiscal Year 2018 related to System Integrity Program Spending (Docket N. 2015-UN-049)," prepared by Richard B. Kuprewicz, dated December 4, 2017.
 62. Report to Hugh A. Donaghue, Esquire, Concord Township Solicitor, "Accufacts Comments on Adelphia Project Application to FERC (Docket No. CP18-46-000) as it might impact Concord Township," dated May 30, 2018.
 63. Report to Mississippi Public Utilities Staff ("MPUS"), "Accufacts Review on Atmos Energy Corporation's Proposed Capital Budget for Fiscal Year 2019 related to System Integrity Program Spending (Docket N. 2015-UN-049)," prepared by Richard B. Kuprewicz, dated August 20, 2018.
 64. Report to West Goshen Township Manager, PA, "Accufacts report on the repurposing of an existing 12-inch Sunoco pipeline segment to interconnect with the Mariner East 2 and Mariner East 2X crossing West Goshen Township," dated November 8, 2018.
 65. Report to West Whiteland Township Manager, PA, "Accufacts Observations on Possible Pennsylvania State Pipeline Safety Regulations," prepared by Richard B. Kuprewicz, dated March 22, 2019.
 66. Accufacts Public Comments on the Proposed Joint Settlement, BI&E v. Sunoco Pipeline L.P. ("SPLP"), Docket No. C-2018-3006534 ("Proposed Settlement"), submitted on August 15, 2019 to the Pennsylvania Public Utility Commission on the behalf of West Goshen Township as an intervener.
 67. Report to West Whiteland Township Manager, Ms. Mimi Gleason, "Accufacts Perspective on Two Questions from West Whiteland's Board of Supervisors on Proposed Changes to ME 2 and ME 2X Construction/Operational Activities within West Whiteland," dated September 5, 2019."

68. Report to West Goshen Township Manager, Mr. Casey LaLonde, "Accufacts Report on the episode on the evening of 8-5-19 at the Mariner East Boot Road Pump Station ("Event"), Boot Road, West Goshen Township, PA," dated September 16, 2019.