

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

IN THE MATTER OF THE APPLICATION
OF SCS CARBON TRANSPORT LLC FOR
A CERTIFICATE OF CORRIDOR
COMPATIBILITY AND ROUTE PERMIT
FOR THE MIDWEST CARBON EXPRESS
PROJECT IN BURLEIGH, CASS, DICKEY,
EMMONS, LOGAN, MCINTOSH,
MORTON, OLIVER, RICHLAND AND
SARGENT COUNTIES, NORTH DAKOTA

CASE NO. PU-22-391

**REBUTTAL TESTIMONY OF ALEX LANGE
ON BEHALF OF
SCS CARBON TRANSPORT LLC**

June 2, 2024

1 **Q: Please state your name, present position, and business address for the record.**

2 A: My name is Alexander Lange. I am the Director of Engineering for Summit Carbon
3 Solutions, LLC (Summit). My business address is 2321 N. Loop Drive, Suite 221, Ames,
4 Iowa, 50010.

5 **Q: Have you testified in this matter previously?**

6 A: No.

7 **Q: Briefly describe your educational and professional background.**

8 A: I have a Bachelor of Science in Electrical Engineering from Michigan State University in
9 East Lansing, Michigan. I have over 8 years of experience in the oil & gas industry working
10 for various pipeline operators. Before working for Summit, I worked for Marathon
11 Petroleum and as a seconded employee to WhiteWater Midstream. My statement of
12 qualifications is filed with this testimony as Attachment A.

13 **Q: What is your role with respect to this project?**

14 A: I am responsible for engineering design of the pipeline and ensuring that technical
15 deliverables associated with the pipeline and pump stations meet quality and performance
16 standards associated with regulatory requirements and industry best practices. In
17 connection with these responsibilities, I manage an internal technical staff and external
18 engineering/technical contractors.

19 **Q: What is the purpose of your testimony?**

20 A: It is my understanding that the Commissioners requested additional details on what
21 meetings had taken place between Summit and emergency management officials and the
22 nature of the information provided in those meetings. The purpose of my testimony is to
23 provide the Commission with additional information concerning dispersion modeling-

1 related presentations provided in meetings with local emergency responders along the
2 proposed route in North Dakota, and to respond to other engineering issues raised in the
3 April 22, 2024 hearing and May 28-30, 2024 technical hearing.

4 **Q: What was your role in the dispersion analysis presentations?**

5 A: I was the person responsible for giving the presentations.

6 **Q: How many dispersion analysis presentations have been given, and when did the**
7 **presentations take place?**

8 A: Since November 7, 2023, I have made ten dispersion analysis presentations in locations
9 across the proposed route in North Dakota. In advance of each presentation, Summit
10 extended invitations to local emergency responders and emergency management
11 leadership in one or two counties. The date of each presentation and the corresponding
12 county or counties whose personnel were invited to each presentation are indicated below:

<u>Invitee Location(s)</u>	<u>Presentation Dates</u>
Dickey County	November 7, 2023
Burleigh County	November 27, 2023
Morton County	November 30, 2023
Oliver County & Mercer County	December 1, 2023
Dickey County	January 9, 2024
Emmons County	January 24, 2024
Richland County	March 5, 2024
Sargent County	March 28, 2024
McIntosh County & Logan County	May 15, 2024
Cass County	May 16, 2024
Oliver County & Mercer County	May 16, 2024

1 **Q What was the purpose of the dispersion analysis presentations?**

2 A: The presentations were intended to provide local emergency responders with foundational
3 information regarding dispersion modeling, such as why dispersion modeling is used, what
4 dispersion modeling is and different methodologies for performing it, the types of
5 conditions dispersion modeling accounts for, and how dispersion buffer mapping compares
6 to what actually happens when dispersion occurs. More broadly, the presentations were
7 intended to begin laying the groundwork for local emergency responders to understand
8 how dispersion modeling informs local emergency response plans and how it may be used
9 in training of first responders.

10 **Q: How did the presentations address why dispersion modeling is performed?**

11 A: The presentations explained that Summit performed dispersion modeling consistent with
12 federal regulations to inform risk assessments, emergency response and awareness
13 activities, and the development of an integrity management program. While such modeling
14 is only required in High Consequence Areas (HCAs), I want to emphasize that Summit has
15 gone beyond the requirements and has modeled the entire route rather than limiting its
16 modeling only to the approximately 16 miles of HCAs in North Dakota.

17 **Q: How did the presentations address what dispersion modeling is and different**
18 **methodologies for performing it?**

19 A: Due to the protective order and the confidential nature of the details, I will discuss the
20 presentation on dispersion methodologies at a high level. The presentations provided an
21 overview of the vapor and terrain aided dispersion modeling methodologies Summit uses
22 to perform dispersion modeling. The presentations also demonstrated how these
23 methodologies together provide a more thorough assessment of the area that could be
24 potentially impacted by a CO₂ release than vapor dispersion modeling alone by accounting

1 for the roles gravity and topography can play in CO₂ dispersion when atmospheric
2 conditions are very calm.

3 **Q: How did the presentations address the types of conditions dispersion modeling**
4 **accounts for?**

5 A: The presentations explained that the CANARY software Summit uses for vapor dispersion
6 modeling accounts for over 20 factors that influence the dispersion of CO₂ through ambient
7 conditions, including the release type, the length and width of any mechanical puncture
8 and the associated height and angle of any resulting release, the operating pressure and
9 diameter of the impacted pipeline segment, nearby valve spacing and valve closure time,
10 the nature of the surrounding terrain, and atmospheric conditions such as temperature, wind
11 speed, and humidity. The presentations also explained how the FLO-2D software Summit
12 uses to perform terrain aided dispersion modeling accounts for the specific topography of
13 the land to identify areas where CO₂ pooling may be possible following a full-bore rupture
14 under calm atmospheric conditions.

15 **Q: How did the presentations address dispersion buffer mapping?**

16 A: The presentations explained what maps illustrating the dispersion buffer for the project
17 show and, by extension, what they do not show. In particular, I explained that dispersion
18 buffer maps show the furthest a vapor plume will reach from the pipeline at the moment
19 when maximum dispersion occurs as if it dispersed equally in all directions at once. I also
20 explained that because dispersion buffer maps do not account for the directional component
21 of the wind, the actual maximum plume size would cover only a fraction of the area
22 included within the buffer. The PowerPoint slideshow displayed during each presentation
23 included a slide demonstrating the relationship between the area included within the

1 dispersion buffer on a vapor dispersion map and the corresponding maximum plume size
2 anticipated at the moment of maximum dispersion.

3 **Q: Has Summit provided the Commission with PowerPoint slides utilized during its**
4 **dispersion analysis presentations?**

5 A: Yes, Summit submitted a PDF of the PowerPoint slideshow utilized during its dispersion
6 analysis presentations to the Commission on May 10, 2024 (Docket No. 563), subject to
7 its August 3, 2023 Protective Order (Docket No. 364). Note that there have been some
8 revisions to the presentation over time based on input from emergency responders.

9 **Q: Did you inform the local emergency responders who attended the dispersion analysis**
10 **presentations of the confidential nature of the information being shared with them?**

11 A: Yes, those who attended the dispersion analysis presentations were informed of the
12 confidential nature of the information being shared with them verbally and in writing on
13 the slideshow that was displayed during the presentations, as previously submitted to the
14 Commission. I would note that the slideshow is dynamic, inasmuch as we have and will
15 continue to update it based upon input and feedback received during our meetings with the
16 local emergency responders.

17 **Q: Besides the topics addressed so far in your testimony, did the dispersion analysis**
18 **presentations address any other topics?**

19 A: Yes. The presentations also addressed the toxicity of CO₂ at sufficient concentrations and
20 reviewed historic release scenarios involving CO₂ pipelines.

21 **Q: How did the presentations address the toxicity of CO₂?**

22 A: The presentations explained that the toxicity of CO₂ is a function of exposure concentration
23 and time, meaning that the point at which CO₂ becomes toxic depends on both the duration
24 of the exposure and the concentration level of the exposure.

1 **Q: Did the presentations address the circumstances under which CO₂ exposure is toxic?**

2 A: The presentations reviewed available data concerning the circumstances under which CO₂
3 becomes toxic from the following sources: (1) the U.S. Department of Energy Protective
4 Action Criteria concentration levels for CO₂ and the severity of biological effects predicted
5 to result from CO₂ exposure at those levels, (2) the estimated duration of CO₂ exposure at
6 various concentration levels predicted to result in a 1% mortality rate and a 50% mortality
7 rate, as determined by the United Kingdom's Health and Safety Executive based on rodent
8 studies, and (3) the results of a 2022 study by a team of Dutch scientists that tested carbon
9 dioxide tolerability in volunteers at increasing CO₂ concentrations and inhalation times in
10 which breathing pure oxygen was shown to return blood pH to baseline values within five
11 minutes.

12 **Q: How did the presentations address actual CO₂ releases?**

13 A: The presentations reviewed available details regarding actual CO₂ releases that occurred in
14 Mississippi in June 2007, Mississippi in February 2020, and in Louisiana in April 2024
15 (for the meetings after the Louisiana release occurred), including both the mitigation steps
16 taken in response to those releases and associated impacts, to the extent there were any.

17 **Q: Whom did Summit invite to the dispersion analysis presentations?**

18 A: Summit distributed invitations to the dispersion analysis presentations to local emergency
19 responders and the local officials to whom those emergency responders are ultimately
20 accountable, including first responders from local fire departments and rural fire protection
21 districts, county sheriffs and police departments, ambulance services and hospitals, as well
22 as county emergency managers, commissioners and council members, and others,
23 including individuals serving as volunteer first responders or designated by local

1 emergency management leadership as individuals who would be charged with emergency
2 response duties in the event of a pipeline failure. Individuals and entities Summit invited
3 to the dispersion analysis presentations are listed in **Attachment B**, which is being filed
4 concurrently with this testimony. In some cases, local emergency responders also invited
5 additional personnel.

6 **Q: Do you know who actually attended these dispersion analysis presentations?**

7 A: Yes. The individuals who attended these dispersion analysis presentations are listed in
8 Attachment B to this testimony.

9 **Q: Were the individuals who attended the dispersion analysis presentations permitted to
10 ask questions? If so, who answered them?**

11 A: Yes. Individuals attending the dispersion analysis presentations were given an opportunity
12 to ask questions. When the question asked was one that I or another Summit attendee could
13 answer based on our knowledge and experience, we responded with the answer. When a
14 question concerned subject matter beyond our area of expertise, I generally explained that
15 we did not personally know the answer but could run the question by a colleague or
16 consultant who would know the answer. For example, during one of the presentations I
17 recently gave, one of the attendees asked a question about treatment protocols following
18 CO₂ exposure, and I indicated that I would pose the question to a toxicologist and get back
19 to them with an answer.

20 **Q: Did the dispersion analysis presentations provide information regarding emergency
21 response plans to local first responders?**

22 A: The presentations I made were intended to introduce local emergency responders to
23 information and concepts that will inform the formulation of specific emergency response
24 plans/initial response tactics. The presentations were relevant to emergency response

1 plans, but Summit will also separately be meeting with emergency responders to solicit
2 input and provide training regarding the emergency response plans Summit must prepare
3 pursuant to federal regulations prior to the start of operations.

4 **Q: What role will you play in preparing the emergency response plans?**

5 A: I will not personally be responsible for preparing the emergency response plans for the
6 project, but the plans will be informed by dispersion modeling performed by me and my
7 team.

8 **Q: Do you understand that Mr. Brian Bitner testified that a 14-mile buffer zone should**
9 **be maintained based on his understanding of the release in Satartia, Mississippi?**

10 A: Yes.

11 **Q: Do you understand that Mr. Bitner testified that the plume from the Satartia,**
12 **Mississippi release traveled 33 kilometers?**

13 A: Yes.

14 **Q: Do you understand that Mr. Chad Wachter testified that a 20-mile buffer zone should**
15 **be maintained based on the release in Satartia, Mississippi?**

16 A: Yes

17 **Q: Do you agree that a 14-mile or 20-mile buffer zone is appropriate?**

18 A: No.

19 **Q: Why not?**

20 A: Respectfully, I believe there is a misunderstanding regarding a diagram of the plume from
21 the Satartia release. The chart that Mr. Bitner and Mr. Wachter refer to while making this
22 determination is held within the “Failure Investigation Report – Denbury Gulf Coast
23 Pipelines, LLC – Pipeline Rupture/Natural Force Damage”, which is the PHMSA incident
24 report following the Denbury release in Satartia, Mississippi. There are multiple issues with
25 utilizing this chart, Figure 5, to discern the distance that CO₂ dispersed during the Satartia

1 incident. The first is the concentration of CO₂ illustrated in the chart. There is no indication
2 of where 10,000, 20,000, or 30,000 parts per million of CO₂ dispersed to. The only
3 discernable shading is for 4.2×10^{-9} , well below normal global atmospheric concentrations
4 of 300-600 parts per million. That is, the diagram may show where some CO₂ molecules
5 were expected to travel, but the overwhelming majority of the indicated area would be at
6 concentrations below levels that would cause any impacts. For ease of reference, I have
7 included the relevant page of the Report as **Attachment C**.

8 The second issue is within the description of the chart, in which it states, “The
9 model indicates the direction a plume or cloud of CO₂ would have followed from ground
10 level while dissipating”. Further, “First responders utilized a plume model generated by
11 the NWS to base the decision to evacuate Satartia”. It is my understanding that this model
12 was used solely to help First Responders identify the *direction* the plume was moving, not
13 to determine the concentration of CO₂ at specific locations. Finally, there is a note on the
14 chart stating, “The NWS approved inclusion of the chart within this report and clarified
15 that ‘Not for Public Dissemination’ pertains to real-time emergency response utilization,
16 due to inherent uncertainties with several variables”.

17 **Q: The issue was also raised of whether a failure of power supply to part of the pipeline**
18 **would create an unsafe condition. Can you address that issue?**

19 A: Yes. Summit completed a surge analysis to ensure compliance with 49 CFR 195.406(b)
20 which requires system pressures to not exceed 110% of the system’s maximum operating
21 pressure during transient or other abnormal activities. While looking at the potential for
22 pipeline surge, there are two events that are investigated. The first being inadvertent valve
23 closure and the second being mainline pump power loss. In all instantaneous pump power
24 loss scenarios, insignificant surge pressures were recorded, less than 100% of the

1 maximum operating pressure. Power loss at mainline valves has no material impact on the
2 operation of the line. In short, there is nothing inherent in a power loss on a portion of the
3 system that creates any risks or which would threaten the integrity of the line itself or allow
4 for a release. The PHMSA regulations anticipate a system engineered to perform safely in
5 power loss conditions and Summit has tested against modeled power loss scenarios.

6 **Q: Does this conclude your testimony?**

7 A: Yes.

8 **Dated this 2nd day of June, 2024.**

9

10

11 /s/ Alexander Lange
12 **Alexander Lange**

13

14

15

16 #82667710v1

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EXPERIENCE

SUMMIT CARBON SOLUTIONS – Ames, Iowa **Sept 2021 – Present**

Director of Engineering (May 2023 – Present)

- Leading team of engineers to complete all aspects of engineering, design, and procurement for a roughly 2,500-mile carbon capture and sequestration system throughout Nebraska, Iowa, South Dakota, Minnesota, and North Dakota
- Responsible for development of the company risk assessment and risk management process
- Assisting in the development of federal, state, and local permitting efforts which includes providing written and verbal testimony during the permit hearing process

Engineering Manager (Aug 2022 – May 2023)

- In addition to the responsibilities previously held for facility design and construction, additional responsibilities include design and execution for the Dakotas, which includes the 450 mile 24” mainline.

Facilities Engineering Supervisor (Sep 2021 – Aug 2022)

- Leading team of engineers to complete the design and execution of (6) carbon dioxide pump stations as well as (3) sequestration facilities

WHITEWATER MIDSTREAM – Austin, Texas

Aug 2019 – Sept 2021

Staff Engineer

- **Whistler Pipeline**
 - Led the design and execution of (17) residue gas meter stations, with a total EFC of \$54MM, the largest facility had a capacity of 500MMscfd with a system total of 3.5Bscfd
 - Led the design and execution of (9) pipeline laterals, with an EFC of \$25MM, ranging in diameter from 12” – 24”
- **BANGL Pipeline**
 - Led the design and execution of (2) NGL pump stations, with a total EFC of \$15MM
 - Completed steady-state hydraulic design, utilizing ProMax, for 600+ mile system with multiple receipt and delivery meter stations

MARATHON PETROLEUM – Findlay, Ohio

Jan 2016 – Aug 2019

Project Engineer I & II

- **M&TE Major Projects (Aug 2017 – Aug 2019)**
 - Capline Reversal – Team Lead
 - Led multi-disciplinary team to design and plan \$193MM Capline system reversal
 - Patoka Tank Farm Expansion – Electrical Engineer
 - Ozark Pipeline Expansion – Electrical Engineer
 - Zachary Tank Farm Expansion – Electrical Engineer
 - Broadway II Expansion – Electrical Engineer
 - Utica Build Out – Electrical Engineer

- **M&TE Pipeline Engineering – Electrical and Controls (Jan 2016 – Aug 2017)**
 - Responsibility included: designing, estimating, scheduling, procurement, and execution
 - 2017: Managed a portfolio of 7 projects with a total budget of \$4.18MM
 - 2016: Managed a portfolio of 19 projects with a total budget of \$1.29MM

INTERNSHIP EXPERIENCE

- General Motors, Marathon Petroleum, GE Aviation, Polaris Industries, Michigan State, TRW Automotive

EDUCATION

MICHIGAN STATE UNIVERSITY - East Lansing, Michigan
Bachelor of Science Degree in Electrical Engineering

December 2015



Dickey County (November 7, 2023)

Invitees Who Attended:

- City of Ellendale, Mayor Don Flaherty
- Dickey County, Highway Superintendent Jeff Hagen
- Dickey County Emergency Management, Director Charlie Russell
- Dickey County Sheriff's Department, Sheriff Chris Estes
- Ellendale Ambulance, Coordinator Corey Gulke
- Ellendale Fire Protection District, Fire Chief Mike Thorpe

Invitees Who Did Not Attend:

- Ashley Hospital, Eric Heupel
- City of Ellendale, Auditor Candice Middlestad
- City of Ellendale Police Department, Police Chief Brad Knudson
- Dickey County, Auditor Wanda Sheppard
- Dickey County Commission, Commissioner-Elect Brandon Carlson
- Dickey County Commission, Commissioner-Elect Kacey Holm
- Dickey County Commission, Commissioner John Hokana
- Dickey County Commission, Commissioner Dean Simek
- Dickey County Commission, Commissioner Marke Roberts
- Dickey County Commission, Commissioner Jerry Walsh
- Ellendale Fire Protection District, Paul Wedel
- Forbes Rural Fire District, Fire Chief Ty Bertsch
- Fullerton Volunteer Fire Department, Fire Chief Steve Peterson

Burleigh County (November 27, 2023)

Invitees Who Attended:

- Bismarck City Commission, Commissioner Steve Marquardt
- Bismarck Emergency Management, Emergency Manager Gary Stockert
- Bismarck Fire Department, Fire Chief Joel Boespflug
- Bismarck Fire Department, Deputy Chief Brooks Martin
- Bismarck Fire Department, Captain Brandon Jochim
- Bismarck Fire Department, Captain Kurt Stein
- Bismarck Police Department, Chief of Police Dave Draovitch
- Bismarck Rural Fire District, Chief Dustin Theurer
- Burleigh County Commission, Chair Brian Bitner
- Burleigh County Emergency Management, Director Mary Senger
- Burleigh County Sheriff's Department, Sheriff Kelly Leben
- Burleigh County Sheriff's Department, Major Jim Hulm
- Burleigh County Sheriff's Department, Lieutenant Tracy Nelson
- Wilton Ambulance Services, Board President LeAnne Domonoske
- Wilton Ambulance Services, Jennifer Herdelau

Invitees Who Designated Another To Attend in Their Place:

- Metro-Area Ambulance Service, Operation Chief Dan Schaefer (Joshua Davis attended in place)

Invitees Who Did Not Attend:

- Lincoln Police Department, Police Chief, Robyn Krile
- Sterling Fire Protection District, Fire Chief Suzette Meland
- Wilton Volunteer Fire Department, Chief Wayne Klein
- Wing Rural Fire Protection District, Chief Frank Hein

- **Morton County (November 30, 2023)**

Invitees Who Attended:

- Mandan City, City Administrator Jim Neubauer
- Mandan City Commission, Commissioner Dennis Rohr
- Mandan Fire Department, Fire Chief Steve Nardello
- Morton County Commission, Commissioner Nathan Boehm
- Morton County Emergency Management, Secretary/Treasurer Joel Rostberg
- Morton County Sheriff's Office, Sheriff Kyle Kirchmeier
- Morton County Emergency Management, Emergency Manager Patrick Martin

Invitees Who Did Not Attend:

- Mandan City, Mayor Tim Helbling
- Mandan City Police Department, Chief Jason Ziegler
- Mandan Rural Fire Department, Fire Chief Lynn Gustin
- Metro-Area Ambulance Service, Operation Chief Dan Schaefer

- **Oliver/Mercer Counties (December 1, 2023)**

Invitees Who Attended:

- Beulah Police Department, Chief Frank Senn
- Hazen Fire Department, Fire Chief Corey Beery
- Hazen Police Department, Police Chief James Wolff
- Mercer County Commission, Commissioner Liza Taylor (Ambulance Board)
- Oliver County Board of Commissioners, Commissioner Darrell Berger (Local Emergency Planning Committee)
- Oliver County Rural Fire Protection District, Assistant Chief JD Hanson

Invitees Who Designated Others To Attend in Their Places:

- Beulah Rural Fire Protection District, Chief Eli Schumann (unidentified designee attended)
- Mercer County Ambulance Service, Manager Marcy Sailer (Teresa Jahner attended in place)
- Oliver County Sheriff Department, Chief Dave Hilliard (unidentified designee attended)

Invitees Who Did Not Attend:

- Dave Layton, Training Officer, Beulah Rural Fire Department,
- Fire Chief Kenny Rude, Oliver County Rural Fire Protection District

Dickey County (January 9, 2024)

Invitees Who Attended:

- Dickey County Emergency Management, Director Charlie Russell
- City of Oakes Police Department, Police Chief Matt O'Brien
- City of Oakes City Council, Council Member Robert Hernandez
- City of Oakes City Council, Council Member Shannon Day
- Oakes Ambulance, Manager Mike Sandy
- Oakes Fire and Rescue Unit, Fire Chief Jerry Hollingsworth
- Oakes Fire and Rescue Unit, Secretary Zach Marthaller
- Oakes Fire and Rescue Unit, Captain Jarret Schroeder
- Oakes Fire and Rescue Unit, Jed Bopp
- Oakes Fire and Rescue Unit, Nathan Clobes
- Oakes Fire and Rescue Unit, Austin Deeim
- Oakes Fire and Rescue Unit, Dylan Hollingsworth
- Oakes Fire and Rescue Unit, Rob Krueger
- Oakes Fire, Jeff Wiek

Invitees Who Did Not Attend:

- City of Oakes, Auditor Zasha Johnson
- Oakes Hospital, Keith Loepp
- Oakes Hospital, Lori Novak
- Oakes Hospital, Mary Quandt
- Dickey County Commission, Commissioner Brandon Carlson
- Dickey County Commission, Commissioner John Hokana
- Dickey County Commission, Commissioner Marke Roberts

Emmons County (January 24, 2024)

Invitees Who Attended:

- Emmons County Ambulance Service, Nolan Anderson
- Emmons County Emergency Management, Emergency Manager Mary Senger
- Emmons County Sheriff's Department, Sheriff Gary Sanders
- Hazelton Fire Department, Chief Derek Beastron
- Hazelton Fire Department, Assistant Chief Cole Moch
- Linton Fire Department, Travis Dockter

Invitees Who Did Not Attend:

- ND Game and Fish, Warden Erick Schmidt
- ND Highway Patrol District, Trooper Michael Hayen

Richland County (March 5, 2024)

Invitees Who Attended:

- Barney Rural Fire District, Jean Akers
- Barney Rural Fire District, Warren Anderson
- Barney Rural Fire District, Joe Busch
- Barney Rural Fire District, Jim Moffet
- Christine Community Fire District, Bryan Halvorson
- Christine Community Fire District, Randy Manson
- Colfax Fire & Rescue Department, Joe Schmit
- Great Bend Fire Department, Patrick Gehring
- Great Bend Fire Department, Isaiah Harkes
- Great Bend Fire Department, Jon Herding
- Great Bend Fire Department, Steve Manock
- Great Bend Fire Department, Ron Thorson
- Mantador Rural Fire District, David Foertsch
- Mantador Rural Fire District, Dan Glynn
- Mantador Rural Fire District, Terry Gutzmer
- Mantador Rural Fire District, Joel Lingen
- Mooreton Rural Fire District, Ben Waskosky
- Mooreton Rural Fire District, Amanda Ward
- Richland County Emergency Management, Director Brett Lambrecht
- Richland County Board of Commissions, Commissioner Terry Goerger
- Wyndmere Fire Department, Chief Andy Thompson
- Wyndmere Fire Department, Assistant Chief Aaron Bell

Sargent County (March 28, 2024)

Invitees Who Attended:

- Forman Fire Department, Mark Bopp
- Forman Fire Department, Mike Keiper
- Forman Fire Department, Clint McLaughlin
- Gwinner County Volunteer First Responders, Ryan Johnson
- Gwinner Rural Fire Protection District, Gary Decker
- Gwinner Rural Fire Protection District, Sam Helm
- Gwinner Rural Fire Protection District, Jerry Waswick
- Milnor Ambulance Service, Coordinator Brian Tayer
- Milnor Fire Department, Mike Elenberger
- Milnor Fire Department, Randy Johnson
- Rutland-Cayuga Rural Fire District, Doug Askerooth
- Rutland-Cayuga Rural Fire District, Zachary Boice
- Rutland-Cayuga Rural Fire District, Kris Jochim
- Rutland-Cayuga Rural Fire District, Jesse Mahy
- Sargent County Emergency Management, Emergency Manager Wendy Willprecht
- Sargent County Board of Commissioners, Commissioner Mark Breker

Invitees Who Did Not Attend:

- Cogswell Rural Fire District
- Sargent County Sherriff's Department

McIntosh/Logan Counties (May 15, 2024)

Invitees Who Attended:

- McIntosh County Disaster Emergency Services, Emergency Manager Loren Lang
- McIntosh County Board of Commissioners, Commissioner Neal Meidinger
- Wishek Fire Department, Chief David Just

Invitee Who Attended Alternate Meeting:

- Logan County Emergency Management, Emergency Manager Daniel Schwartz (individual meeting held May 16, 2024 at 1:00 pm)

Invitees Who Did Not Attend:

- Ashley Ambulance Service
- Logan County Board of Commissioners
- Logan County Sheriff, Sheriff Andrew Bartholomaus
- McIntosh County, Ashley Fire Chief Link Golz
- McIntosh County, Kulm Fire Chief Doug Hintzman
- McIntosh County, Lehr Fire Chief Lane Bader
- McIntosh County, Zeeland Fire Chief Dean Schumacher
- McIntosh County Sheriff, Sheriff Steve Delzer
- Napoleon Volunteer Fire Department/Ambulance Service
- Wishek Ambulance Service, Jo Vilhauer

Cass County (May 16, 2024)

Invitees Who Attended:

- Cass County Emergency Management, Emergency Manager Jim Prochniak
- Cass County Highway Department, Assistant County Engineer Kyle Litchy
- Cass County Sheriff's Office, Sheriff Jesse Jahner
- Cass County Sheriff's Office, Chief Deputy Dean Haaland
- Casselton Fire Department, Chief John Hejl
- Casselton County Rural Ambulance District, Chief Ken Krupich
- North Dakota State House, District 22 Representative Brandy Pyle

Invitees Who Did Not Attend:

- Cass County Commission, Chair Chad Peterson
- Cass County Commission, Commissioner Tony Grindberg
- Cass County Commission, Commissioner Jim Kapitan

Oliver/Mercer Counties (May 16, 2024)

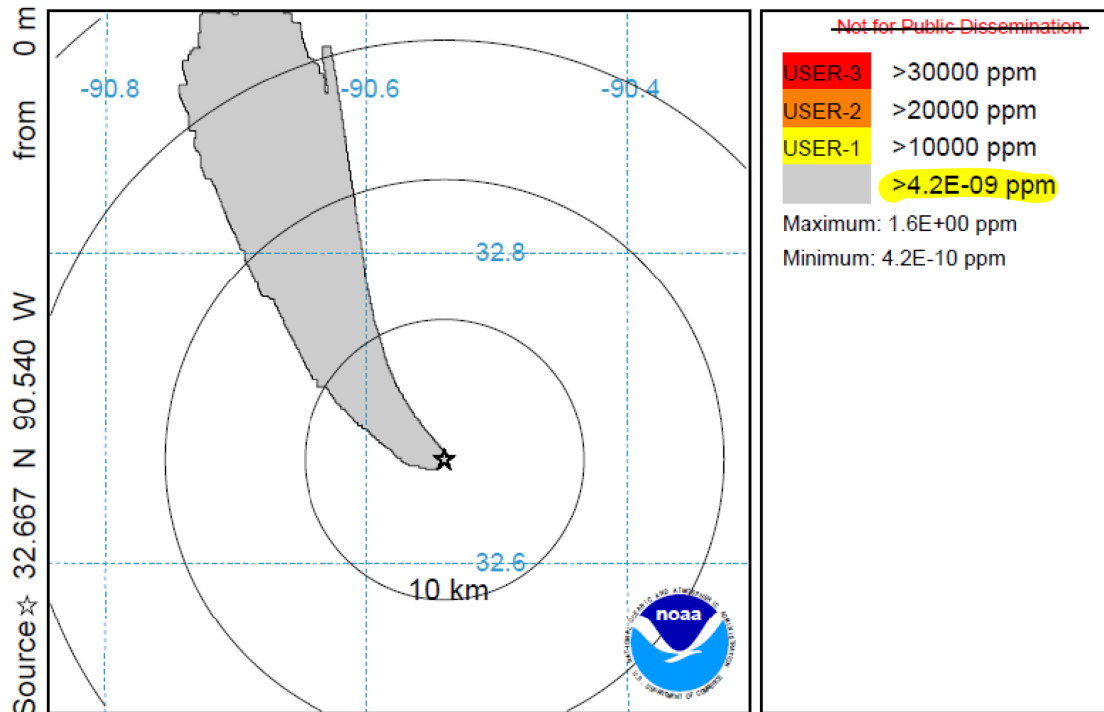
Invitees Who Attended:

- Oliver County Ambulance Squad, Mickie McNulty
- Oliver County Rural Fire Protection District, Fire Chief Austin Weigal
- Oliver County Rural Fire Protection District, Training Officer Bryan Bradley
- Oliver County/Mercer County Emergency Manager, Alice Grinsteinner (beginning only)
- Mercer County Ambulance Service, Manager Marcy Sailer
- Mercer County Commission, Commissioner Jamee Folk
- Zap Rural Fire Protection District, Fire Chief Mike Mohl

Invitees Who Did Not Attend:

- Beulah Police Department, Chief Frank Senn (attended previous meeting)
- Beulah Rural Fire Protection District, Chief Eli Schumann (designee attended previous meeting)
- Oliver County Board of Commissioners, Commissioner Darrell Berger (attended previous meeting)
- Glen Ullin Fire District, Fire Chief Wade Kottre (did not attend)
- Hebron Fire Protection District, Fire Chief Jason Wehri
- Mandan Rural Fire Department, Fire Chief Lynn Gustin
- Mercer County Ambulance Board, Member Dave Czywczynski
- Mercer County Sheriff, Sheriff Terry Ternes
- New Salem Fire Department, Fire Chief, Barry Schulz
- Oliver County Sheriff Department, Sheriff David Hilliard
- Stanton Fire Department, Fire Chief Nick Chapman
- Stanton Rural Fire Protection District, Fire Chief Lane Hall
- Zap Rural Fire Protection District, Ryan Taylor

Failure Investigation Report – Denbury Gulf Coast Pipelines LLC
Pipeline Rupture/Natural Force Damage
 February 22, 2020



HRRR METEOROLOGICAL DATA

Job ID: 23884	Job Start: Sun Feb 23 04:29:26 UTC 2020
Release: lat.: 32.667157 lon.: -90.540381 Hgt: 0.0 m	
Pollutant: (124-38-9) CARBON DIOXIDE	
Release Quantity: 69.7 kg Start: 20 02 23 02 49	
Output: Maximum 15-minute Average Air Concentration	
Dry Deposition rate: 0 cm/s Wet Removal: None #Part: 40000	
Initial LOC-3: 30000 ppm LOC-2: 20000 ppm LOC-1: 10000 ppm	
Meteorology: 0200Z 23 Feb 2020 - HRRR	
Event: Real_Event - Hazmat_Industrial	
Produced by user: david.cox - WFO: MS: Jackson: 601-939-2786	

Figure 5: This Chart Shows the Plume Model Data Generated by the National Weather Service/NOAA - The Model Indicates the Direction a Plume or Cloud of CO₂ Would Have Followed from Ground Level While Dissipating, According to Atmospheric Data at the Time of the Release - Each Ring is 10 Kilometers (Satartia is Less Than Two Kilometers Northwest of Release Site, Indicated by the Star)⁸

Prior to the accident in 2011, Denbury had contracted a third-party company to generate an affected radius model for a potential CO₂ release. Denbury used the model to generate a zone along the pipeline ROW to identify pipeline segments which were within or “could affect” an HCA and to develop its Public Awareness Program (PAP).⁹ The model established a zone for the Delhi Pipeline (Figure 6) that left Satartia outside of the affected radius, and therefore the pipeline segment was not identified by Denbury as a “could affect” HCA. Additionally, Satartia was not included in Denbury’s PAP or considered in any local

⁸ The NWS approved inclusion of the chart within this report and clarified that “Not for Public Dissemination” (in the upper right-hand corner) pertains to real-time emergency response utilization, due to inherent uncertainties with several variables.

⁹ Required by 49 CFR § 195.440.