1250 West Century Avenue
Mailing Address:
P.O. Box 5601
Bismarck, ND 58506-5601
(701) 530-1600

July 28, 2020

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

Re: OEP/DG2E/Gas Branch 1
WBI Energy Transmission, Inc.
North Bakken Expansion Project
Docket No. CP20-52-000
§ 375.308(x)

Dear Ms. Bose:

WBI Energy Transmission, Inc. (WBI Energy), herewith submits responses to the environmental information requests of the Office of Energy Projects of the Federal Energy Regulatory Commission (Commission) received on July 13, 2020 in the above referenced docket.

The filing includes the following volumes:

Volume I – contains all responses to the environmental information requests with the exception of sensitive information included in the responses to Request Nos. 13 and 14 described below. The information contained in Volume I is public.

Volume II – Attachment B to the response to Request No. 13 contains sensitive information on archaeological sites along with copies of previously unfiled correspondence with the State Historic Preservation Office. The response to Request No. 14 contains previously unfiled tribal and other agency correspondence from Beaver Creek Archaeology. Pursuant to 18 CFR §388.112, and consistent with the Commission's precedent and other applicable regulations with respect to sensitive information, WBI Energy requests privileged and confidential treatment of this information, which is labeled: "CUI//PRIV – DO NOT RELEASE."

Pursuant to 18 CFR § 385.2010 of the Commission's regulations, copies of responses are being served to each person whose name appears on the official service list for this proceeding.

Any questions regarding this filing should be addressed to the undersigned at (701) 530-1563.

Sincerely,

/s/ Lori Myerchin

Lori Myerchin
Director, Regulatory Affairs and
Transportation Services

Attachments

cc: via email
Dawn Ramsey, FERC Environmental Project Manager
Shannon Crosley, FERC Environmental Deputy Project Manager
Official Service List

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated this 28th day of July 2020.

By /s/ Lori Myerchin
Lori Myerchin
Director, Regulatory Affairs and
Transportation Services
WBI Energy Transmission, Inc.
1250 West Century Avenue
Bismarck, ND 58503
Telephone: (701) 530-1563

STATE OF NORTH DAKOTA)
COUNTY OF BURLEIGH)

I, Lori Myerchin, being first duly sworn, do hereby depose and say that I am the Director, Regulatory Affairs and Transportation Services for WBI Energy Transmission, Inc.; that I have read the foregoing document; that I know the contents thereof; that I am authorized to execute such document; and that all such statements and matters set forth therein are true and correct to the best of my knowledge, information and belief.

Dated this 28th day of July 2020.

By _____
Lori Myerchin
Director, Regulatory Affairs and
Transportation Services

Subscribed and sworn to before me this 28th day of July 2020.

_____
Carmen Fish, Notary Public
Burleigh County, North Dakota
My Commission Expires: 1/03/2024

CARMEN FISH
Notary Public
State of North Dakota
My Commission Expires January 3, 2024

WBI Energy Transmission, Inc.
North Bakken Expansion Project
Docket No. CP20-52-000

Responses to Environmental Information Request on July 13, 2020

Request No. 1

Title 18 of the Code of Federal Regulations, Part 157.21(f)(9) states that within 14 days of the end of the scoping comment period, the applicant shall respond to issues raised during scoping. In response to this, WBI Energy stated that it would respond to comments in its application; however, we note that WBI Energy did not fully respond to comments from Justin and Angie Hartel and LeMoine and Clarice Hartel, and did not provide any responses to comments from the North Dakota Department of Environmental Quality. Provide a comment matrix identifying each comment and respective response for these letters.

Response:

As an attachment to this data response, WBI Energy Transmission, Inc. (WBI Energy) is providing a comment matrix identifying the scoping comments provided by Justin and Angie Hartel, LeMoine and Clarice Hartel, and the North Dakota Department of Environmental Quality. Included in the comment matrix is WBI Energy's response to each issue/comment raised in these letters and references to previously filed documents (where applicable). Note that WBI Energy is responding to the comments from the Hartels that relate to the proposed North Bakken Expansion Project (Project). Information on WBI Energy's other pipelines on Hartel property can be found on the Federal Energy Regulatory Commission's (FERC) e-Library using the following docket numbers: CP14-50 (Garden Creek II Pipeline Project), CP18-21 (Line Section 27 Cherry Creek to Spring Creek Expansion Project), and CP19-27 (Demicks Lake – Cherry Creek Pipeline Project).

Attachment:

Request No. 1 Attachment – WBI Energy's Responses to Scoping Comments Received

Request No. 2

Provide information on any rerouting for the project due to WBI Energy's discovery of sensitive resources and any additional studies that have been completed due to rerouting.

Response:

Rerouting to avoid sensitive resources is ongoing with WBI Energy's 2020 field survey season. This includes route adjustments to avoid Dakota skipper (DASK) reproductive habitat and sensitive cultural resources sites. WBI Energy will be providing FERC with a supplemental filing in late August or early September of 2020 which will encompass all route adjustments identified to date.

Request No. 3

Clarify if the width of the construction and permanent right-of-way on U.S. Forest Service (USFS) land. If different from the remainder of the project, clarify why the reduced right-of-way width would not be applied throughout the construction/operational area.

Response:

The proposed 24-inch-diameter Tioga-Elkhorn Creek pipeline will have a 100-foot-wide construction right-of-way (70-foot-wide working side and a 30-foot-wide spoil side). Following construction, a 50-foot-wide permanent easement will be retained for pipeline operations; the remainder of the construction right-of-way will be restored to pre-existing conditions.

A 100-foot-wide construction right-of-way width will be necessary to provide sufficient workspace to accommodate increased amounts of topsoil and subsoil materials requiring additional storage space while allowing safe passage of construction equipment and material along the working side of the right-of-way during construction. Soil stability is anticipated to be one of the main soil limiting factors affecting proposed Project activities. Trench excavations in erosive soils have the potential to cave in, and may require widening the trench and increasing the amount of soil materials that will be stored along the right-of-way. The 100-foot-wide right-of-way will allow adequate space for wider trench excavations in erosive soils and allow for sufficient soil stockpile storage space along the right-of-way. To aid in revegetation efforts, WBI Energy proposes to segregate topsoil in all non-saturated areas affected by standard pipeline construction and not just those areas required by the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan), which will require additional workspace for topsoil and subsoil storage.

Additionally, a 100-foot-wide right-of-way will allow implementation of proper safety precautions during construction. These safety measures may include but are not limited to:

- After trench excavation, work between the pipe and the trench will be prohibited.
- During lowering-in operations, workers will be positioned between the equipment and the pipe to monitor, inspect, and repair coating as needed or to adjust temporary pipe supports.
- To minimize the potential for trench collapse, construction equipment will be offset from the edge of the trench at a minimum distance equal to that of the depth of the trench.
- The 100-foot right-of-way ensures that there will be travel lane around construction equipment for first responders in the event of an incident.

In accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures (Procedures), WBI Energy will be necking down to a 75-foot-wide construction right-of-way when crossing sensitive resources such as wetlands. Based on consultations with the USFS, for the approximately 2.1-mile portion of the Tioga to Elkhorn Creek pipeline crossing USFS land, the USFS requires a 75-foot-wide construction right-of-way on USFS lands. The permanent right-of-way on USFS lands will be a 50-foot-wide permanent easement. WBI Energy finds that it is feasible to reduce the construction right-of-way to 75 feet in these select sensitive resource areas including USFS land. Based on the constraints discussed above, it is not feasible to reduce the construction right-of-way to 75 feet for the entire length of the Tioga to Elkhorn Creek pipeline.

Request No. 4

For all proposed modifications to the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures), provide measures proposed to protect the resources that are equal to or greater than what is outlined in the Plan and Procedures.

Response:

The table below was provided in Resource Report 1 of the February 14, 2020 FERC Application. A column has been added to the right-hand side of this table for an explanation of measures to protect resources that are equal to or greater than those measures outlined in the Plan and Procedures. As previously noted, WBI Energy will be providing a supplemental filing in late August or early September of 2020 to account for route adjustments that have occurred since the February 14, 2020 FERC Application. A revised version of this table will be filed at that time.

TABLE 1.3-1

North Bakken Expansion Project
Proposed Modifications to the FERC Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures

Plan or Procedures/ Section No.	Measure	Proposed Modification	Justification for Proposed Modification	Protection Measures
Plan				
IV.A.2	The construction right-of-way width for a project shall not exceed 75 feet.	For the 24-inch-diameter Tioga-Elkhorn Creek and Elkhorn Creek-Northern Border pipelines, WBI Energy will use a 100-foot-wide construction right-of-way in non-wetland areas except across USFS land.	Consistent with the Plan, WBI Energy will expand the construction right-of-way by 25 feet (for a total construction right-of-way width of 100 feet) to accommodate full topsoil segregation, rolling terrain along portions of the pipeline route, erosive soil conditions, and to allow for efficient and safe construction.	WBI Energy will adhere to all erosion and sediment control requirements outlined in the FERC Plan and Procedures and follow the measures outlined in the Project Spill Prevention, Control, and Countermeasure Plan (SPCC Plan). To aid in revegetation efforts, WBI Energy will segregate topsoil in all non-saturated areas affected by standard pipeline construction and not just those areas required by the FERC Plan.
Procedures				
V.B.2	Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	Locate workspace at milepost (MP) 12.1 of the Tioga-Elkhorn Creek pipeline within 50 feet of the water's edge.	The workspace on the south side of 60th Street NW is necessary to cross the road by guided bore; the workspace is about 24 feet from the waterbody. The guided bore crossing of 60th Street NW will minimize impacts on the road.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to prevent sediment from entering the waterbody. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect waterbodies from potential spills.

TABLE 1.3-1

North Bakken Expansion Project
Proposed Modifications to the FERC Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures

Plan or Procedures/ Section No.	Measure	Proposed Modification	Justification for Proposed Modification	Protection Measures
		Locate workspace at MP 27.3 of the Tioga-Elkhorn Creek pipeline within 50 feet of the water's edge.	The workspace on the east side of the drainage is necessary for the guided bore crossing of the waterbody; the workspace is about 7 feet from the waterbody.	A route adjustment has occurred in the vicinity of MP 27.3. This waterbody is no longer within 50 feet of an extra workspace.
		Locate workspace at MP 44.7 of the Tioga-Elkhorn Creek pipeline within a waterbody.	This workspace on the north side of 33rd Street NW is necessary to cross this road by guided bore. The guided bore crossing of 33rd Street NW will minimize impacts on the road. Note this area has not been field surveyed due to landowner access issues and data is currently based on the National Hydrography Dataset.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to minimize sediment from entering the waterbody. It is not anticipated that there will be perceptible flow in this waterbody at the time of construction. If flow is present, the waterbody would be crossed using either a guided bore or dry crossing method. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect waterbodies from potential spills.
VI.B.1	Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	Locate workspace at MP 28.4 of the Tioga-Elkhorn Creek pipeline within 50 feet of an emergent wetland.	To meet right-of-way requirements for USFS land, a 25-foot-wide ATWS has been placed along the 50-foot-wide permanent right-of-way through USFS land. This 25 feet is needed for topsoil segregation, travel lanes, and equipment/ personnel safety.	A route adjustment has occurred in the vicinity of MP 28.4. This wetland is no longer within 50 feet of an extra workspace.
		Locate workspace at MP 29.2 of the Tioga-Elkhorn Creek pipeline within an emergent wetland.	To meet right-of-way requirements for USFS land, a 25-foot-wide ATWS has been placed along the 50-foot-wide permanent right-of-way through USFS land. This 25 feet is needed for topsoil segregation, travel lanes, and equipment/ personnel safety.	A route adjustment has occurred in the vicinity of MP 29.2. This wetland is no longer within 50 feet of an extra workspace.

TABLE 1.3-1

North Bakken Expansion Project
Proposed Modifications to the FERC Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures

Plan or Procedures/ Section No.	Measure	Proposed Modification	Justification for Proposed Modification	Protection Measures
		Locate workspace at MP 44.7 of the Tioga-Elkhorn Creek pipeline within a wetland	This workspace on the north side of 33rd Street NW is necessary to cross this road by guided bore. Note this area has not been field surveyed due to landowner access issues and data is currently based on National Wetlands Inventory data. The guided bore crossing of 33rd Street NW will minimize impacts on the road.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to minimize sediment entering the wetland. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect wetlands from potential spills.
		Locate two workspaces at MP 13.4 of the Line Section 25 Loop within 50 feet of an emergent wetland.	The workspaces on the south side of White Earth Creek are necessary for the guided bore crossing of this waterbody and associated fringe wetland. The workspaces are between about 18 and 20 feet from the wetland.	This modification is requested to facilitate installation of a guided bore crossing of the wetland, which would avoid impacts on, and provide greater protection to, this wetland. WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to prevent sediment from entering the wetland. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect the wetland from potential spills.
		Locate workspace at MP 0.4 of the Tioga Compressor Lateral within 50 feet of an emergent wetland.	The workspace on the west side of 103rd Avenue NW is necessary to cross the road by guided bore; the workspace is about 5 feet from a wetland. The guided bore crossing of 103rd Avenue NW will minimize impacts on the road.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to prevent sediment from entering the wetland. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect the wetland from potential spills.
		Locate workspace at uprate bore site 3 within 50 feet of an emergent wetland.	The workspace on the south side of 92nd Street NW is necessary to cross the road by guided bore; the workspace is about 45 feet from the wetland. The guided bore crossing of 92nd Street NW will minimize impacts on the road.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to prevent sediment from entering the wetland. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect the wetland from potential spills.

TABLE 1.3-1

North Bakken Expansion Project
Proposed Modifications to the FERC Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures

Plan or Procedures/ Section No.	Measure	Proposed Modification	Justification for Proposed Modification	Protection Measures
		Locate workspace at uprate bore site 4 within 50 feet of an emergent wetland.	The workspace on the north side of 93rd Street NW is necessary to cross the road by guided bore; the workspace is about 33 feet from the wetland. The guided bore crossing of 93rd Street NW will minimize impacts on the road.	WBI Energy will install erosion and sediment control devices in accordance with the FERC Plan and Procedures to prevent sediment from entering the wetland. Additionally, WBI Energy will implement measures outlined in the Project SPCC Plan to protect the wetland from potential spills.

Request No. 5

Provide further detail on why the additional temporary workspace at Milepost 28.4 cannot be moved to comply with the FERC Procedures to locate extra work areas at least 50 feet from a wetland boundary.

Response:

A route adjustment has occurred in the vicinity of Milepost 28.4. This wetland is no longer within 50 feet of an extra workspace. WBI Energy will be providing a supplemental filing encompassing all route adjustments in late August or early September of 2020.

Request No. 6

File an updated table 1 (Summary of Proposed Guided Bore Locations and Surficial Geology) from WBI Energy's April 20, 2020 response to our March 31, 2020 Environmental Information Request (EIR) to provide the length and maximum depth for proposed guided bore crossings that were previously noted as "TBD".

Response:

An updated version of table 1 (Summary of Proposed Guided Bore Locations and Surficial Geology) with completed crossing length and depth information is provided below. As previously noted, WBI Energy will be providing a supplemental filing in late August or early September of 2020 to account for route adjustments that have occurred since the February 14, 2020 FERC Application. A revised version of this table will be filed at that time.

TABLE 1

Summary of Proposed Guided Bore Locations and Surficial Geology [a]

Facility/ Milepost	Feature Crossed	Length (feet)	Max Depth (feet)	Geologic Formation [b] / Deposit Type	Map Unit	Approximate Thickness (feet)
Line Section 25 Loop						
0.6	103rd Ave NW	195	10.9	Coleharbor / Glacial	Qcdn	100
0.7	w-wm-eb-002e	657	20.3	Coleharbor / Glacial	Qccu	100
1.0	69th St NW	316	12.6	Coleharbor / Glacial	Qccu	100
2.0	70th St NW & 103rd Ave NW	308	18.5	Coleharbor / Glacial	Qccu	100
3.1	71st St NW	308	10.7	Coleharbor / Glacial	Qccu	100
4.1	72nd St NW	223	10.5	Coleharbor / Glacial	Qccu	100
5.1	73rd St NW	129	8.7	Coleharbor / Glacial	Qccu	100
6.2	74th St NW	200	12.0	Coleharbor / Glacial	Qccu	100
6.6	102nd Ave NW	449	15.9	Coleharbor / Glacial	Qcdn	100
7.2	75th St NW	271	12.2	Coleharbor / Glacial	Qcdn	100
8.2	76th St NW	270	12.4	Coleharbor / Glacial	Qcdn	100
9.3	77th St NW	272	20.1	Coleharbor / Glacial	Qcdn	100
10.3	78th St NW	264	19.2	Coleharbor / Glacial	Qccu	100
11.3	79th St NW	277	14.0	Coleharbor / Glacial	Qccr	100
11.4	101st Ave NW	260	11.7	Coleharbor / Glacial	Qccr	100
12.5	80th St NW	312	18.3	Coleharbor / Glacial	Qccr	100
13.4	White Earth Creek	965 [c]	30.0 [c]	Coleharbor / Glacial	Qcdn	100
13.6	81st St NW	204	12.7	Coleharbor / Glacial	Qcdn	100
14.8	100th Ave NW	229 [c]	12.5 [c]	Coleharbor / Glacial	Qcdn	100
16.2	99th Ave NW & w-bk-ea-001e	475 [c]	22.5 [c]	Coleharbor / Glacial	Qcdc	100
17.1	83rd St NW	225 [c]	12.0 [c]	Coleharbor / Glacial	Qcdc	100
17.5	98th Ave NW	240 [c]	12.0 [c]	Coleharbor / Glacial	Qcoh	200
19.3	85th St NW	195 [c]	11.5 [c]	Coleharbor / Glacial	Qcoh	200
Uprate Line Section 25						
18.9	86th Ave NW & Wetland	745	22.7	Coleharbor / Glacial	Qccr	100
17.2	HWY 40	381	18.0	Coleharbor / Glacial	Qcch	100
10.8	92nd St NW	351	21.6	Coleharbor / River Sediment	Qcrh	100
9.6	93rd St NW & 89th Ave NW	313	11.1	Coleharbor / Glacial	Qcch	100
Line Section 30 Loop						
3.2	106TH AVE NW	200	7	Coleharbor / Glacial	Qcdn	100
4.2	105TH AVE NW	250	7	Coleharbor / Glacial	Qcdn	100
5.2	66TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100
6.3	STATE HWY 40	350	20	Coleharbor / Glacial	Qcdn	100
7.5	67TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100

TABLE 1

Summary of Proposed Guided Bore Locations and Surficial Geology [a]

Facility/ Milepost	Feature Crossed	Length (feet)	Max Depth (feet)	Geologic Formation [b] / Deposit Type	Map Unit	Approximate Thickness (feet)
7.7	103RD AVE NW	250	7	Coleharbor / Glacial	Qcdn	100
8.6	GREAT NORTHERN RAILROAD	500	12	Coleharbor / Glacial	Qcdn	100
9.2	68TH ST NW	350	7	Coleharbor / Glacial	Qcdn	100
Tioga-Elkhorn Creek						
0.3	68TH ST NW	350	7	Coleharbor / Glacial	Qcdn	100
0.8	GREAT NORTHERN RAILROAD	500	12	Coleharbor / Glacial	Qcdn	100
1.8	103RD AVE NW	251	7	Coleharbor / Glacial	Qcdn	100
2.1	67TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100
3.2	66TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100
4.3	65TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100
5.3	US HWY 2	600	15	Coleharbor / Glacial	Qcdn	100
6.2	104TH AVE NW	250	7	Coleharbor / Glacial	Qcdn	100
7.1	105TH AVE NW	350	7	Coleharbor / Glacial	Qcdn	100
7.4	63RD ST NW	250	7	Coleharbor / Glacial	Qcdn	100
8.5	106TH AVE NW	250	7	Coleharbor / Glacial	Qccu	100
9.2	62ND ST NW	350	7	Coleharbor / Glacial	Qcoh	100
12.1	60TH ST NW	350	7	Coleharbor / Glacial	Qccu	100
14.1	58TH ST NW	250	7	Coleharbor / Glacial	Qcdn	100
16.1	56TH ST NW	250	7	Bullion Creek / River, Lake and Swamp	Tb	600
18.1	Beaver Creek s-wm-eb-002	630	13	Coleharbor / Glacial	Qcdn	100
18.4	109th AVE NW	250	7	Oahe / River Sediment	Qor	30
19.7	110TH AVE NW	250	7	Oahe / River Sediment	Qor	30
19.7	STATE HWY 1806	278	7	Oahe / River Sediment	Qor	30
20.7	53RD ST NW	250	7	Oahe / River Sediment	Qor	30
22.3	52ND ST NW	250	7	Oahe / Windblown Sediment	Qou	10
22.9	DRIVEWAY	250	7	Oahe / Windblown Sediment	Qou	10
26.2	48TH ST NW	1433	19	Bullion Creek / River, Lake and Swamp	Tb	600
28.8	WETLAND m-mk-ea-002e	N/A [d]	N/A [d]	Bullion Creek / River, Lake and Swamp	Tb	600
29.7	COUNTY HWY 43	250	10	Bullion Creek / River, Lake and Swamp	Tb	600
30.0	Tobacco Garden Creek s-mk-eb-002	250	20	Oahe / River Sediment	Qor	30
30.5	45TH STREET NW	250	7	Oahe / River Sediment	Qor	30
34.5	42ND STREET NW	250	7	Oahe / River Sediment	Qor	30
36.2	PORCUPINE COULEE s-mk-ea-003	250	20	Oahe / River Sediment	Qor	30
36.7	COUNTY HWY 10	350	10	Sentinel Butte / River, Lake and Swamp	Ts	600
38.2	WETLAND w-mk-ea-003e	1200		Sentinel Butte / River, Lake and Swamp	Ts	600
38.6	121ST AVE NW	214	6	Sentinel Butte / River, Lake and Swamp	Ts	600
39.2	38TH ST NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
41.3	ACCESS ROAD	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
42.5	35TH ST NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
43.4	COUNTY HWY 12	350	10	Coleharbor / Glacial	Qcdn	25 [b]
43.6	121ST AVE NW	250	7	Coleharbor / Glacial	Qcdn	25 [b]
44.6	31ST ST NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
46.5	31ST ST NW	350	7	Oahe / River Sediment	Qor	30
47.6	30TH ST NW	250	7	Oahe / River Sediment	Qor	30
48.6	29TH ST NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
48.9	121ST AVE NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
49.6	ACCESS ROAD	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
50.8	STATE HWY 23	508	20	Sentinel Butte / River, Lake and Swamp	Ts	600
51.0	Northfork Creek s-mk-eb-005	636	12	Sentinel Butte / River, Lake and Swamp	Ts	600
51.8	Cherry Creek	723	12	Sentinel Butte / River, Lake and Swamp	Ts	600
54.6	COUNTY HWY 37	250	10	Sentinel Butte / River, Lake and Swamp	Ts	600
56.5	112TH AVE NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
56.7	112TH AVE NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600

TABLE 1

Summary of Proposed Guided Bore Locations and Surficial Geology [a]

Facility/ Milepost	Feature Crossed	Length (feet)	Max Depth (feet)	Geologic Formation [b] / Deposit Type	Map Unit	Approximate Thickness (feet)
57.7	WATERCOURSE	800	10	Sentinel Butte / River, Lake and Swamp	Ts	600
57.9	122ND AVE NW	250	7	Sentinel Butte / River, Lake and Swamp	Ts	600
59.5	COUNTY HWY 37	250	10	Sentinel Butte / River, Lake and Swamp	Ts	600

[a] Sourced from Clayton et al. (1980), North Dakota Geological Survey (2015), and Carlson (1985).
[b] Carlson (1985) indicates that the Coleharbor Group in McKenzie County may be closer to 25 feet thick.
[c] The bore length and maximum depth have been estimated. Updated information will be provided upon completion of final bore design if values change.
[d] A route adjustment has occurred in this area and the previously proposed bore is no longer a part of the Project.

Request No. 7

Given the proximity of WBI Energy's proposed Lignite Plant Receipt Station and Lignite Town Border Station to a site of known, existing contamination ("Lignite Gas Plant"), discuss the potential for encountering contaminated soil or groundwater during construction activities. This discussion should address the specific chemicals of concern released; clarify characterization efforts completed to date as well as the media affected by the release (e.g. soil, groundwater, sediment); specify the location (horizontal and vertical extent) of the contamination; describe remediation activities completed to date; and identify if response measures include or will include engineering or institutional controls.

Response:

The Lignite Plant Receipt Station and Lignite Town Border Station site will be graded and prepared to accommodate the construction of aboveground measurement facilities with buildings and supporting structures to continue to receive gas from the Lignite Gas Plant and deliver gas to the city of Lignite, North Dakota in accordance with the volume commitments associated with this Project. Belowground pipeline tie-ins will be required to connect the new measurement facilities. Trenching will occur throughout the station to install power and communications infrastructure to the equipment and buildings.

After review of the General Environmental Incident Summary (attached) for the Lignite Gas Plant saltwater spill, there is a low chance for encountering any contaminated soil or groundwater during construction. The Lignite Plant Receipt Station and Lignite Town Border Station are located to the west of the Lignite Gas Plant. The release occurred at an abandoned disposal well on the eastern end of the gas plant and flowed east along a lease road into a privately owned field and a small pond on the east side of the plant. The on-site well release was contained, and the released material that went off site was retrieved. A sample from the source of the release was tested and showed levels of chloride in the water that were above drinking water standards. At this time, the necessary environmental monitoring survey is scheduled to occur in September as members of the team are located in Canada and are unable to cross the border due to COVID-19. The results of this survey will be used to determine the next steps necessary in the cleanup process at the site and if any additional measures would need to occur during construction of the aboveground facilities. If determined to be needed, the station soil will be analyzed and evaluated by an outside consultant to advise WBI Energy of potential soil contamination, if any, and the mitigation methods required for construction and station activities.

Attachment:

Request No. 7 Attachment – General Environmental Incident Summary

Request No. 8

WBI Energy provided April 20, 2020 responses to the March 31, 2020 EIR for the Biological Assessment (BA) submitted for the Project. The USFS and the U.S. Fish and Wildlife Service [USFWS] had multiple questions that WBI responded to by referencing the draft BA or stating that it would provide updates to include additional information (i.e. additional surveys, recommendations) to the BA. File the information requested by the USFS and the U.S. Fish and Wildlife Service from the March 31, 2020 EIR. Additionally, the data from appendices a, b, c, d, and e from the draft BA have not been provided. File the data referenced in these appendices.

Response:

A portion of the comments provided by the USFS and USFWS in the March 31, 2020 data request were based on a preliminary draft of the BA sent to the agencies for review. The BA was then updated and filed as part of the February 14, 2020 FERC Application along with appendices (A through D). The BA was filed as privileged given the data and mapping included for DASK habitat. This filing is available on FERC e-Library at accession number 20200214-5293.

As noted in other data request responses, WBI Energy will be filing a supplemental filing in late August or early September of 2020 with updated information specific to route adjustments that have taken place since the February 2020 FERC Application filing. This supplemental filing will include an updated BA and Biological Evaluation, which will both address the remaining comments received from the USFS and USFWS and updated information based on route changes.

Request No. 9

File updated/completed habitat survey results for the Dakota Skipper (DASK) for the entire project. If any additional DASK habitat is identified in the updated surveys, provide a discussion as to how WBI Energy would avoid further impacts on the DASK and its habitat.

Response:

Rerouting to avoid sensitive resources is ongoing with WBI Energy's 2020 field survey season. This includes route adjustments to avoid DASK reproductive habitat. WBI Energy will continue to avoid DASK reproductive habitat by the use of minor route adjustments or boring beneath habitat. WBI Energy will continue to consult with the USFWS regarding proposed mitigation measures to minimize impacts on DASK habitat. An updated survey report will be provided in the upcoming supplemental filing scheduled for late August or early September of 2020.

Request No. 10

File results from all supplemental cultural resources investigations, including survey and testing reports for studies completed in 2020. File any comments from participating agencies and tribes, as well as any comments from the North Dakota State Historic Preservation Officer (SHPO).

Response:

The 2020 cultural resources field surveys and site testing are ongoing. WBI Energy anticipates filing a comprehensive survey and testing report (an update to the Class III inventory report previously filed with WBI Energy's Application on February 14, 2020) in September 2020. WBI Energy additionally will provide copies of the updated Class III inventory report to the SHPO and participating agencies and tribes. WBI Energy will file comments on the report from the SHPO and participating agencies and tribes, when received.

Request No. 11

File the geomorphological assessment reports for archaeological resources completed in 2020, including any comments from participating agencies and tribes, as well as any comments from the SHPO.

Response:

While fieldwork for the geomorphological assessment is complete, analysis of the recovered cores is ongoing. WBI Energy anticipates filing a report on the results of the assessment in August 2020. WBI Energy additionally will provide copies of the report to the SHPO and participating agencies and tribes. WBI Energy will file comments on the report from the SHPO and participating agencies and tribes when received.

Request No. 12

File information on tribal participation during cultural resources investigations in 2020.

Response:

As noted in a supplemental filing on July 8, 2020, WBI Energy retained Beaver Creek Archaeology (BCA) to coordinate tribal participation in the 2020 field investigations. BCA contacted the Tribal Historic Preservation Officers (THPOs) at each of the 13 tribes consulted for the Project[1]. To date, tribal cultural specialists representing the following tribes have participated in field surveys and/or site testing in 2020:

- Standing Rock Sioux Tribe;
- Rosebud Sioux Tribe;
- Assiniboine and Sioux Tribes;
- Rosebud Sioux Tribe on behalf of the Sisseton-Wahpeton Oyate; and
- Turtle Mountain Band of Chippewa Indians.

In addition to these tribes, a tribal cultural specialist from the Three Affiliated Tribes observed a gradiometer survey completed at Site 32WI976. Some tribes have been unable to participate in fieldwork due to travel restrictions associated with COVID-19.

WBI Energy's consultant, Environmental Resources Management (ERM), is completing fieldwork for the Project using two survey teams. The tribal cultural specialists participating in this work are split between the two teams. Prior to completion of the fieldwork, re-visits to potentially significant sites (mainly prehistoric stone feature sites) identified during survey will be conducted so that each of the tribal cultural specialists has the opportunity to visit and comment on each site. Likewise, potentially significant sites identified during the 2019 survey effort will also be re-visited.

[1] These are: Standing Rock Sioux Tribe, Sisseton-Wahpeton Oyate, Turtle Mountain Band of Chippewa Indians, Three Affiliated Tribes, Spirit Lake Sioux Tribe, Yankton Sioux Tribe, Northern Cheyenne Tribe, Cheyenne River Sioux Tribe, Assiniboine and Sioux Tribes, Rosebud Sioux Tribe, Oglala Sioux Tribe, Northern Arapaho Tribe of Wind River Indian Reservation, and Fort Belknap Indian Community.

Request No. 13

Provide any previously unfiled correspondence with the SHPO and file the SHPO's concurrence on the finding of effect for the proposed project.

Response:

An updated table summarizing previously unfiled communications with the SHPO and copies of previously unfiled correspondence with the SHPO are provided in Request No. 13 Attachment A. Copies of correspondence which contain location or character information on archaeological sites are provided in Request No. 13 Attachment B, which has been filed under separate cover. This appendix is marked "CUI//PRIV – DO NOT RELEASE."

The SHPO provided comments on WBI Energy's Class III inventory report describing the results of the 2019 field investigations in a letter to WBI Energy dated April 15, 2020 (letter filed on July 8, 2020). WBI Energy reviewed these comments with the SHPO in a teleconference on April 28, 2020 (minutes filed on July 8, 2020). During the teleconference, the SHPO indicated a preference for a single, comprehensive Project report which address the comments on the previous report and incorporates the results of the ongoing survey and site testing effort. WBI Energy anticipates filing this report in September 2020.

In an email to WBI Energy on May 6, 2020 (email filed on July 8, 2020), the SHPO advised WBI Energy that it will defer concurrence on eligibility and effect determinations (for both archaeology and historic architecture) until after it receives federal determinations.

Attachment:

Request No. 13 Attachment A – Copies of Previously Unfiled Agency Correspondence (Public)

Request No. 13 Attachment B – Copies of Previously Unfiled Agency Correspondence (CUI//PRIV – DO NOT RELEASE)

Request No. 14

Provide any previously unfiled correspondence, including the Bureau of Land Management, U.S. Army Corps of Engineers, USFS, and Native American tribes. Ensure that any tribe requesting additional information receives it.

Response:

Attachment A and Attachment B to Request No. 13 provide the previously unfiled agency correspondence.

As noted in the response to Question 12, WBI Energy retained BCA to coordinate tribal participation in site testing and field surveys. Summaries of BCA's communications with tribes and other agencies regarding tribal participation in fieldwork and associated correspondence are provided in Request No. 14 Attachment. Because this appendix contains location and character information for archaeological sites, it has been filed under separate cover and is labelled "CUI//PRIV – DO NOT RELEASE".

The Standing Rock Sioux Tribe has requested a copy of the 2019 Class III inventory report. WBI Energy will provide a copy of this report to the tribe and file documentation of the report transmittal.

Attachment:

Request No. 14 Attachment – Copies of Previously Unfiled Tribal and Agency Correspondence from Beaver Creek Archaeology (CUI//PRIV – DO NOT RELEASE)

Request No. 1 Attachment

WBI Energy's Responses to Scoping Comments Received

REQUEST NO. 1 ATTACHMENT

North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
Justin and Angie Hartel and Le Moine and Clarice Hartel October 15, 2019 Comment Letters (accession nos. 20191015-5325 and 20191015-5344)					
1	Cumulative Impacts	The proposed Project currently follows a multiple utility corridor across our property. There are currently 10 (ten) oil and/or gas pipelines located within this corridor, 2 of which belong to WBI. There are also another 4 major pipelines located within the general vicinity of this corridor. WBI's most recent line was constructed in 2018 and in 2019 another was constructed across land that we lease. This land has been severely and significantly impacted by the number of pipelines that cross through it and by adding another pipeline such as this there will be significant cumulative impacts to soils, water resources/wetlands, land use, vegetation, wildlife, socioeconomics, air quality, and possibly to T&E [threatened and endangered] species or their habitat. A strong hard look at cumulative impacts needs to be looked at including all previous and future projects.	Section 1.10 of Resource Report 1 describes the general scope of WBI Energy's cumulative impact analysis for the Project. The reasonably foreseeable future actions included in this analysis are identified in appendix 1J and figure 1.10-1 of Resource Report 1. Appendix 1J also includes the location, proposed schedule, and a description of each reasonably foreseeable future action. In accordance with the requirements of the National Environmental Policy Act, cumulative impacts of the Project and other actions on specific environmental resources in the region are evaluated in Resource Reports 2 through 9.	Resource Report 1, Section 1.10 and Appendix 1J Resource Report 2, Section 2.4 Resource Report 3, Section 3.7 Resource Report 4, Section 4.8 Resource Report 5, Section 5.4 Resource Report 6, Section 6.8 Resource Report 7, Section 7.4 Resource Report 8, Section 8.14 Resource Report 9, Section 9.3	
2	Pipeline Routing/Land Use	There is also a multi-well pad that has been constructed for 4 years and not drilled in the SWSW of Section 23. The operator has stated that the main reason for not drilling the wells on this pad is because there is not enough infrastructure in the area for gas capture. We want to reserve any future impacts to the land for pipelines that will help take product away from this multi-well pad instead of granting access to this Project for a line that does not benefit the land it crosses or the individual landowners.	As described in section 1.1.1 of Resource Report 1, natural gas pipeline infrastructure is needed to provide an outlet for the processed natural gas in the Bakken region of northwest North Dakota. WBI Energy intends to construct, own, operate, and maintain the proposed Project to transport processed natural gas from the region to Northern Border's existing mainline for transit on that system.	Resource Report 1, Section 1.1.1	
3	Alternatives	The Project overview map shows that there is an existing WBI line to the west of the proposed route across our land. This existing corridor runs to the east of Watford City and already ties into the Northern Border Line south of Watford City at an existing compressor station. This existing route and compressor station should be analyzed in full as an alternative. If this alternative is not chosen, cumulative impacts should include this existing infrastructure. A very small portion of this existing route to the west goes through a developed area. WBI will state that this is a concern and they cannot do this but there is sufficient room within their existing permanent easement to include this additional line. WBI will also state that there is pavement/cement in some of this area but it is our opinion that environmental impacts will be less because they will not be moving and mixing topsoil and subsoils. This has been a huge problem in the past with the lines they have installed on our land and the land we lease.	As described in section C.4.2 of the Applicant-Prepared Environmental Assessment, in response to the Hartels comments, WBI Energy investigated replacing the existing pipeline that extends east of Watford City and ties into Northern Border south of Watford City with a larger diameter pipeline. WBI Energy's North Badlands sub-system's 16-inch-diamater pipeline generally follows a portion of the proposed Project route. This pipeline is designed to flow 200 million cubic feet per day of natural gas, which would be interrupted for approximately 8 months during the construction of a replacement pipeline. The interruption would have a significant impact on upstream gas processing plants. To accommodate the combined volume level that would be flowing on the replacement pipeline, either the diameter of the pipeline would need to be increased or additional horsepower installed at the Elkhorn Creek Compressor Station, increasing Project costs. The pipeline would have to be extended from its current interconnect with Northern Border at Spring Creek to the Elkhorn Creek Compressor Station. In addition, WBI Energy's North Badlands sub-system is operated independently of WBI Energy's integrated system, with separate pressure requirements, transportation rates, and fuel reimbursement provision, which would be affected by replacing the current 16-inch-diameter pipeline. For these reasons, replacing the existing pipeline would not be a viable alternative.	Applicant-Prepared Environmental Assessment, Section C.4.2	
4	Property Values	WBI has not been willing to fairly negotiate ROW and/or surface damage fees with any of their previous lines. Our land where the project is proposed is very close to the Watford City extra-territorial area (ETA) with some of our lands within the same Section being included within the ETA. Due to this and to the high level of oil/gas development and city growth that has happened over the last 10-15 years, land values have substantially and significantly increased. The lands near Watford City are arguably the most valuable lands along the entire proposed Project route. This has been proven by ROW easements that all pipeline companies, besides WBI, have been willing to pay for access across these lands. WBI has used, or misused, the power of eminent domain to be able to access these valuable lands at a significantly less value. We do have available the values we have obtained that we would be willing to share with FERC [Federal Energy Regulatory Commission] confidentially outside this public document. These values have been shared with WBI in the past and they have ignored "industry standard rates" and actual land values in their offers. Even other pipeline companies that have eminent domain rights have crossed our land in this same area and have been a significant 4-5 times higher than WBI offers. We feel it is hard for WBI, with headquarters located in Glendive, MT and well outside the impacted areas of the Bakken, to fully understand the land values in this area and a full analysis should be done to consider the socioeconomic impact this causes. Once a ROW is granted we as land owners lose the value of that land for future development. We also have a private business where we have installed pipe of similar size to WBI's proposal and we have personally paid a higher value to landowners in the immediate area, therefore, we have firsthand knowledge and experience of what land values are in this area.	As described in section 8.5 of Resource Report 8 and section B.6.6 of the Applicant-Prepared Environmental Assessment, WBI Energy does not currently have recourse to eminent domain to obtain an easement for the Project. Under section 7(h) of the Natural Gas Act, WBI Energy would obtain the right to eminent domain if FERC issues a Certificate for the Project. Regardless, WBI Energy states that it will attempt to negotiate an easement agreement with each landowner along the proposed pipeline route. Regarding compensation, WBI Energy states that it will negotiate with affected landowners in good faith and in a fair and honest manner to obtain an easement to construct, operate, and maintain the proposed pipeline in return for monetary compensation. Compensation for easements will be based on fair market value and will be paid on a one-time, lump-sum basis.	Resource Report 8, Section 8.5 Applicant-Prepared Environmental Assessment, Section B.6.6	

REQUEST NO. 1 ATTACHMENT

North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
5	Easement Terms	Another factor and concern is the lease term length that WBI has not been willing to negotiate. We understand that with eminent domain lease terms can go up to 99 years. It is not required that leases be a length of 99 years. Again, industry standard for ROW lease agreements in this particular area as of late has been 20-30 years. WBI should not be allowed to obtain a 99 year lease term. The EA being conducted by FERC can absolutely not fully analyze impacts of this line operating over the next 99 years. There are too many future impacts due to erosion, sink holes, spills, repairs, replacements, land use changes, addition of T&E species, etc. that cannot effectively be analyzed. A design criteria should be included in the final EA stating that ROW easements cannot exceed 30 years. If this design criteria cannot be included than a full Environmental Impact Statement (EIS) should be prepared. Also, at the reduced values that WBI obtains ROW as discussed above, the lease term should definitely not exceed 20-30 years. I do not believe the pipe being placed in the ground has the ability to withstand 99 years in the ground without severe degradation. Any Federal lands that will be crossed with this Project will require Federal permission from the surface managing agency. In the case of Forest Service land that will be crossed with this Project a Special Use Permit (SUP) will be required. The Forest Service in this area will only issue SUP with a term of 10 years. In rare cases they may have issued them for 20-30 years. We have never heard of them issuing a SUP for 99 years. If this is standard operating on Federal lands than it should also be required for private lands.	As described in section 8.5 of Resource Report 8 and section B.6.6 of the Applicant-Prepared Environmental Assessment, WBI Energy will follow the requirements in the North Dakota Century Code T47C05 regarding easement terms.	Resource Report 8, Section 8.5 Applicant-Prepared Environmental Assessment, Section B.6.6	
6	Design Alternatives	WBI currently has 2 existing lines across our property. I understand that based on demand at the time of pipe installation WBI only sizes their pipe systems to handle that demand. This causes WBI to keep coming back and placing new lines in the ground with greater significant impacts. WBI, as an alternative, should be required to take out the old undersized lines and install the new larger pipe in the same areas. I understand that this would cause a temporary delay in product moving in those existing lines but again they have a 99 year lease term so what is a few months of being shut down to install a new line with no new disturbance. It is less than 0.2% of the total time of the 99 year lease term. I believe they are probably shut down longer times than that for line repairs over the life of the easement. This has been done by other pipeline companies needing to upsize their capacities and is becoming more common, especially on Federal lands. If this is not a feasible alternative than WBI should be required to put in a sufficient size line so that this is the last line that will be installed in this area. At a minimum, design criteria should be included that would require line replacement in the future.	As described in section 1.1.1 of Resource Report 1, WBI Energy is proposing to install the 24-inch-diameter pipeline and associated facilities to meet market demand for incremental firm transportation capacity from the Williston Basin in northwestern North Dakota. As described in section C.4.2 of the Applicant-Prepared Environmental Assessment, WBI Energy investigated replacing the existing pipeline that extends east of Watford City and ties into Northern Border south of Watford City with a larger diameter pipeline, which would result in an interruption of service for approximately 8 months during the construction of a replacement pipeline. The interruption would have a significant impact on upstream gas processing plants. .See also the response to Hartels' comment no. 3 above and the response to the North Dakota Department of Environmental Quality's (NDDEQ) comment no. 2 below.	Resource Report 1, Section 1.1.1 Applicant-Prepared Environmental Assessment, Section C.4.2	
7	Alternatives/ Collocation	WBI should be required to install their new line between the 2 existing lines. There is sufficient space in between the existing lines for the proposed 20-inch-diameter line. This way impacts will be limited to areas of previous disturbance. WBI currently has plans to follow these existing lines until they reach the NWNE of Section 26 and then they propose to follow an existing Hess line. We feel an alternative that should be analyzed in full is that WBI continues to follow their 2 existing lines and stay in between them until it leaves our property in the SWNE of Section 26. Since our negations with WBI have not even started, these alternatives need to be evaluated.	As described in section C.4.2 of the Applicant-Prepared Environmental Assessment, WBI Energy investigated routing the Tioga-Elkhorn Creek pipeline between two existing WBI Energy pipelines from about mileposts 51.8 to 52.8. At the time that the Applicant-Prepared Environmental Assessment was prepared, this analysis was completed using desktop data because civil survey crews did not yet have landowner permission to access the Hartel property. Civil surveys were subsequently completed the week of July 20, 2020, and the results are currently being reviewed to determine if there is enough room to safely route the pipeline between the two existing WBI Energy pipelines on the Hartel property. Additional information on this route and potential route adjustment will be provided in a supplemental filing.	Applicant-Prepared Environmental Assessment, Section C.4.2	

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North Bakken Expansion Project
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Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
8	FERC Approval Process/Alternatives	A problem that we have had in the past with WBI is that they start the process of getting FERC approval long before negotiations with landowners are reached and then when they do come back to the landowner they say this is how it has to be done because "that is what the Feds have approved." WBI should be made aware of small changes that can be made as the project progresses. This is the case with this project. WBI has been told we are not in favor of them crossing our land but they continue to submit the proposals to FERC without properly communicating with us knowing in the end they will have eminent domain rights and then it should be done the way it was approved. A wide variety of alternatives need to be evaluated or it needs to be explained to WBI what changes can be made and how to go about them once they do start wanting to negotiate with the landowner.	As described in section 1.9 of Resource Report 1, WBI Energy has notified each of the landowners identified for the proposed Project in accordance with Title 18 of the Code of Federal Regulations (CFR) Part 157.6(d). As described in section A.9 of the Applicant-Prepared Environmental Assessment, WBI Energy hosted four private landowner meetings to introduce the Project to affected landowners and receive input: two on May 8, 2019 in Tioga, North Dakota and two on May 9, 2019 in Watford City, North Dakota. On April 18, 2019, WBI Energy sent letters of invitation to all affected landowners along the Project route. The Project team, which included WBI Energy personnel and their consultants, had productive conversations with landowners and received valuable feedback regarding potential Project concerns and the proposed pipeline routes. Discussion topics included the purpose of the Project, route siting, construction, and land use and restoration. WBI Energy hosted four open house meetings to inform stakeholders about the Project and provide an opportunity for stakeholders to ask questions and express comments and concerns: two on August 6, 2019 in Tioga, North Dakota and two on August 7, 2019 in Watford City, North Dakota. On July 17, 2019 WBI Energy mailed an open house invitation letter to Project stakeholders, including affected landowners, and published announcements for the open houses in local newspapers. Additionally, FERC environmental staff conducted two public scoping sessions on October 1 and 2, 2019 in Tioga and Watford City, North Dakota, respectively, to receive verbal scoping comments on the Project. Landowners had multiple opportunities to provide comments on the proposed Project. Alternatives to the proposed Project are described in Resource Report 10 and Section C of the Applicant-Prepared Environmental Assessment. The range of alternatives analyzed includes the no-action alternative, system alternatives, route alternatives, route variations, and aboveground facility site alternatives.	Resource Report 1, Section 1.9 Applicant-Prepared Environmental Assessment, Sections A.9 and C Resource Report 10	
9	Waterbody (Cherry Creek) Crossing/Access Road Use	WBI [Energy] proposes to cross Cherry Creek with this project in the SE of Section 23. Cherry Creek is one of only a couple perennial streams in McKenzie County, ND. Every measure should be taken to avoid any impact to this streambed or to its stream banks. Design criteria should be included that requires WBI to bore Cherry Creek and any other creek bed along the route. The bore should be a minimum of 10 feet below the stream bed and should have to be double cased to avoid impacts of any future spills. WBI in the past has supposedly been allowed to push in the banks and cross this Creek with their past projects. This should not be allowed again. Appendix A has been attached to show pictures of past WBI projects in this area. Photo 1 shows how WBI pushed in the banks of Cherry Creek to install their matting. Cherry Creek runs high during spring runoff and will periodically run outside its normal channel during the year depending on rainfall events. Photos 2 and 3 show what happened to WBI's reclaim this last spring after high waters. You will see in the photos that all the topsoil that had been placed in the stream banks was washed away and this caused it to be deposited downstream in the creek channel. This is absolutely against ND Dept. of Health regulations and would not comply with the Clean Water Act. Photo 4 shows another pipeline company that came through at that same time right next to WBI. This company stopped short of the Cherry Creek banks and did not push them in like WBI. This resulted in no soil loss or bank stability loss. The reason for this is that the other company negotiated with us as landowners and crossed the stream as we asked. When a company such as WBI is allowed to do it the way they want, even with the oversite of FERC and their environmental analysis, it shows that the landowner knows what is best on their land and that should take precedence over the findings of an "outside" environmental consultant. WBI has reasonable access to both sides of Cherry Creek from their ROW and would not need to push in the banks. No creek crossing will be allowed on Cherry Creek. If for some reason WBI cannot access from their ROW or there is an emergency situation, there is an existing creek crossing in the immediate area that we as landowners may be willing to allow use on if our terms our met. WBI is aware of this existing crossing because they illegally used it in 2018 during their line construction even with the bridge matting in place. A number of photos were obtained from security camera footage of WBI using the unauthorized crossing for vehicle, UTV, and foot traffic. This would have violated FERCs approval as well as the agreement with the landowner and should be strongly considered when issuing WBI eminent domain rights.	As described in section 2.2.1 of Resource Report 2, WBI Energy proposes to cross Cherry Creek via the guided bore crossing method. As shown in table 1 (Summary of Proposed Guided Bore Locations and Surficial Geology) included in WBI Energy's responses to FERC's March 31, 2020 environmental information request, the bore under Cherry Creek will reach a depth of approximately 12 feet. As described in section 8.2.4 of Resource Report 8, WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment vehicles, and materials to the proposed Project work areas during construction. Standard-maintenance public roads will be used for access without modification or improvement. Some minimum maintenance public roads and private roads, may require improvements (such as grading, blading, and placement of gravel for stability) to safely accommodate Project equipment and vehicles. Locations of access roads are depicted on the Project route maps provided as appendices 1A and 1B of Resource Report 1, and a list of these access roads is provided in appendix 8B of Resource Report 8. If WBI Energy identifies any additional access roads required for construction or operation of the Project at a later date, it would need to submit a variance request to FERC for approval to use those roads and complete all appropriate federal, state, and local permitting associated with the Project change.	Resource Report 1, Appendices 1A and 1B Resource Report 2, Section 2.2.1 Table 1 (Summary of Guided Bore Locations and Surficial Geology) of WBI Energy's April 20, 2020 Responses to FERC's Environmental Information Request on the Application and Supporting Documentation (accession no. 20200420-5138) Resource Report 8, Section 8.2.4 and Appendix 8B	

REQUEST NO. 1 ATTACHMENT

North Bakken Expansion Project
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Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
10	Stream Restoration/Noxious Weeds	Upon reclamation of Cherry Creek stream banks, WBI did not seed a portion of the area reclaimed. They were notified of this in the spring and summer of 2019 and have still not complied. The area was covered with weeds this summer and we as landowners took it upon ourselves to mow the weeds in the area to prevent spreading. Photos 5 and 6 show this area that has not been seeded and has been overrun with weeds.	As described in section 3.5.3 of Resource Report 3, WBI Energy will revegetate disturbed non-agricultural upland areas within the right-of-way and additional temporary workspace in accordance with the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (FERC Plan) using seed mixes recommended by the Natural Resources Conservation Service (NRCS), landowners, or other appropriate agencies. In areas where final grade and cleanup is completed during active construction, WBI Energy will comply with the timelines for seeding identified in the FERC Plan (weather and soil conditions permitting) or as recommended by the NRCS or Farm Service Agency (subject to approval by landowners). As described in section 3.5.4 of Resource Report 3, WBI Energy will implement the measures described in its Noxious Weeds Management Plan to prevent and control the introduction or spread of noxious weeds during and following construction of the project; the plan is provided in appendix 1F of Resource Report 1. The measures contained in this plan are designed to identify areas supporting noxious weeds prior to construction; prevent the introduction and spread of weeds from construction equipment moving along the right-of-way; contain weed seeds and propagules by preventing segregated topsoil from being spread to adjacent areas or along the construction right-of-way; and address weed infestations that develop during operation of the Project.	Resource Report 1, Appendix 1F-3 Resource Report 3, Sections 3.5.3 and 3.5.4	
11	Topsoil Segregation	Other problems seen during WBI's last pipeline construction was the severe mixing of topsoil and subsoils. Photo 7 shows an example of this mixing. Topsoil in this area is very limited with only between 4" to 6" to work with. The removal and storage of topsoil in these areas is very critical. This is why the best alternative for the proposed Project is for WBI to follow their existing lines through our property and stay in between them with their new line. Then they will be moving soil that has already been impacted due to poor handling and no additional environmental concerns should occur. The best way to preserve topsoil is this area is to only strip the O-Horizon (Organic) and A-Horizon together across the entire ROW. Then the B-Horizon should only be removed from above the trench area. Lastly the C- Horizon should only be removed from the trench where the pipe will be installed. Once the pipe is in place the layers will go back in the reverse order.	As described in section 1.3.1 of Resource Report 1, WBI Energy anticipates that topsoil will be segregated across the entire width of the right-of-way except in saturated areas. As described in section 7.3.1 of Resource Report 7, to prevent mixing of the soil horizons, topsoil segregation will be performed in non-saturated wetlands, cultivated or rotated croplands, managed pastures, hayfields, residential areas, and in other areas requested by the landowner or land managing agency. Topsoil will be segregated, as appropriate, from the subsoil and will be replaced in the proper order during backfilling and final grading. Implementation of proper topsoil segregation will help promote post-construction revegetation success, thereby minimizing loss of crop productivity and the potential for long-term problems with erosion. Topsoil will be segregated in accordance with the FERC Plan and Procedures. In areas disturbed by grading and as required by the FERC Plan and Procedures, temporary erosion and sediment controls will be installed within the right-of-way to minimize erosion. These erosion and sediment controls will be inspected and maintained throughout the construction and restoration phases of the Project, as appropriate, and as required by the FERC Plan and Procedures. During cleanup, project area contours will be restored to pre-existing conditions as closely as possible, the segregated topsoil will be spread over the surface of the right-of-way, and permanent erosion controls will be installed.	Resource Report 1, Section 1.3.1 Resource Report 7, Section 7.3.1	
12	Cleanup	Other concerns during construction that have been seen are garbage and flags being left in the area. WBI was also observed not removing one-call flags before they mowed the grass of the ROW prior to topsoil stripping. This caused pieces of tangled wire flags to be found throughout the project area (Photos 8 and 9).	As described in section 1.3.1.8 of Resource Report 1, during cleanup, construction debris will be collected and taken to a disposal facility.	Resource Report 1, Section 1.3.1.8	
13	Property Access	Also, while clearing ROW the excessive topsoil piles where placed where they blocked our existing two-track access roads to get to fields (Photo 10). We had to contact WBI and wait for the areas to be opened before we could get equipment through for spring planting. WBI should be required to leave access points on all existing two-tracks as well as areas where cattle can be crossed. This should be negotiated with the landowner.	WBI Energy will work with landowners to maintain access to fields for spring planting and cattle grazing.	Not applicable	

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14	Dewater/Water Appropriation	WBI on their last construction project also used a pump and hose to drain water from their open trench onto the adjacent land that was outside of their ROW easement as shown in Photos 11 and 12. This again did not have the permission of us as landowners and it is assumed that this practice was not evaluated under FERC's previous EA. No such practices should be allowed under the current proposal. WBI was also found to be setting up to pump water out of Cherry Creek in order to fill their finished line for testing. When we approached them about not allowing this they stated they had FERC approval and that they could do it. The waters of Cherry Creek are under control of the State of ND. Any pulling of water from this stream requires a permit from the State Water Commission and also needs landowner approval. None of these were obtained. From discussions with FERC staff it is my understanding that they do not give approval for these type of actions and FERC requires that all State, County, and other Federal laws be followed. If industrial water is needed for Hydro-testing of the new proposed line WBI should be obtaining information on where the points are and any routes needed to transfer the water to their ROW should be evaluated. There is an existing water source located in the SE of Section 23 that could be used. This would require that a 10-inch lay flat line be laid on our property down an existing two-track to the ROW. All additional permits needed are already in place or would be obtained by us as the landowner. This line has been installed in the same area a number of times for non-Federal projects and is a nominal use that requires no disturbance so no additional cultural or environmental surveys would be needed.	As described in section 2.1.5 of Resource Report 2, trench dewatering will be necessary if shallow groundwater is encountered within the excavation zone. Water pumped from the trench or excavated areas will be discharged in accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures (FERC Procedures) and applicable permits. The potential impact of dewatering will be minimized by discharging the pumped water to well-vegetated areas or properly constructed temporary retention structures that will promote infiltration and minimize or eliminate runoff. As described in section 2.2.4 of Resource Report 2, water will be obtained from local water depots or surface waters in accordance with state regulations for a combination of hydrostatic testing of the pipelines, horizontal directional drill (HDD) and guided bore drilling fluid, and dust control. If WBI Energy determines that it is necessary to obtain water from a surface water source, it will obtain any required permits or approvals in accordance with state regulations and FERC requirements.	Resource Report 2, Sections 2.1.5 and 2.2.4	
15	Erosion and Sediment Control	Measures need to be taken to control soil erosion and loss. In order for the last line to get FERC approval it would have showed that there would have been no significant impact to soils. As discussed above already with topsoil issues there were also erosion issues on the last project. Photos 13-15 show some of the soil erosion that took place. This is after all reclamation was done and all required soil erosion measures were in place. Although WBI did come back Spring of 2019 to fix these areas, the topsoil that was lost was not able to be recovered. A strong Stormwater Pollution Prevention Plan (SWPPP) needs to be put into place for the proposed project and it should be the responsibility of FERC inspectors to enforce that the SWPPP is strictly followed. FERC inspectors should be on the project at all times during construction to make sure all regulations and design features are being followed. They should also be in contact with all landowners to make sure the project is being constructed according to ROW easements.	As described in section 7.3.1 or Resource Report 7, WBI Energy will utilize erosion and sedimentation control devices in accordance with the FERC Plan. Temporary erosion controls (silt fences, straw bales, or straw logs) will be installed, where appropriate, during clearing to prevent the movement of disturbed soils off the right-of-way or other work areas. As necessary, trench breakers (stacked sand bags or foam) will be installed in the trench around the pipe to prevent movement of subsurface water along the pipeline. Additionally, temporary slope breakers consisting of mounded and compacted soil will be installed across the right-of-way in areas required by the FERC Plan and Procedures. Temporary slope breakers will be installed during clearing and grading activities, and permanent slope breakers will be installed during cleanup or as soon as weather conditions permit in accordance with the FERC Plan and Procedures. WBI Energy's environmental inspectors (EIs) will inspect sedimentation and erosion control devices on a regular basis as specified in the FERC Plan and Procedures. Additionally, construction activities will be conducted in accordance with all landowner agreements.	Resource Report 7, Section 7.3.1	
16	Pipeline Markers (Safety)	Another concern is the placement of WBI's line markers. These markers should only be allowed at fence, road, stream, and property crossings. WBI typically places line markers in these areas but also places them at points of inflections (PIs). Any pipeline maker that is placed on a PI causes future problems to landowners. They are often in the way of equipment when placed in a field and in pasture land they act as an area for cattle to congregate and use as a rubbing post. How does FERC analyze these impacts? Photo 16 shows one of these markers in a pasture where cattle where only grazed for one week this summer. The photo shows that there is nothing growing around the post due to the cattle in that area. This spot will eventually become worse and worse with a depression forming around the post that will hold water. This will have potential of then compromising the pipeline trench. Markers on PIs should not be allowed unless they are in a fence line or next to a road. Common sense needs to be taken on these type of issues. Again, as stated above, these type of issues do not take place with other pipeline companies that are constructed without FERC involvement and when the pipeline company willingly and sincerely negotiate with the landowner for the best interest of the land.	As described in sections 1.3.1.8 of Resource Report 1 and 11.2.5 of Resource Report 11, pipeline markers showing the location of the pipelines will be installed at fence crossings, road crossings, points of inflection, and other areas as necessary to identify WBI Energy as the owner of the pipelines and convey emergency information in accordance with applicable government regulations, including U.S. Department of Transportation (USDOT) safety requirements. As described in section B.9.7 of the Applicant-Prepared Environmental Assessment, the pipeline markers are a requirement of USDOT regulations to warn where a transmission pipeline is located, and WBI Energy will comply with these safety standards.	Resource Report 1, Section 1.3.1.8 Resource Report 11, Section 11.2.5 Applicant-Prepared Environmental Assessment, Section B.9.7	

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17	Noxious Weeds	Weeds have become a major problem with all pipeline installations. We recognize that within the first 1- 2 years of grass establishment there will be some weeds on the ROW. It needs to be a high priority for WBI to maintain those weeds during that time. WBI has done a poor job of monitoring weeds along their existing ROW. It has not been getting taken care of until contacted by the landowner of the landowner addressing the issue themselves. This again is a breach of what is stated in the ROW easement. Photo 17 shows a weed infested WBI ROW. Photos 18 and 19 show a weed issue in a field of barley hay. The darker green areas of this field are weeds that caused an extensive loss to crop production in that area of the field. Photo 20 shows mature and dried out kochia weeds that were left in a fence line that WBI crossed with their line in 2018. These kochia plants will act as a snow catch over the winter and all the fence lines will be loose or broke after snow melt because of these weeds. Strict design criteria need to be included that require WBI to maintain control of weeds during new seed establishment. ND State noxious weed leafy spurge has not yet been introduced to our land or the land that we lease. WBI will be crossing a number of leafy spurge infestations to the north of our land in the Tobacco Garden area. In order to prevent the spread of this and any other noxious weed WBI should be required to pressure wash all equipment before leaving those infested lands and before entering onto lands where the plants have not been introduced. We ask that verification of pressure cleaning be given to the landowner before equipment is moved onto their land. It would even be reasonable for FERC to require an inspection of the equipment to make sure this will happen. This is a requirement on all Federal lands and private lands should be treated no different.	As described in section 3.5.4 of Resource Report 3, WBI Energy conducted noxious weed surveys for state- and county-listed noxious weed species within a 300-foot-wide corridor centered on the proposed pipeline centerlines within grassland areas. The noxious weed species observed during surveys are listed by location in table 3.5.4-2 and will be identified on the alignment sheets. Additional areas supporting noxious species may be identified during preconstruction inspections by WBI Energy's EIs. WBI Energy will implement the measures described in its Noxious Weeds Management Plan to prevent and control the introduction or spread of noxious weeds during and following construction of the Project; the plan is provided in appendix 1F of Resource Report 1. The measures contained in this plan are designed to identify areas supporting noxious weeds prior to construction; prevent the introduction and spread of weeds from construction equipment moving along the right-of-way; contain weed seeds and propagules by preventing segregated topsoil from being spread to adjacent areas or along the construction right-of-way; and address weed infestations that develop during operation of the Project. These measures include but are not limited to: • Prior to construction, the EIs will mark areas of noxious weed infestation by using color-coded flagging, staking, and/or signs on the construction right-of-way. Identification of existing noxious weed locations will alert EIs and construction personnel to implement weed control measures during construction. • Prior to clearing and grading operations, pre-treatment of noxious weed infestations (e.g., application of herbicide or mechanical measures) may be conducted if it is determined that pre-treatment will aid in controlling the spread of weeds during construction. The weed control measure chosen will be the best method available for the time, place, and species or weed. • All equipment will be cleaned prior to arriving on the Project site and inspected to verify that it is adequately clean of soil and debris capable of transporting weed propagules prior to working on the Project. • Material used for erosion control (e.g., hay bales or straw) will be certified as weed-free. • Following construction, WBI Energy will monitor the Project area in accordance with the FERC Plan and Procedures. In the event that noxious weed species become established in the right-of-way, WBI Energy will make efforts to control the weeds within the right-of-way and to work with adjacent landowners to prevent the spread of noxious weed species to adjacent lands. • WBI Energy will control noxious weed species at WBI Energy-managed aboveground facility sites to prevent the spread of weeds onto adjacent properties. This may include the use of approved herbicides, mechanical methods, and/or alternative methods as appropriate for the species and in accordance with applicable laws and regulations. • WBI Energy operations staff will monitor and treat noxious weeds as part of its normal operations and maintenance activities in accordance with state regulations.	Resource Report 1, Appendix 1F-3 Resource Report 3, Section 3.5.4	
18	Seeding	When seeding reclaimed areas, all pasture land should be seeded to a native seed mix that is recommended by the local NRCS office. On past projects this has also been a requirement of WBI but by looking at the stand that is coming in their ROW this has not been followed. Photo 21 shows a stand of Yellow Sweet clover growing in WBIs previous ROW. There are very few native forbs or grasses growing in this ROW. We assume that it would also be a requirement of FERC that native species be seeded back in areas of native pasture. This has not happened and would be another regulation violation. A design criteria should be included that requires WBI to provide the landowner with a copy of the seed tag for the recommended NRCS seed mix that will be used prior to seeding. This will insure that the correct mix is getting seeded. NRCS suggested seeding dates should also be required to be followed. An annual cover crop would be allowed and is suggested by local NRCS as well. All seeded areas should be required to have a certified weed-free straw to be spread on top following seeding to assist in erosion control and moisture preservation.	As described in section 3.5.3 of Resource Report 3 and section 7.3.1 of Resource Report 7, following construction, WBI Energy will revegetate disturbed non-agricultural upland areas within the right-of-way and additional temporary workspace in accordance with the FERC Plan using seed mixes recommended by the NRCS, landowners, or other appropriate agencies. Documentation of consultation with the NRCS regarding seed mixes was provided in appendix 1G of Resource Report 1. In areas where final grade and cleanup is completed during active construction, WBI Energy will comply with the timelines for seeding identified in the FERC Plan (weather and soil conditions permitting) or as recommended by the NRCS or Farm Service Agency (subject to approval by landowners). Best management practices will be implemented to verify that approved seed mixes are used, including verification of seed tags by the environmental inspection staff. Mulch will be applied in upland areas (except cultivated cropland) in accordance with the FERC Plan to stabilize the soil surface and reduce wind and water erosion. The FERC Plan states that mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.	Resource Report 1, Appendix 1G Resource Report 3, Section 3.5.3 Resource Report 7, Section 7.3.1	

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19	Seeding/Restoration /Access	In the past, as mentioned above in an example, WBI has failed to seed some areas of disturbance. On land that we lease for grazing in Section 24 there was an area that WBI used as an access point on their 2018 construction project. There was not a road or trail in this area before but as can be seen in Photo 22 there is clearly a trail that has been created by WBI. This area was never reclaimed or seeded. Photos 23 and 24 show where this trail entered onto WBI ROW. Due to this past performance and assumed non-compliance with FERC regulations WBI should not be allowed to access using any additional ingress and egress points in Section 24. They already have a constructed road across the SW of Section 13 and into their existing valve setting in the NENW of Section 24 that can be used to access their proposed ROW. WBI should also be held responsible for the damage already caused and not be allowed to continue with a new proposal until all issues with past FERC related projects have been addressed. Since we run cattle in this area it has impacted our grazing abilities but we continue to lease the entire area, even the areas that are bare ground.	As described in section 8.2.4 of Resource Report 8, WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment vehicles, and materials to the proposed Project work areas during construction. Standard-maintenance public roads will be used for access without modification or improvement. Some minimum maintenance public roads and private roads, may require improvements (such as grading, blading, and placement of gravel for stability) to safely accommodate Project equipment and vehicles. Locations of access roads are depicted on the Project route maps provided as appendices 1A and 1B of Resource Report 1, and a list of these access roads is provided in appendix 8B of Resource Report 8. If WBI Energy identifies any additional access roads required for construction or operation of the Project at a later date, it would need to submit a variance request to FERC for approval to use those roads and complete all appropriate federal, state, and local permitting associated with the Project change.	Resource Report 1, Appendices 1A and 1B Resource Report 8, Section 8.2.4 and Appendix 8B	
20	Access Roads/Drainage	The existing road in Sections 13 and 24 that WBI currently uses to access their valve setting site should be the only access road used to access their ROW south of Highway 23 and south to Cherry Creek. The proposed Project indicates this already and there is no need for additional alternatives for ROW access in this area. WBI should be held responsible for upkeep of this existing access road. Photo 25 shows damage obtained from WBI traffic leaving the access road while entering into the valve setting site. This damage was unlikely to have been analyzed under the previous FERC project analysis and that should be considered under the new analysis. Also unlikely analyzed was the impact that the previous project has caused to water drainage because of this constructed road. Photo 26 shows water pooled next to the WBI access road and over the top of other utilities. WBI should be required to deal with the existing issues before any new FERC certificate is issued.	As described in section 8.2.4 of Resource Report 8, WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment vehicles, and materials to the proposed Project work areas during construction. Standard-maintenance public roads will be used for access without modification or improvement. Some minimum maintenance public roads and private roads, may require improvements (such as grading, blading, and placement of gravel for stability) to safely accommodate Project equipment and vehicles. *All access roads will be restored to pre-existing condition or better.* Locations of access roads are depicted on the Project route maps provided as appendices 1A and 1B of Resource Report 1, and a list of these access roads is provided in appendix 8B of Resource Report 8. If WBI Energy identifies any additional access roads required for construction or operation of the Project at a later date, it would need to submit a variance request to FERC for approval to use those roads and complete all appropriate federal, state, and local permitting associated with the Project change.	Resource Report 1, Appendices 1A and 1B Resource Report 8, Section 8.2.4 and Appendix 8B	
21	Restoration/Drainag e	Photos 27 and 28 show a wetland that has been created since the installation of WBI's line in 2018. This is located on land we lease for grazing in the NENW of Section 24 and is just adjacent to their valve setting site. Runoff water from this area used to drain to Northfork Creek drainage to the southwest. Since the construction of the 2018 WBI line it has caused water to sit in this area. Water has been in the area all of 2019 and there are wetland grasses starting to establish in this area. When cows are grazing in this area they tend to congregate around this area and have been causing damage due to the foot traffic in the wetland. It is assumed a proper water resource and wetland analysis was either not completed properly by FERC for the 2018 project or that WBI did not follow proper Best Management Practices to prevent this significant impact to water resources from occurring. Corrective actions should be taken on this existing issue prior to the issuance of a new certificate. This shows that an EA was not an accurate assessment to be used and that a Finding of No Significant Impact (FONSI) could not have been reached. A full EIS should be prepared to evaluate the new Project due to cumulative impacts caused by previous projects.	FERC is responsible for determining whether an environmental assessment or environmental impact statement is required for a proposed action. If an agency determines that a Categorical Exclusion does not apply to a proposed action, the agency may prepare an environmental assessment to determine whether or not a federal action has the potential to cause significant environmental effects (U.S. Environmental Protection Agency, 2017). Based on the environmental assessment, FERC will either determine that the action will not have significant environmental impacts and it will issue a Finding of No Significant Impact or FERC will determine that the environmental impacts will be significant, and an environmental impact statement will be prepared.	Not applicable	U.S. Environmental Protection Agency. 2017. National Environmental Policy Act Review Process. Available online at https://www.epa.gov/nepa/national-environmental-policy-act-review-process. Accessed July 2020.
22	Access Roads/Traffic Management	Another thing that we would like to point out relates to the FERC approved pipeline project that WBI completed the spring of 2019. This project only impacted land that we lease for grazing and the access road used to get into our Ranch Headquarters. WBI did not in any way discuss the use of this road for accessing their ROW. Again, they have an existing access road already in place to their valve setting site. On a number of occasions this spring we encountered construction equipment and vehicles related to this project parked at the top of a hill on the road into our Ranch. This equipment and vehicles were outside of any ROW and was on our private lands. Although there was no environmental damage as a result of this, the impact to public safety was a huge and disturbing concern. On a number of occasions when traveling this road from either direction equipment like that seen in Photo 29 were encountered. The vehicles took up the whole road sometimes and at other times were just on one side or the other. Vehicle collisions nearly took place a number of different times because of this and because of WBI traffic not being properly to the side of the road when topping the hill. 90% of the time there were no flaggers in place warning traffic of the activity, even though the activity was not allowed to be taking place in this area in the first place. WBI needs to be held accountable to these actions and to the non- compliance of FERC regulations that have been seeing throughout their projects. FERC should strongly consider these points before issuing a new Project certificate and a full public safety analysis should be conducted.	As described in section 8.2.4 of Resource Report 8, WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment vehicles, and materials to the proposed Project work areas during construction. Standard-maintenance public roads will be used for access without modification or improvement. Some minimum maintenance public roads and private roads, may require improvements (such as grading, blading, and placement of gravel for stability) to safely accommodate Project equipment and vehicles. *All access roads will be restored to pre-existing condition or better.* Locations of access roads are depicted on the Project route maps provided as appendices 1A and 1B of Resource Report 1, and a list of these access roads is provided in appendix 8B of Resource Report 8. If WBI Energy identifies any additional access roads required for construction or operation of the Project at a later date, it would need to submit a variance request to FERC for approval to use those roads and complete all appropriate federal, state, and local permitting associated with the Project change. As described in Section 5.2.7 of Resource Report 5, The movement of construction equipment, materials, and construction personnel will cause a temporary increase in traffic volumes along area roadways. However, impacts from construction-related traffic will be short term at any location as construction personnel and equipment will be geographically dispersed during the construction period, and personnel will travel to and from the Project area primarily during early morning and late evening hours.	Resource Report 1, Appendices 1A and 1B Resource Report 8, Section 8.2.4 and Appendix 8B Resource Report 5, Section 5.2.7	

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			Additionally, construction contractors will comply with local weight limitations and restrictions on area roadways and will remove any soil that falls onto roadway surfaces. Brief traffic delays may occur when equipment needed to complete a bore or directional drill is brought onto or off of the Project site; however, the Project will use flaggers and signage to safely slow or direct traffic as appropriate. Unpaved farm roads, two-tracks, trails, and driveways, as well as roads in areas with a high water table, will be crossed using the open-cut method and then restored to preconstruction condition. Although these crossings are not expected to affect transportation, the Project will implement measures (e.g., detours, plating over the open portion of the trench) to maintain passage for landowners and emergency vehicles, as appropriate.		
23	Approved Access Road Use/Dust Control	Another concern is the amount of dust created by traffic on the ROW. On past projects there has been an overwhelming, unnecessary amount of vehicle travel on the ROW. We believe a proper soils and air quality analysis has not been completed with the past FERC projects and this should be looked at closer during this Project analysis. Vehicles come and go on the ROW continuously throughout construction. Vehicle traffic should be limited to going in and going out one time per day. Also, in many cases crews can access using a shared vehicle and not to where everyone on the crew travels the ROW with a separate vehicle. During the 2018 WBI project, vehicles were observed on countless different occasions accessing the ROW via our private road located in the N2NE of Section 26. This was not allowed under any landowner agreements and in fact it was expressed vividly during negotiations with WBI that this road would not be used as an access point to which they agreed with. There would have been no FERC analysis of the impacts caused due to dust generated on this road from WBI's illegal use. As many times as we were told during negotiations that WBI could not so something because "it hadn't been approved by the Feds" they seem to forget about what was really approved once construction started. WBI will not be allowed to use this road as an access point during the new Project as they have sufficient access using the proposed ROW. Access to the proposed or Alternate ROW would come off of where they intersect County road #37 to the south of our property. The proposed Project does not indicate use of our private road will be needed so an analysis on this road will not be needed. FERC inspectors should go to great lengths during Project construction to make sure this is followed.	As described in section 8.2.4 of Resource Report 8, WBI Energy will use existing public and private access roads on a temporary basis to transport personnel, equipment vehicles, and materials to the proposed Project work areas during construction. Standard-maintenance public roads will be used for access without modification or improvement. Some minimum maintenance public roads and private roads, may require improvements (such as grading, blading, and placement of gravel for stability) to safely accommodate Project equipment and vehicles. All access roads will be restored to pre-existing condition or better. Locations of access roads are depicted on the Project route maps provided as appendices 1A and 1B of Resource Report 1, and a list of these access roads is provided in appendix 8B of Resource Report 8. If WBI Energy identifies any additional access roads required for construction or operation of the Project at a later date, it would need to submit a variance request to FERC for approval to use those roads and complete all appropriate federal, state, and local permitting associated with the Project change. As described section 9.1.4 of Resource Report 9, WBI Energy will implement industry-standard procedures to reduce fugitive dust. These procedures may include spraying disturbed areas or dirt/gravel roads with water; covering areas susceptible to fugitive dust with mulch or a suitable biodegradable or water soluble chemical; installing fencing in areas susceptible to dust to reduce wind speeds; modifying the speed of truck and equipment traffic in disturbed areas or on dirt/gravel roads; and/or removing dirt tracked onto paved roads by construction equipment. Detailed information on these measures is included in WBI Energy's Fugitive Dust Control Plan in appendix 1F of Resource Report 1. Construction and roadway fugitive dust emissions were considered in the analysis of potential construction emissions for the Project as shown in Table 9.1.4-1 in section 9.1.4 and the more detailed construction calculations included in appendix 9C of Resource Report 9.	Resource Report 1, Appendix 1F-5 Resource Report 8, Section 8.2.4 Resource Report 9, Section 9.1.4 and Appendix 9C	
24	Fence and Gate Repair	All fences and gates crossed or installed by WBI during the Project need to be done as acceptable by the landowner. This may include fences adjacent to the ROW. Many times when opening up a fenceline for ROW construction in has an impact on the fences adjacent to the ROW since it is a continuous fence. In some cases it is not good enough to just install a new gate in the line without going back out of the ROW to a sufficient tie-in point to make the whole fenceline maintain its strength. WBI should be required to work with the landowners in any areas where this would be the case. If requested by the landowner, no trespassing signs should also be required at all gates in ownership boundary fences. It should not have to be the responsibility of the landowner to go back and sign each new gate that was created when there was no gate there to start with. This posting is required by the State of ND to sufficiently post private lands as closed to the public.	As described in section 8.5 of Resource Report 8, WBI Energy will work with individual landowners on an as-needed basis to work out any potential issues with property access and potential damage to gates and fences. WBI Energy would install no trespassing signs where required by the landowner agreements.	Resource Report 8, Section 8.5	
25	Wildlife	Great consideration and analysis should be given also to the wildlife impacts that this new Project will cause. Declines in sharp-tailed grouse, mule deer, pronghorn, and other wildlife species have been greatly noticed since the increase in oil/gas activity and pipeline construction in this area. A full analysis should be done to address the effects these cumulative projects have had and will continue to have.	Sections 3.2, 3.3, 3.4, and 3.6 of Resource Report 3 provide a detailed analysis of the Project's potential impacts on wildlife, migratory birds, bald and golden eagles, and threatened and endangered species. Section 3.7 of Resource Report 3 describes the potential cumulative impacts on fish, wildlife, and vegetation from the Project combined with other past, present, and reasonably foreseeable future actions.	Resource Report 3, Sections 3.2, 3.3, 3.4, 3.6, and 3.7	

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Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
26	Threatened and Endangered Species (Dakota skipper)	There is also Dakota skipper habitat in Sections 23, 24 and 26 that will be impacted with this Project. Habitat that includes Bluestem grasses, needlegrasses, and purple coneflower dominate portions of the areas that will be impacted by the project. The main impact would occur from the current proposed route in Section 26. This would have a direct affect to these native plant species that act as habitat for the Dakota skipper. An alternative that should be considered in full is that WBI follows their existing 2 lines across Section 26 and places their new line in between these existing 2 lines. There is sufficient room for the proposed 20-inch line to go in between these other lines. Impacts have already been made to the Dakota skipper habitat in these areas and no additional cumulative effects to the Dakota skipper should take place using this alternative.	As described in section 3.6.2.7 of Resource Report 3, the Project area is within Dakota skipper range and habitat; however, the Project has been designed to avoid and minimize impacts on the species to the greatest extent practicable. Due to the distance between the Project and the North Dakota Critical Habitat Units, the Project is not anticipated to have an effect on Dakota skipper critical habitat. Areas identified as potential reproductive habitat that are adjacent to or within the Project will be excluded from the Project area during construction using a combination of HDD and/or guided bore crossing methods and installation of orange construction exclusion fencing and/or silt fencing to demarcate avoidance areas. Implementation of these measures will prevent construction equipment and temporarily stockpiled soil from encroaching into the habitat. Areas identified as potential foraging habitat that are adjacent to or within the Project area will be excluded from construction activities using a combination of orange construction exclusion fencing and/or silt fencing to demarcate avoidance areas during the Dakota skipper annual flight period. Dakota skipper flight periods vary annually; however, the U.S. Fish and Wildlife Service confirmed that construction activities should be restricted in Dakota skipper foraging and reproductive habitat areas from June 10 through July 15. Regarding installing the pipeline between the two existing lines, see the response to Hartels' comment no. 7 above.	Resource Report 3, Section 3.6.2.7	
27	Right-of-Way Width	WBI is proposing a 100' temporary construction easement and a 50' permanent easement. We are not in agreeance with this and will not allow it on our private land. We believe a reasonable temporary construction width for a 20-inch pipe is 50' with a permanent maintenance easement of 20'. WBI will be crossing Forest Service lands in Sections 12, 13 and 14, T153N, R97W. This land is part of the Little Missouri National Grasslands/Dakota Prairie Grasslands which is managed by the McKenzie Ranger District. Standards and guidelines listed in the 2001 Land and Resource Management Plan should be followed. The Forest Service standard width for a temporary construction easement is 50' with the permanent easement being 20'. This will be designated in the SUP that WBI will need to obtain from the Forest Service. In no way should WBI be allowed to vary from this standard for easement widths. All companies constructing and operating similar lines as the one WBI is proposing have followed this standard on Forest Service lands. We personally just recently obtained a SUP from the Forest Service on the McKenzie Ranger District. This permit was for a 24" HDPE line. This line is bigger and will be constructed deeper than the line that is being proposed by WBI. The construction easement we were given with the SUP we received was 40' with a permanent of 20'. WBI should not be allowed to impact more public land than what is normal and what has been accepted by all other operators already. If WBI is allowed more, than FERC and the Forest Service needs to be ready to adjust easement widths for all past, current and future SUP. WBI is no different than these other pipeline companies and needs to operate under the same standards as everyone else. Since the ROW widths will be limited on Federal land, WBI should also only be given a 50' construction easement and a 20' permanent easement on our private land. There are many Best Management Practices available to make this work. This should be considered as an alternative when crossing our surface and the land that we lease.	As described in sections 1.1.3.1 and 1.3 of Resource Report 1, a 100-foot-wide construction right-of-way width will be necessary to provide sufficient workspace to accommodate increased amounts of topsoil and subsoil materials requiring additional storage space while allowing safe passage of construction equipment and material along the working side of the right-of-way during construction. Soil stability is anticipated to be one of the main soil-limiting factors affecting proposed Project activities. Trench excavations in erosive soils have the potential to cave in, widening the trench and increasing the amount of soil materials that will be stored along the right-of-way. The 100-foot-wide right-of-way will allow adequate space for wider trench excavations in erosive soils and allow for sufficient soil stockpile storage space along the right-of-way. To aid in revegetation efforts, WBI Energy proposes to segregate topsoil in all non-saturated areas affected by standard pipeline construction and not just those areas required by the FERC Plan, which will require additional workspace for topsoil and subsoil storage. Additionally, a 100-foot-wide right-of-way will allow implementation of proper safety precautions during construction. In accordance with the FERC Procedures, WBI Energy will be necking down to a 75-foot-wide construction right-of-way when crossing sensitive resources such as wetlands. Additionally, based on consultations with the U.S. Forest Service, the construction right-of-way has been necked-down to 75 feet for the approximately 2.1-mile portion of the Tioga-Elkhorn Creek pipeline crossing U.S. Forest Service land. The permanent right-of-way on U.S. Forest Service lands will be a 50-foot-wide permanent easement. WBI Energy finds that it is feasible to reduce the construction right-of-way to 75-feet in these select sensitive resource areas including U.S. Forest Service land. Based on the constraints discussed above, it is not feasible to reduce the construction right-of-way to 75 feet for the entire length of the Tioga-Elkhorn Creek pipeline. Following construction, a standard 50-foot-wide permanent easement will be retained for pipeline operations in all areas; the remainder of the construction right-of-way will be restored to pre-existing conditions.	Resource Report 1, Sections 1.1.3.1 and 1.3	
28	Environmental Assessment vs. Environmental Impact Statement/Cumulative Impacts	With the concerns brought forward above, we do not believe an EA is adequate and that a FONSI will not be able to be reached with this proposed Project. We ask that a complete EIS be completed to fully evaluate all significant impacts that will be caused by this Project. This should include a complete look at all direct, indirect, and cumulative effects to all resource areas of concern we have brought forward.	FERC will either determine that the Project will not have significant environmental impacts and it will issue a Finding of No Significant Impact based on the environmental assessment, or the agency will determine that the environmental impacts will be significant and an environmental impact statement will be prepared (see also the response to Hartels' comment no. 21 above).	Not applicable	

REQUEST NO. 1 ATTACHMENT

North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
North Dakota Department of Environmental Quality (NDDEQ), Division of Water Quality October 31, 2019 Comment Letter (accession no. 20191031-0014)					
1	Lake Sakakawea Crossing	[T]he crossing of Missouri River/Lake Sakakawea should be given extra attention.	To reduce potential impacts of the Project on the Missouri River/Lake Sakakawea, WBI Energy proposes to cross the Missouri River/Lake Sakakawea via the HDD method. WBI Energy prepared a draft site-specific HDD plan/profile drawing for the proposed HDD crossing, which was included as an attachment to the Horizontal Directional Drill/Guided Bore Drilling Fluid Monitoring and Operations Plan (HDD Plan) provided in appendix 1F of Resource Report 1. A final HDD plan/profile drawing will be included in an HDD Plan specific to the Missouri River/Lake Sakakawea HDD, which will be filed in a supplemental filing (anticipated to occur in late August or early September 2020). Additional information regarding the Missouri River/Lake Sakakawea crossing, including measures to reduce potential impacts, is provided in sections 2.2.1 through 2.2.5 of Resource Report 2.	Resource Report 2, Sections 2.2.1 through 2.2.5 Resource Report 1, Appendix 1F-8	
2	Pipeline Design/Safety	In general, pipeline projects should be built to specifications appropriate to carry hazardous material and sized generously as they are sometimes repurposed.	As described in section 11.1.1 of Resource Report 11, the Project will be designed, constructed, tested, operated, inspected, and maintained to meet or exceed the USDOT's Minimum Federal Safety Standards specified in 49 CFR 192. These regulations are intended to ensure adequate protection of the public from natural gas pipeline facility accidents and failures; in addition, 49 CFR 192 specifies the minimum material, design, welding, construction, testing, protection from corrosion, operations, maintenance, and personnel qualifications for pipelines. As described in section 1.1.1 of Resource Report 1, WBI Energy has designed the Project and associated facilities, including the 24-inch-diameter pipeline, to meet the market demand for incremental firm transportation capacity from natural gas processing plants in northwestern North Dakota to a proposed interconnect with Northern Border to facilitate the transportation of increasing levels of natural gas production from the Williston Basin to Midwestern markets, and to assist in meeting established state-mandated natural gas capture targets. The Project design, including the pipeline diameter/size, is based on the market demand (i.e., the required incremental firm transportation capacity).	Resource Report 1, Section 1.1.1 Resource Report 11, Section 11.1.1	
3	Water Resources	Pipeline paths should be selected that minimize the potential for impacts to surface and ground water during construction, and in the event of a spill, have containment and safeguards built into the construction process to prevent harmful or hazardous materials from reaching ground or surface waters. Pipelines that intersect, cross, or lie within the floodplain of I, IA, II, and III class rivers or streams, and classified lake(s) listed in the Appendixes I and II of ND Administrative Code, chapter 33-16-02.1, the Standards of Quality for Water of the State (standards) that require a federal permit will also require a Clean Water Act Section 401 Certification.	The Project was designed/routed to minimize or avoid impacts on surface and ground water to the greatest extent practicable. Waterbodies are crossed where necessary to avoid other features or in response to other unavoidable routing constraints. The limited locations along the Project where there are multiple waterbody crossings are in riparian lowlands; therefore, any route adjustments in these areas would likely result in a similar level of impact on waterbodies. WBI Energy's Spill Prevention, Control, and Countermeasure Plan (SPCC Plan), included in appendix 1F of Resource Report 1, describes the measures that WBI Energy personnel and contractors will implement to prevent, and if necessary, control inadvertent spill of fuels, lubricants, solvents, and other hazardous materials. As described in section 1.8 of Resource Report 1, WBI Energy will obtain all necessary permits, clearances, and licenses for Project construction and operation by the time required and prior to construction.	Resource Report 1, Section 1.8 and Appendix 1F-1 Resource Report 2, Sections 2.1 and 2.2	
4	Waterbody Crossings (HDD, bore)	Pipeline projects, when possible, should utilize horizontal directional drilling with a bore depth equal to or deeper than four (4) feet than any potential bank erosion or bed scour as calculated by appropriate engineering methods	All HDDs and bores under waterbodies will be at a depth equal to or greater than 4 feet below any potential bank erosion or bed scour as calculated by appropriate engineering methods. The proposed bore depths were provided in Table 1 (Summary of Guided Bore Locations and Surficial Geology) of WBI Energy's April 20, 2020 Responses to FERC's Environmental Information Request on the Application and Supporting Documentation. An updated version of Table 1 is included in the response to FERC's environmental information request no. 6 of this filing.	Table 1 (Summary of Guided Bore Locations and Surficial Geology) of WBI Energy's April 20, 2020 Responses to FERC's Environmental Information Request on the Application and Supporting Documentation (accession no. 20200420-5138)	
5	Water Resources (floodplains/ spill response plan)	Pipeline projects that cross, or lie within the floodplain of I, IA, II, and III class river or streams, and classified lake(s) listed in the standards are required to obtain all appropriate state and federal permits prior to construction. Projects that involve the constructions of pipelines crossing these waters will have; (1) a spill response plan that emphasize[s] rapid deployment of prepositioned assets necessary to contain spills and subsequent cleanup; (2) surveillance and monitoring equipment for early detection of leaks, and; (3) strategically located shutdown valves to prevent a release of harmful or hazardous materials to surface or ground waters.	As described in section 1.8 of Resource Report 1, WBI Energy will obtain all necessary permits, clearances, and licenses for Project construction and operation by the time required prior to construction. WBI Energy's SPCC Plan, included in appendix 1F of Resource Report 1, describes the measures that WBI Energy personnel and contractors will implement to prevent, and if necessary, control inadvertent spill of fuels, lubricants, solvents, and other hazardous materials. See also the response to NDDEQ comment no. 12 below.	Resource Report 1, Section 1.8 and Appendix 1F-1 Resource Report 2, Section 2.2	

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North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
6	General	Make all reasonable adjustment to avoid or minimize the potential for environmental damage during construction.	As described in section 1.3 of Resource Report 1, the Project will be designed, constructed, operated, and maintained in accordance with all applicable requirements defined by the USDOT regulations in 49 CFR 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*; by 18 CFR 380.15, *Siting and Maintenance Requirements*; and by other applicable federal and state regulations; except as otherwise specified in WBI Energy's application or approved by the appropriate regulatory agency. Except where modifications have been approved by FERC, WBI Energy will implement the measures in the FERC Plan and Procedures to minimize impacts during Project construction. Additionally, WBI Energy has prepared the following additional construction, restoration, and mitigation plans to minimize the potential for Project impacts on the environment and sensitive resources: • SPCC Plan; • Plan for Unanticipated Discovery of Contaminated Environmental Media; • Noxious Weeds Management Plan; • Blasting Plan; • Fugitive Dust Control Plan; • Plan for Unanticipated Discovery of Historic Properties or Human Remains during Construction; • Plan for Unanticipated Discovery of Paleontological Resources during Construction; and • HDD Plan. Copies of these plans are provided in appendix 1F of Resource Report 1.	Resource Report 1, Section 1.3 and Appendix 1F	
7	Water Resources	Avoid Source Water Protection Areas.	As described in section 2.2.3 of Resource Report 2 and based on the review of the source water protection status list of North Dakota's public water systems, no surface water-dependent communities, non-transient non-communities, or transient non-community systems exist within the Project area (NDDEQ, 2019a). Additionally, WBI Energy will not divert or appropriate water from the Missouri River during Project construction or operation. Therefore, the Project will not have any impacts on reservoir water capacity.	Resource Report 2, Section 2.2.3	Source: North Dakota Department of Environmental Quality. 2019a. Source Water Protection. Available online at: North Dakota State Water Commission. 2005. Water in North Dakota – A Reference Guide. North Dakota State Water Commission. Bismarck, ND.
8	Water Resources	Avoid when possible Section 303(d) Listed Waters	As described in section 2.2.2 of Resource Report 2 and based on the 2018 Section 303(d) impaired waterbody list and 305(b) Water Quality Inventory Report for North Dakota, the Project does not cross any waterbodies identified for contaminated sediments (NDDEQ, 2018).	Resource Report 2, Section 2.2.2	Source: North Dakota Department of Environmental Quality. 2018. North Dakota 2018 Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads. Available online at: https://deq.nd.gov/publications/WQ/3_WM/TMDL/1_IntegratedReports/2018_Final_ND_Integrated_Report_20190426.pdf. Accessed September 2019.

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North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
9	Water resources	Avoid Surface and Groundwater Drinking Sources.	As described in section 2.1.3 Resource Report 2, no public water supply wells are located within 150 feet of pipeline construction workspaces (NDDEQ, 2019b). Based on available data, no water supply wells exist adjacent to the proposed pipeline routes (North Dakota State Water Commission, 2019). WBI Energy recorded the location of private wells identified during civil surveys and through landowner interviews. One private livestock watering well was identified within 150 feet of the proposed Project footprint. Additionally, two springs were identified along the Tioga-Elkhorn Creek pipeline. As described in section 2.1.5 of Resource Report 2, for active wells and springs within 150 feet of construction work areas, WBI Energy will conduct preconstruction and post-construction water quality and yield testing and/or sampling to verify that construction of the Project does not permanently affect water wells or springs.	Resource Report 2, Sections 2.1.3 and 2.1.5	North Dakota Department of Environmental Quality. 2019b. Data and Maps. Available online at: https://deq.nd.gov/portal/DataMaps/default.aspx. Accessed September 2019. North Dakota State Water Commission. 2019. Map Service. Available online at: https://mapservice.swc.nd.gov/. Accessed September 2019.
10	Permits	The contractor(s) [shall] obtain a Stormwater Construction Permit from the department and follow all requirements.	As described in section 1.8 of Resource Report 1, WBI Energy will obtain with all necessary permits, clearances, and licenses for Project construction and operation, including but not limited to the General Permit for Construction Stormwater Discharge under the National Pollutant Discharge Elimination System. Project activities will be conducted in accordance with the requirements of all permits and authorizations, except as otherwise approved by the appropriate regulatory agency.	Resource Report 1, Section 1.8	
11	Spill Prevention	Proper surveillance and monitoring for early detection of leaks is required.	As described in section 11.2.7 of Resource Report 11 and in accordance with USDOT regulations, WBI Energy has developed an emergency response plan for its existing pipeline system, which will be updated to incorporate the proposed Project. The plan includes procedures to minimize hazards in a natural gas pipeline emergency to protect the public and the environment. Additionally, as described in section 11.2.3 of Resource Report 11, WBI Energy utilizes an extensive Supervisory, Control, and Data Acquisition System (SCADA), which is monitored 24 hours per day, 365 days per year from WBI Energy's Gas Control Center. Gas controllers use SCADA to monitor the pipeline system, which includes a wide range of activities such as monitoring gas pressures and flows along the pipeline, physical startup and shutdown of compressor sites, and operating system valves along the pipeline. If system parameters fall outside a predetermined range, an alarm is activated and corrective action is taken by the gas controller as needed. Local WBI Energy personnel are dispatched in response to these alarms if intervention is required outside Gas Control.	Resource Report 11, Sections 11.2.3 and 11.2.7	
12	Spill/Leak Prevention and Monitoring	Proper surveillance and monitoring: All pipelines should have adequate leak detection systems to allow for timely detection of leaks. There is little data on what the impacts to aquatic life and drinking would be from a natural gas release under the ice in a flowing reservoir like Lake Sakakawea, but the smaller the release the better. Historically, inadequate leak detection has resulted in significant losses of both oil and saltwater and subsequent environmental damage. Conversely, timely detection of leaks by pipeline operators resulted in only small incidents. The department believes a robust monitoring, leak detection and control room management system is a requirement. Such a robust system will reduce the potential for adverse environmental impacts. This is based on experience. Our experience indicates that the detection system and response plan should also require training and periodic review. Items to include: 1) Collection of data from the Supervisory Control and Data Acquisition (SCADA) system, including protocols to ensure its accuracy. 2) Calculation and presentation of the data to the pipeline controllers by the computational pipeline monitoring (CPM) system, including alarm management. 3) Written control room management procedures, including the operator's authority and responsibilities. 4) Processes for tracking and approving changes to the SCADA and CPM systems. 5) Training on CPM system and control room management procedures.	As described in section 11.2.3 of Resource Report 11 and in accordance with the requirements of 49 CFR 192.631, WBI Energy uses SCADA to monitor the pipeline system 24 hours per day, 365 days per year from a Gas Control Center located at WBI Energy's headquarters in Bismarck, North Dakota. Data acquisition occurs at many locations along the mainline, such as compressor stations and meter stations. This data is transmitted to Gas Control through SCADA. If system parameters fall outside a predetermined range, an alarm is activated at Gas Control and corrective action is taken by the gas controller as needed. Local WBI Energy personnel are dispatched in response to these alarms if intervention is required outside Gas Control. WBI Energy would implement the management and response procedures included in its Emergency Operating Procedures and Dispatching Instructions, Gas System Operations and Maintenance Manual, and Gas Control Manual Control Room Management Manual, which describe the procedures for operation and maintenance of WBI Energy's natural gas transmission system and the activities required by the applicable federal and state pipeline safety regulations for gas control operations. The aforementioned manuals and procedures are reviewed annually; all changes are approved by a department manager and communicated through WBI Energy's Management of Change procedure.	Resource Report 11, section 11.2.3	

REQUEST NO. 1 ATTACHMENT

North Bakken Expansion Project
WBI Energy Transmission, Inc.'s Responses to Scoping Comments Received

Comment Letter/ Comment No.	Category	Scoping Comment	Response	Where Addressed (if applicable):	Sources (if applicable)
13	Pipeline Routing	We also encourage pipeline projects to consider contacting the North Dakota Geological Survey to help set a route though the most stable areas.	As described in sections 6.1 and 6.4 of Resource Report 6, WBI Energy consulted North Dakota Geological Survey data to help assess the surficial and bedrock geological setting of the area, identify potential paleontological resources in the vicinity, and identify potential geologic hazards that may affect the Project. This information was considered during Project design.	Resource Report 6, Sections 6.1 and 6.4	Sources: North Dakota Geological Survey. 2015. Surface Geology. Available online at https://gishubdata.nd.gov/dataset/surface-geology. Accessed September 30, 2019. North Dakota Geological Survey. 2019a. Overview of the Petroleum Geology of the North Dakota Williston Basin. Available online at https://www.dmr.nd.gov/ndgs/Resources/. Accessed September 30, 2019. North Dakota Geological Survey. 2019b. North Dakota Landslide Maps. Available online at https://www.dmr.nd.gov/ndgs/landslides/. Accessed September 30, 2019.

Request No. 7 Attachment

General Environmental Incident Summary

General Environmental Incident Summary

Incident: 9329 **Notice:** 11/24/2019 1300 **Occurred:** 11/24/2019 0001

DEM Incident No: **No Further Action:** ☐

Responsible Party: Steel Reef Burke LLC

County: Burke

Twp Rng Sec Qtr: 162 91 7 NW

Lat Long + Method: 48.87178 -102.54350 Interpolation from map

Location Description:
Facility: Lignite Gas Plant
Address: 10050 84th Avenue
Land Location: NW 7-162-91 W5M
1.5 miles west of Lignite Town

Submitted By Info:
Martina Strnadova
Steel Reef Burke LLC
1200, 333-7th Avenue SW
Calgary AB T2P 2Z1

Received By Info:

Contact Info:
Martina Strnadova
10050 84th Ave. NW
Lignite ND 58752

Affected Medium: 03 - soil

Near. Occupied Bldg: 1.5 Miles

Type of Incident: Abandoned well

Release Contained: Yes

Reported to NRC: Unknown

Contaminant: Brackish water.

Volume of Release: 1980 barrels

Duration of Release:

Agriculture Related: No

EPA Extremely Hazardous Substance: Unknown

Number of Fatalities: 0

Number of Injuries: 0

Cause of Incident:

Abandoned well failure, cause not known yet. Investigation is in progress. The water disposal well was abandoned in 1984.

Risk Evaluation:

No immediate risks.

Potential Env. Impacts:

Soil contamination.

Action Taken/Planned:

The on-site well release is contained with a temporary earthen berm and water is being stored in on-site containment. Some of the initial water release went off site, but it is now contained and clean-up efforts will begin immediately, the landowner has been notified.

Wastes Disposal Location:

To be determined.

Other Agencies Involved:

NDDES, Local Emergency Manager

Updates

Date: 11/24/2019 ***Status:*** Reviewed - Follow-up Required

Author: Crowdus, Kory

Notes:

Release on and off facility site. Follow-up is required.

Updated Volume: None at the time of this update

Date: 11/29/2019 ***Status:*** Inspection - More Follow-up Required

Author: Schiermeister, Robin

Notes:

Arrived on site on 11-26-2019 at 10:23. It was cold with temperatures in the 20s. Release was due to an abandoned well that flowed east along the lease road into a field and possibly into a pond. Updated release volume. BARR Engineering was called and asked to delineate/sample. The well was plugged and a sample was taken of the water from the well. That sample has been submitted to the NDDEQ Chemistry Lab. The chain of custody can be found in the folder. A Quantab reading was also done on the pond to see if was contaminated. The reading showed 217.5 ppm. More further follow up is necessary to determine what the clean up methods will occur and if the contamination did in fact reach the pond.

Updated Volume: 100 barrels

Date: 12/2/2019 ***Status:*** Correspondence - More Follow-up Required

Author: Suess, Bill

Notes:

The Responsible Party (RP) updated the spill volume to 1,980 bbls of water. Analytical data, supplied by the RP, indicates chloride levels of 5,150 mg/L in the produced water.

Updated Volume: 1980 barrels

Date: 12/9/2019 ***Status:*** Inspection - More Follow-up Required

Author: Lund, Dylan

Notes:

Arrived on site at 10:20 am CT. Had plant personnel show me the source of the spill and flow path along the lease road to where some of the water eventually crosses the road into a crop field. Some water also flowed into a small pond on the east side of plant. Only a small area of the spill had been excavated at the time of inspection. Photos were taken. More follow up is required.

Updated Volume: None at the time of this update

Date: 1/8/2020 ***Status:*** Correspondence - More Follow-up Required

Author: Schiermeister, Robin

Notes:

Received sample results from the abandoned well. The results showed chloride levels around 5120 ppm which is above drinking water standards. The results can be found in the incident folder.

Updated Volume: None at the time of this update

Date: 1/31/2020 ***Status:*** Correspondence - More Follow-up Required

Author: Suess, Bill

Notes:

The RP submitted a clean-up report. Laboratory analysis still shows elevated chloride levels in the impact area. The report does not detail any actual remediation, only describing delineation and sampling. More follow-up is needed.

Updated Volume: None at the time of this update

Date: 5/12/2020 ***Status:*** Correspondence - More Follow-up Required

Author: Stockdill, Scott

Notes:

Email sent to responsible party requesting an EM survey be completed.

More follow-up is necessary.

Updated Volume: None at the time of this update

Date: 6/19/2020 ***Status:*** Correspondence - More Follow-up Required

Author: Stockdill, Scott

Notes:

Email sent to responsible party requesting a status update on the delineation of the site.

More follow-up is necessary.

Updated Volume: None at the time of this update

Date: 6/19/2020 ***Status:*** Correspondence - More Follow-up Required

Author: Stockdill, Scott

Notes:

Email from responsible party.

"… We were planning to complete the survey some time in September, because some of us from Canada would like to be on site to learn how the survey is conducted and how we determine the required next steps (this is when we anticipate free access to/from North Dakota). Would you like to be on site for the survey? …"

Full email in the incident folder.

Further follow-up is necessary to ensure proper cleanup.

Updated Volume: None at the time of this update

Request No. 13 Attachment A

Copies of Previously Unfiled Correspondence (Public)

North Bakken Expansion Project
Summary of Previously Unfiled Agency Correspondence through July 17, 2020 (Public)

Agency	Contact Name(s)	Date of Correspondence	Format	Summary
U.S. Army Corps of Engineers (USACE)				
USACE	Reece Nelson, Jonas Grundman	06/16/2020	Email	Email chain cancelling the Project monthly call for the month of June.
USACE	Richard Rogers	06/18/2020	Email	Email chain sharing a copy of a site testing plan and the SHSND's comments on the plan.
USACE	Reece Nelson, Jason Renschler	06/24/2020	Phone Log / Meeting Notes	Phone call discussing the permitting changes while changing from a NWP 12 to current individual permits.
USACE	Richard Rogers	07/02/2020	Phone Log	Phone call regarding state permitting requirements for an upcoming gradiometer survey at 32WI976.
USACE	Richard Rogers	07/02/2020	Phone Log	Phone call regarding state permitting requirements for an upcoming gradiometer survey at 32WI976.
USACE	Richard Rogers	07/06/2020	Email	Email chain regarding state permitting requirements for an upcoming gradiometer survey at 32WI976.
USACE	Richard Rogers	07/07/2020	Phone Log	Phone call regarding weather for an upcoming gradiometer survey at 32WI976.
USACE	Richard Rogers	07/07/2020	Phone Log	Phone call regarding weather for an upcoming gradiometer survey at 32WI976.
USACE	Jason Renschler	07/07/2020	Email	Email chain discussing recent court rulings regarding the NWP 12 and its status moving forward.
USACE	Jason Renschler	07/08/2020	Phone Log / Meeting Notes	Conference call discussing updates to NWP 12 and alternative 404 permitting.
USACE	Richard Rogers	07/13/2020	Email	Email chain regarding the results of a gradiometer survey at 32WI976.
USACE	Richard Rogers, Megan Moscarello, Sandra Barnum	07/13/2020	Email	Email chain regarding the results of a gradiometer survey at 32WI976.
USACE	Richard Rogers, Megan Moscarello, Sandra Barnum	07/14/2020	Email	Email chain regarding the results of a gradiometer survey at 32WI976.
USACE	Richard Rogers, Megan Moscarello, Sandra Barnum	07/14/2020	Email	Email chain regarding the results of a gradiometer survey at 32WI976.
USACE	Richard Rogers, Megan Moscarello, Sandra Barnum	07/14/2020	Email	Email chain regarding the results of a gradiometer survey at 32WI976.
USACE	Luke Wallace, Brad Hoefer, Jeremy Thury, John Hargrave, Rick Rogers	07/16/2020	Phone Log / Meeting Notes	Conference call discussing the filing of the Section 408 application materials and NWP 12 changes.

North Bakken Expansion Project Summary of Previously Unfiled Agency Correspondence through July 17, 2020 (Public)				
Agency	Contact Name(s)	Date of Correspondence	Format	Summary
U.S. Forest Service (USFS)				
USFS	Sandra IronRoad, Liv Fetterman	06/10/2020	Email	Email regarding the status of an application for a 2020 archaeological survey permit.
USFS	Sandra IronRoad, Liv Fetterman	06/10/2020	Email	Email regarding the status of an application for a 2020 archaeological survey permit.
USFS	Cale Bickerdyke, Sarah Bickerdyke	06/16/2020	Email	Email chain discussing Dakota Skipper surveys and meeting coordination.
USFS	Liv Fetterman	06/18/2020	Email	Email chain regarding the use of temporary flagging to mark site boundaries for pipeline routing.
USFS	Cale Bickerdyke	06/18/2020	Email	Email chain coordinating an in-person meeting to discuss possible reroutes.
USFS	Liv Fetterman	06/23/2020	Email	Email regarding the use of temporary flagging to mark site boundaries for pipeline routing.
USFS	Liv Fetterman	06/23/2020	Email	Email approving the use of temporary flagging to mark site boundaries for pipeline routing.
USFS	Liv Fetterman	06/23/2020	Email	Email regarding the use of temporary flagging to mark site boundaries for pipeline routing.
USFS	Cale Bickerdyke	06/29/2020	Email	Email chain discussing the location of the Gladstone and Gunslinger well pads.
USFS	Liv Fetterman	07/09/2020	Phone Log	Phone call regarding the 2020 archaeological survey permit.
USFS	Liv Fetterman	07/10/2020	Email	Email sharing a map of the survey area on USFS lands.
USFS	Liv Fetterman	07/10/2020	Phone Log	Phone call regarding the 2020 archaeological survey permit.
USFS	Sandra IronRoad, Liv Fetterman	07/10/2020	Email	Email sharing the 2020 archaeological survey permit number.
USFS	Sandra IronRoad, Liv Fetterman	07/11/2020	Email	Email acknowledging receipt of the 2020 archaeological survey permit number.
North Dakota Department of Environmental Quality (NDDEQ) and North Dakota Department of Health (NDDOH)				
NDDEQ	Peter Wax	06/23/2020	Phone Log / Meeting Notes	Conference call discussing permitting changes due to Nationwide Permit 12 being unavailable.
NDDEQ	Craig Thorstenson	07/02/2020	Letter	Letter submitting updated permit for the construction of the Tioga Compressor Station.
NDDEQ	Rheanna Kautzman	07/14/2020	Email	Email chain distributing and discussing the Tioga Modeling files.
State Historical Society of North Dakota (SHSND)				
SHSND	Fern Swenson	06/26/2020	Phone Log	Phone call regarding the discovery of human remains at 32WI3313.

North Bakken Expansion Project Summary of Previously Unfiled Agency Correspondence through July 17, 2020 (Public)				
Agency	Contact Name(s)	Date of Correspondence	Format	Summary
SHSND	Andrew Clark	06/26/2020	Phone Log	Phone call regarding the discovery of human remains at 32MZ3313.
SHSND	Andrew Clark	07/02/2020	Phone Log	Phone call regarding state permit requirements for a gradiometer survey at 32WI976.
SHSND	Andrew Clark	07/06/2020	Email	Email chain regarding site testing completed at 32WI2352 in 2019 for another pipeline project (unassociated with the North Bakken Expansion Project).
SHSND	Andrew Clark	07/06/2020	Email	Email chain regarding permit requirements for a gradiometer survey at 32WI976.
SHSND	Andrew Clark	07/06/2020	Email	Email chain regarding permit requirements for a gradiometer survey at 32WI976.

NORTH BAKKEN EXPANSION PROJECT

Agency Correspondence – U.S. Army Corps of Engineers (USACE)

From: Nelson, Reece E CIV USARMY CENWO (USA) <Reece.E.Nelson@usace.army.mil>
Sent: Tuesday, June 16, 2020 5:18 AM
To: Andrea Thornton
Cc: Wade Hammer; Grundman, Jonas L CIV USARMY CENWO (US)
Subject: RE: North Bakken Expansion Monthly Call 6/18 (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Thanks for letting me know Andrea, no problem with canceling. I'll let the team know, and if anyone has any specific questions or comments to bring up, will forward them on.

Yeah, appreciate it if you forward me that call info, I will plan on being on. If this does go an IP, Jason and I just need to work closer, as an IP and 408 permission trigger 408/Regulatory one decision document. Invite Mr. Grundman along to, please (CC'd).

-Reece

From: Andrea Thornton [mailto:Andrea.Thornton@erm.com]
Sent: Monday, June 15, 2020 1:41 PM
To: Nelson, Reece E CIV USARMY CENWO (USA) <Reece.E.Nelson@usace.army.mil>
Cc: Wade Hammer <Wade.Hammer@erm.com>
Subject: [Non-DoD Source] North Bakken Expansion Monthly Call 6/18

Hi Reece –

I've chatted with the WBI Energy folks and they think we can cancel our scheduled call for this Thursday. We do not have many updates to provide as we are waiting for the report from the geotech work to start updating the 408 documents.

We have had some discussions with Jason Renschler about the Section 10/404 permitting for the project and the likely need to change to an Individual Permit. Would you be available next Wednesday (June 24th) at 11 central time to join our next call with Jason?

Thanks,
Andrea

Andrea Thornton
Principal Consultant

Environmental Resources Management (ERM)
1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** Blockedwww.erm.com

Pat Robblee

From: Pat Robblee
Sent: Thursday, June 18, 2020 11:37 AM
To: Rogers, Richard R II CIV USARMY CENWO (USA)
Cc: Kevin Malloy
Subject: North Bakken Expansion Project - site testing at 32WI976
Attachments: NBE Site Testing Plan (reduced file size).pdf; 060320 SHSND - email - testing plan comments.pdf

Hi Rick.

Hope all is well.

For WBI Energy's North Bakken Project, we are planning to conduct the additional testing recommended by the COE and SHSND at Site 32WI976 in July. The attached document is a site testing plan we submitted to the SHSND for review. Site 32WI976 is discussed on pages 4-40 to 4-44 (there is a bookmark to the report section – 4.2.9). The SHSND concurred with the testing plan for this site (see attached email from Andy Clark). We would appreciate any comments you have on the testing plan.

As you previously suggested, we are planning to conduct a gradiometer survey prior to the additional testing at 32WI976 in an effort to identify soil anomalies which could be associated with features and to assist in the placement of test units. The survey will be completed by Enviroprobe Services, Inc. using a Geometrics G-858 Gradiometer with no greater than half meter line spacing. Data will be collected in one orthogonal direction with the gradiometer.

We anticipate that representatives of several tribes will be present to observe or participate in the site testing.

Kevin or I will reach out to you when we have a date scheduled for the testing.

Thank you.

Pat

Patrick Robblee
Program Director

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NORTH BAKKEN EXPANSION PROJECT
CONFERENCE CALL NOTES

MEETING TOPIC:
Discuss Change from NWP 12 to Individual Permit and Coordination Between 404 (Regulatory) and 408 (Civil Works) Teams at the USACE

DATE OF MEETING:
June 24, 2020 at 11:00 a.m. CST (9:00 a.m. PST) – Project Conference Call

ATTENDEES:

WBI Energy Transmission, Inc. (WBI)
Dave Linn
Jill Linn

Environmental Resources Management (ERM)
Andrea Thornton
Wade Hammer

U.S. Army Corps of Engineers (USACE)
Reece Nelson
Jason Renschler

MEETING NOTES:

- Andrea Thornton opened the call by asking if there were updates pertaining to the Regional General Permit, which the U.S. Army Corps of Engineers (USACE) Omaha District has been working to replace Nationwide Permit 12 (NWP 12) since it was vacated for "new oil and gas pipelines" due to the Montana District Court ruling, and also for updated NWPs. Jason Renschler stated that there were no updates since the last discussion (i.e., RGP is being worked on, and new NWPs are also being worked on).
- In lieu of no NWP 12, no certainty on timing of the RGP or new NWPs, Andrea stated that the logical approach at this point is to begin developing an IP for submittal. She requested a summary of the process and coordination necessary between Reece Nelson (408 Permit lead) and Jason (404/10 Permit lead) at the USACE.
    - Reece noted that the two permit paths would convene in the end as one decision document for the 408/404/10 permit that would be signed by the commander.
    - Reece and Jason discussed the process of incorporating or utilizing the Federal Energy Regulatory Commission (FERC) National Environmental Policy Act (NEPA) documents, and how to potentially sync their public comment period with the public notice that FERC had completed. Ultimately they determined that Reece may not require an additional comment period for a categorical exclusion for the 408 permit, whereas Jason would need to post the project for public notice for the 404/10 permits.
    - Jason indicated that in a public notice that he develops, the notice would include an explanation that the lead federal agency for the project is FERC, and the NEPA document is being developed by FERC.

    - Both Reece and Jason agreed that they would circle back to Luke Wallace (Omaha District NEPA Coordinator) and their respective supervisors (i.e., the acting regulatory chief) offline over the next week or so to confirm their approach.

- Andrea explained that the WBI team intended to resubmit an IP application sometime around the end of July, which would include some minor route adjustments and updated field survey data. Crews are now in the field and data would be incorporated into the updated IP application once field surveys are complete.
- Dave Linn asked Reece and Jason if they would have the ability to update the project schedule that had been discussed during the project kickoff meeting in Omaha earlier in the year, to see if they could revisit the schedule and incorporate the new approach to apply for an IP and outline schedule.
    - Reece asked for clarification of the FERC schedule. Andrea offered that the only date that has been discussed was completion of the Environmental Assessment by September 2020. Others stated that the original schedule had a targeted certificate issuance in December 2020, but that FERC had not officially confirmed this date.
    - Reece acknowledged that he had intended to update the schedule approximately a month ago and he would attempt to update the schedule he had started to develop to help WBI understand the timeline.
- Andrea asked Jason to clarify that WBI could withdraw an IP application and reapply under another permit type (e.g., NWP 12, or RGP) if one of the other permit processes was approved for use in a timeline that worked for the project. Jason confirmed that WBI could withdraw an IP and reapply under another permit if that becomes a viable option.

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Call Log

Log of Telephone Conversation

Call To/From Whom	Rick Rogers
Phone number	701-301-0018
Company	USACE
ERM Contact	Kevin Malloy
Phone number	906-285-0361
Date	July 2, 2020
Time of Conversation	1:18 p.m.
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Rick Rogers from the USACE called me to discuss the upcoming gradiometry survey and the need for Enviroprobe to have their own ND work permit for cultural investigations.

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Call Log

Log of Telephone Conversation

Call To/From Whom	Rick Rogers
Phone number	701-301-0018
Company	USACE
ERM Contact	Pat Robblee
Phone number	612-840-8976
Date	July 2, 2020
Time of Conversation	12:30 p.m.
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Mr. Rodgers called to discuss the upcoming gradiometer survey planned to occur at 32WI976. He asked who would be completing the survey. I told him that ERM had retained Enviroprobe Services, Inc. (Enviroprobe) to complete the survey. Mr. Rogers said he is not familiar with Enviroprobe and asked if they have a North Dakota archaeology survey permit, which he said would be required by the SHSND. I told Mr. Rogers that Enviroprobe does not have that permit; that the person conducting the survey will be a professional geophysical scientist, not an archaeologist; and that the survey will be completed under ERM's direction. Mr. Rogers said I should reach out to the SHSND to verify the permit requirement for the survey, adding that the SHSND can usually process survey permit applications in a few days. I told Mr. Rogers that Kevin Malloy or I would reach back out to him after we discuss the permit requirement with the SHSND.

I confirmed with Mr. Rogers that Enviroprobe can work under the ARPA permit that the USACE previously issued to ERM for work on USACE lands.

Mr. Rogers said he still needs to see a work plan for the proposed testing which will occur at 32WI976 after the gradiometer survey. I told Mr. Rogers that I had emailed him a copy of ERM's site testing plan and the SHSND's comments on the plan on June 18, 2020. Mr. Rogers located the email before we concluded the call.

Pat Robblee

From: Pat Robblee
Sent: Monday, July 6, 2020 11:55 AM
To: Rogers, Richard R II CIV USARMY CENWO (USA)
Cc: Kevin Malloy
Subject: Gradiometer survey at 32WI976

Rick,

Andy Clark approved Enviroprobe working under ERM's permit. See below. We're planning to do the gradiometer survey on Wednesday (and Thursday, if needed). The additional testing will likely occur sometime next week. Kevin or I will let you know when we anticipate the crew will be out for that.

Pat

Patrick Robblee
Program Director

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From: Clark, Andrew <andrewclark@nd.gov>
Sent: Monday, July 6, 2020 10:03 AM
To: Pat Robblee <Pat.Robblee@erm.com>
Cc: Kevin Malloy <Kevin.Malloy@erm.com>
Subject: RE: gradiometer survey

Hi Pat and Kevin,

Enviroprobe will be able to work under ERM's permit, provided that permitted ERM staff are onsite.

Best,

Andy

ERM

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Call Log

Log of Telephone Conversation

Call To/From Whom	Rick Rogers
Phone number	701-301-0018
Company	USACE
ERM Contact	Kevin Malloy
Phone number	906-285-0361
Date	July 7, 2020
Time of Conversation	12:35 p.m.; 1:49 pm; 2:10 pm
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Rick Rogers from the USACE called me to discuss the upcoming gradiometry survey slated for tomorrow and inquire as to whether or not inclement weather would adversely affect the survey. I told him I would contact Matt McMillan from Enviroprobe and get back to him.

Update: 1:49

Called Rick to update him about the gradiometry survey and the inclement weather. He did not answer and I left a message.

Update: 2:10

Rick returned my call and I let him know that saturated soils would not affect the results of the survey according to Matt McMillan. Rick was pleased and said he would let the other parties who would be out there know.

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Call Log

Log of Telephone Conversation

Call To/From Whom	Rick Rogers
Phone number	701-301-0018
Company	USACE
ERM Contact	Pat Robblee
Phone number	612-840-8976
Date	July 7, 2020
Time of Conversation	1:30 p.m.
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Mr. Rodgers called to discuss the upcoming gradiometer survey planned to occur at 32WI976 on July 8 and 9, 2020. Mr. Rogers said the state of North Dakota is expecting severe weather with substantial rainfall overnight on July 7 and is concerned that water saturated soils could interfere with the gradiometer readings, suggesting the survey may need to be delayed a day or two. I told Mr. Rogers that Kevin Malloy or I will coordinate with Enviroprobe Services, Inc., the subcontractor who will complete the work at the site, regarding the potential of the rain to affect results, and delay the survey as needed. I said that Kevin or I will be in touch with him later in the day to confirm schedule.

From: Wade Hammer
Sent: Tuesday, July 7, 2020 12:26 PM
To: Renschler, Jason J CIV USARMY CENWO (USA)
Cc: Andrea Thornton
Subject: RE: July 6th Ruling

Thanks for the response Jason. Perhaps we can discuss a little bit tomorrow. I don't think we have much new, but may be worth talking through what you might be hearing.

Wade Hammer
Principal Consultant/Biologist
Pronouns: he/him/his

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From: Renschler, Jason J CIV USARMY CENWO (USA) <Jason.J.Renschler@usace.army.mil>
Sent: Tuesday, July 07, 2020 2:14 PM
To: Wade Hammer <Wade.Hammer@erm.com>
Cc: Andrea Thornton <Andrea.Thornton@erm.com>
Subject: RE: July 6th Ruling

Afternoon Wade, Andrea – received same notification late last night from our District OC. They stated NWP 12 is available for use on all project other than KXL. Only additional thing I have is the Division OC indicated there may be additional guidance forthcoming from HQ that maybe applicable in using NWP 12 other than KXL going forward. I'll keep you posted if I hear anything additional. Jason.

From: Wade Hammer [mailto:Wade.Hammer@erm.com]
Sent: Tuesday, July 7, 2020 12:13 PM
To: Renschler, Jason J CIV USARMY CENWO (USA) <Jason.J.Renschler@usace.army.mil>
Cc: Andrea Thornton <Andrea.Thornton@erm.com>
Subject: [Non-DoD Source] July 6th Ruling

Jason,

We're aware of some activity around the MT Court Case regarding NWP 12 and wanted to see if there has been any guidance passed down, or if there are any further updates based on the attached court document? We are not entirely clear on what is directed in the last half of the document, but it appears that the ruling has been stayed except for as it applies to KXL, at least for now.

Any update you might have would be great. I also think we have a call tomorrow, so perhaps this might be a prompt to see if there's anything you can dig up between now an then.

Thanks,
Wade

Wade Hammer
Principal Consultant/Biologist
Pronouns: he/him/his

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Please note our new address as of June 19, 2020.

NORTH BAKKEN EXPANSION PROJECT
CONFERENCE CALL NOTES

MEETING TOPIC:
Nationwide Permit 12 Update – Regional General Permit and Alternative 404 Permitting Discussion

DATE OF MEETING:
July 8, 2020 at 11:00 a.m. CST (9:00 a.m. PST) – Project Conference Call

ATTENDEES:

WBI Energy Transmission, Inc. (WBI)
Jill Linn
Greg Huncovsky

Environmental Resources Management (ERM)
Andrea Thornton
Wade Hammer

U.S. Army Corps of Engineers (USACE)
Jason Renschler

MEETING NOTES:

- Andrea Thornton opened the call with a question to Jason Renschler about the recent Supreme Court decision that reinstated Nationwide Permit 12 (NWP 12) for new oil and gas pipelines, except for the KXL Pipeline, on which the original Montana District Court ruling had originally ruled in April 2020. Andrea, asked if Jason had any further clarification or guidance on how this Supreme Court ruling would be applied by the U.S. Army Corps of Engineers (USACE). Jason said he had been informed of the Supreme Court's action, but that there had been no official guidance provided yet. He further noted that he had seen communication from the USACE counsel in a couple of levels that stated that NWP 12 is now available for all pipeline projects, except KXL.
- Jason also indicated that he and Peter Wax with the North Dakota Department of Environmental Quality (NDDEQ) had spoken about coordinating an individual Section 404 Permit through the USACE and an individual permit from the NDDEQ. The group discussed that this coordination was a helpful step and appreciated, and if NWP 12 is not available, this coordination would be appreciated. However, Andrea confirmed with Jill Linn and Greg Huncovsky that as long as NWP 12 had been reinstated for new oil and gas pipelines, that the Project would now continue under the NWP 12 permitting framework.
- Andrea raised a question for Jason's input regarding how to proceed with permitting where landowner permissions for wetland and waterbody surveys is not available. At least one landowner has been unwilling to let crews survey on their property. Andrea noted that a previous project went through the property in 2017, and that WBI has records of the wetlands and waterbodies that were permitted for the previous project. Andrea asked if Jason would be willing to accept the previous wetland and waterbody boundaries used to permit the project in 2017. Jason stated that since it is only 3 years, and the USACE

typically sets a timeline of 5 years for jurisdictional determinations, that use of the previous project data should be fine.

- The call ended at approximately 11:25 a.m. Central.

Pat Robblee

From: Kevin Malloy
Sent: Monday, July 13, 2020 10:53 AM
To: Richard.R.Rogers@usace.army.mil
Cc: Pat Robblee
Subject: Gradiometry Meeting

Hi Rick,

I hope you had an excellent weekend.
I expect to receive the results of the gradiometry survey of 32WI976 by Wednesday or Thursday of this week. Pat and I were hoping we could have a call to discuss those results with you on Friday some time if that works. We're hoping to go out to the site to test on Saturday.

Best,
Kevin

From: Rogers, Richard R II CIV USARMY CENWO (USA) <Richard.R.Rogers@usace.army.mil>
Sent: Monday, July 13, 2020 1:23 PM
To: Kevin Malloy <Kevin.Malloy@erm.com>; Pat Robblee <Pat.Robblee@erm.com>
Cc: Moscarello, Megan J CIV USARMY CENWO (USA) <Megan.J.Moscarello@usace.army.mil>; Barnum, Sandra V CIV USARMY CENWO (US) <Sandra.V.Barnum@usace.army.mil>
Subject: Re: Gradiometry Meeting (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Hello Kevin!

Looking forward to seeing the output of the gradiometer work; however, before you get going on any additional test units I'll need digital copies of the remote sensing output (with ERM's interpretation) and an updated copy of the work plan that takes the results of the aforementioned remote sensing into account.

I want to ensure that the work being proposed at this location meets the expectations of consulting parties, as well as the needs of the USACE, for the review and assessment of historic property 32WI0976. I plan to send copies of the remote sensing results and updated work plan to the SHSND, MHA THPO, Rosebud THPO, Ft. Peck THPO, and Northern Cheyenne THPO as they have requested to be involved in the evaluation of this historic property.

Respectfully, the Saturday (7/18/2020) date would not appear to allow sufficient time to review the results of the remote sensing effort and the associated work plan proposed for the additional site evaluation at this location, so please take this into account in the planning of your anticipated work schedule.

I am more than happy to speak with you on the matter this week - I have availability this afternoon (all times central) from 14:00- 15:30, Wednesday 7/15 (11-15:00), Thursday 7/16 (13:00-16:00), and Friday 7/17 (09:30-13:00).

Best,

Rick

Richard R. Rogers
USACE NWO, Garrison Project
Archeologist
201 1st Street, Rm 210
Riverdale, ND 58565
Richard.R.Rogers@usace.army.mil
Office: (701) 654-7744
Cell: (701) 301-0018

From: Kevin Malloy <Kevin.Malloy@erm.com>
Sent: Tuesday, July 14, 2020 9:09 AM
To: Rogers, Richard R II CIV USARMY CENWO (USA) <Richard.R.Rogers@usace.army.mil>; Pat Robblee <Pat.Robblee@erm.com>
Cc: Moscarello, Megan J CIV USARMY CENWO (USA) <Megan.J.Moscarello@usace.army.mil>; Barnum, Sandra V CIV USARMY CENWO (US) <Sandra.V.Barnum@usace.army.mil>
Subject: RE: Gradiometry Meeting (UNCLASSIFIED)

Hi Rick,

Thanks for your response. Once we have the results of the gradiometry survey we will compose a new draft work plan for the site and submit it to you sometime next week. Maybe we could meet after that to review the plan and then make any adjustments based on your feedback before the plan is sent to the SHSND and other consulting parties.

Please let me know if you have any questions or concerns about this approach.

Best,
Kevin

From: Rogers, Richard R II CIV USARMY CENWO (USA) <Richard.R.Rogers@usace.army.mil>
Sent: Tuesday, July 14, 2020 10:43 AM
To: Kevin Malloy <Kevin.Malloy@erm.com>; Pat Robblee <Pat.Robblee@erm.com>
Cc: Barnum, Sandra V CIV USARMY CENWO (US) <Sandra.V.Barnum@usace.army.mil>; Moscarello, Megan J CIV USARMY CENWO (USA) <Megan.J.Moscarello@usace.army.mil>
Subject: RE: Gradiometry Meeting (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Sounds good Kevin! I will probably be off the grid a few days next week taking care of some compliance work, but I will keep a lookout for the new draft!

If something else comes up, or if you need to get ahold of me about the draft feel free to call or email.

Best,

Rick

From: Kevin Malloy <Kevin.Malloy@erm.com>
Sent: Tuesday, July 14, 2020 10:45 AM
To: Rogers, Richard R II CIV USARMY CENWO (USA) <Richard.R.Rogers@usace.army.mil>; Pat Robblee <Pat.Robblee@erm.com>
Cc: Barnum, Sandra V CIV USARMY CENWO (US) <Sandra.V.Barnum@usace.army.mil>; Moscarello, Megan J CIV USARMY CENWO (USA) <Megan.J.Moscarello@usace.army.mil>
Subject: RE: Gradiometry Meeting (UNCLASSIFIED)

Excellent! Sounds good Rick. We will start working on it as soon as we have the gradiometry results.

Best,
Kevin

NORTH BAKKEN EXPANSION PROJECT
CONFERENCE CALL NOTES

MEETING TOPIC:
Status update on Filing of Final Section 408 Application Materials, and General Coordination

DATE OF MEETING:
July 16, 2020 at 10:30 a.m. CST (8:30 a.m. PST) – Project Conference Call

ATTENDEES:

WBI Energy Transmission, Inc. (WBI)
Dave Linn
Greg Huncovsky
General Robert Crear (The CREAR Group, LLC)

Environmental Resources Management (ERM)
Andrea Thornton
Wade Hammer

U.S. Army Corps of Engineers (USACE)
Luke Wallace
Brad Hoefer
Jeremy Thury
John Hargrave
Rick Rogers

MEETING NOTES:

- Andrea Thornton opened the call noting there were just a few items to cover. First, Andrea noted that WBI had left a copy of the WBI Energy Transmission, Inc. (WBI) Operations and Maintenance Plan and Control Room Plan with the U.S. Army Corps of Engineers (USACE) after our January 2020 in person meeting. These materials will be filed as Privileged and Confidential with the remaining Section 408 permit application materials. Andrea was interested to know if these plans had been circulated among the USACE staff that were on the call, to determine if USACE staff felt there were evident gaps in these plans. Andrea offered to resend the plans via email if the USACE staff. Jeremy Thury noted that he did not recall seeing the plans, but receiving copies via email would be very helpful. Jeremy also noted he would check with Reece to see if he had copies of these on file for the USACE team to review.
- Dave Linn noted that the Operations and Maintenance and Control Room Plans were standard plans that were reviewed by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and that WBI preferred to keep these plans as the controlling document, and not have separate plans just for the North Bakken Expansion Project (Project) or the Lake Sakakawea crossing. He noted that staff at WBI are trained with the PHMSA approved plan and their preference would be to add to this overall plan if the USACE staff felt necessary to add details. Dave further noted that the plans would be updated with the appropriate point of contact for the USACE for emergency response purposes once the Project is in service.

- Andrea raised a second topic, related to contingency planning for gaining access to USACE owned lands if there was an unexpected inadvertent return of drilling fluid on USACE lands during the horizontal directional drill (HDD) of Lake Sakakawea. Andrea noted that there is no planned workspace on USACE owned land, and the HDD workspace is all on private land. However, should there be an inadvertent return of drilling fluid, Andrea asked how best to coordinate with the USACE or how to document in advance a potential access across USACE land if this scenario occurred during construction. Jeremy Thury said that it would be best if WBI provided potential access routes across or to USACE owned lands. He noted that the topography in the vicinity of the lake is steep and dynamic, which would likely make access points relatively clear. Andrea agreed to follow-up with some information that the USACE could review relevant to this topic.
- The third item discussed was the schedule for submittal of the remaining 408 permit application materials. Andrea noted that the contractor working to incorporate the geotechnical information into the HDD plan for the Lake Sakakawea crossing was nearing complete review. Dave followed that there were some remaining items that WBI planned to meet with the drilling contractor and engineers about in the following week, so the intention of finishing the HDD Plan this week would likely be pushed a bit. Andrea acknowledged that this may push the schedule past the intended submittal timing of late July, into early August instead.
- Dave asked about Nationwide Permit 12 (NWP 12) and if anyone on the call with the USACE knows any further details. WBI has decided to continue to pursue NWP 12 given the recent Supreme Court action to reinstate NWP 12 for all new oil and gas pipeline projects except the original project on which the district court ruled. Dave noted that this is a topic of significant interest through the management levels at WBI. Jeremy noted that Jason Renschler would be the best person to comment on this and he was not on the call. Andrea noted that the Project team has a bi-weekly call with Jason, so she would send Dave the invitation to the call with Jason next week.
- Andrea closed the call by recounting the action items which included:
    - Andrea resubmitting the Operations and Maintenance and Control Room Plan to the USACE via email,
    - Project team would submit proposed access points for crossing USACE owned lands in event of an inadvertent return of drilling fluid.
    - Andrea will invite Dave to the bi-weekly call with Jason Renschler.

NORTH BAKKEN EXPANSION PROJECT

Agency Correspondence – U.S. Forest Service (USFS)

From: Kevin Malloy [mailto:Kevin.Malloy@erm.com]
Sent: Wednesday, June 10, 2020 10:29 AM
To: IronRoad, Sandra -FS <sandra.ironroad@usda.gov>
Cc: Fetterman, Liv K -FS <liv.fetterman@usda.gov>
Subject: RE: ERM 2020 Permit Application

Hi Sandra,
I hope this email finds you well. I was wondering about the status of our Permit application for this summer's fieldwork. We are planning on being on the USFS land the week after next. Are there more forms to fill out?

Kind regards,
Kevin

From: Fetterman, Liv K -FS <liv.fetterman@usda.gov>
Sent: Wednesday, June 10, 2020 11:51 AM
To: Kevin Malloy; IronRoad, Sandra -FS
Subject: RE: ERM 2020 Permit Application

Hi Kevin,
Sandra and I will touch base and let you know exactly where your application is in the permitting process.
Best,
Liv

Liv K. Fetterman
Grasslands Archaeologist,
Heritage Program Manager,
Tribal Relations Program Manager
Forest Service
Dakota Prairie Grasslands
p: 701-989-7306
f: 701-989-7299
liv.fetterman@usda.gov
2000 Miriam Circle
Bismarck, ND 58501
www.fs.fed.us
Caring for the land and serving people

From: Andrea Thornton
Sent: Tuesday, June 16, 2020 11:53 AM
To: Bickerdyke, Sarah - FS; Luke Martinson
Cc: Bickerdyke, Cale E -FS; Justin Moffett; Klarissa Lawrence; abrazeal@west-inc.com
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys

Hi Sarah –

I just confirmed with the crew that 11 works for them. Yes the crew will make sure to keep social distancing in mind.

Thanks again,
Andrea

Andrea Thornton
Principal Consultant

Environmental Resources Management (ERM)
1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** www.erm.com

From: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Sent: Tuesday, June 16, 2020 11:47 AM
To: Andrea Thornton <Andrea.Thornton@erm.com>; Luke Martinson <lmartinson@west-inc.com>
Cc: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>; Klarissa Lawrence <klawrence@west-inc.com>; abrazeal@west-inc.com
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys

Does 11 work for folks out there? I'll either be in a black Subaru or a FS vehicle. Let's keep social distancing measures in mind, please.

Sarah Bickerdyke
Wildlife Biologist
Forest Service
Dakota Prairie Grasslands, McKenzie Ranger District
p: 701-842-8524
f: 701-842-8544
sarah.bickerdyke@usda.gov
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Watford City, ND 58854
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Caring for the land and serving people

From: Andrea Thornton [mailto:Andrea.Thornton@erm.com]
Sent: Tuesday, June 16, 2020 1:32 PM
To: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>; Luke Martinson <lmartinson@west-inc.com>
Cc: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>; Klarissa Lawrence <klawrence@west-inc.com>; abrazeal@west-inc.com
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys
Importance: High

Hi Sarah –

We have not seen any updates on the time for the meeting tomorrow. Could you let us know when you will be on site?

Thanks,
Andrea

Andrea Thornton
Principal Consultant

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1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** www.erm.com

From: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Sent: Thursday, June 11, 2020 1:25 PM
To: Andrea Thornton <Andrea.Thornton@erm.com>; Luke Martinson <lmartinson@west-inc.com>
Cc: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>; Klarissa Lawrence <klawrence@west-inc.com>; abrazeal@west-inc.com
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys

Hi Andrea et al,

I am involved in another project potentially starting next week, dependent on DASK flight. I have a meeting tomorrow to nail down some of the logistics and should have a better idea of what Wednesday looks like then. I'll be up in that area, so could potentially meet at the turn to that access road (the western road of the two) that heads north in section 12 and zip up there. I'll send an email with a good timeframe tomorrow afternoon.

Thanks,

Sarah Bickerdyke
Wildlife Biologist
Forest Service
Dakota Prairie Grasslands, McKenzie Ranger District
p: 701-842-8524
f: 701-842-8544
sarah.bickerdyke@usda.gov

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Caring for the land and serving people

From: Andrea Thornton [mailto:Andrea.Thornton@erm.com]
Sent: Wednesday, June 10, 2020 1:15 PM
To: Luke Martinson <lmartinson@west-inc.com>; Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Cc: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>; Klarissa Lawrence <klawrence@west-inc.com>; abrazeal@west-inc.com
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys

Hi Sarah –

We would like to get a meeting time and location set for Wednesday. Below are the cell phone numbers of the two biologists who will be in the field completing the DASK habitat surveys next week.

Is there a time/location that works best for you?

- Klarissa Lawrence - 720.201.1469
- Alex Brazeal - 701.498.0707

Thanks,
Andrea

Andrea Thornton
Principal Consultant

Environmental Resources Management (ERM)
1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** www.erm.com

From: Luke Martinson <lmartinson@west-inc.com>
Sent: Friday, June 5, 2020 11:15 AM
To: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Cc: Andrea Thornton <Andrea.Thornton@erm.com>; Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>
Subject: Re: North Bakken Expansion - Dakota Skipper Surveys

We can make that work. Let me know the best way to get it scheduled. I can provide the observers contact info if direct communication with them makes the most sense. Or, we can identify a meet spot near target tracts.

Luke Martinson
Senior Manager - Biologist

Western EcoSystems Technology, Inc.
Environmental & Statistical Consultants
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Cheyenne, WY 82001
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307-214-7720 cell
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On Fri, Jun 5, 2020 at 11:42 AM Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov> wrote:

> Wednesday, please, if at all possible.

Sarah Bickerdyke
Wildlife Biologist
Forest Service

Dakota Prairie Grasslands, McKenzie Ranger District
p: 701-842-8524
f: 701-842-8544
sarah.bickerdyke@usda.gov
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Caring for the land and serving people

From: Luke Martinson [mailto:lmartinson@west-inc.com]
Sent: Friday, June 5, 2020 9:29 AM
To: Andrea Thornton <Andrea.Thornton@erm.com>
Cc: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>; Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Justin Moffett <Justin.Moffett@erm.com>
Subject: Re: North Bakken Expansion - Dakota Skipper Surveys

Hi,

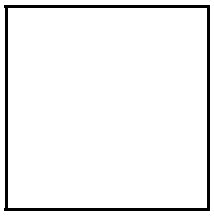
Thanks for looping me in. Tues or Wed would be preferred as they will be south of the lake.

Regards,

Luke

Luke Martinson

Senior Manager - Biologist



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www.west-inc.com

Follow WEST: Facebook, Twitter, Linked In, Join our Mailing list

On Fri, Jun 5, 2020 at 8:13 AM Andrea Thornton <Andrea.Thornton@erm.com> wrote:

Hi Sarah –

Yes that sounds like a good plan. I will let Luke Martinson weigh in here as to if there is a day (Tuesday – Friday) that week that would work better for the crew.

Thanks,

Andrea

Andrea Thornton

Principal Consultant

Environmental Resources Management (ERM)

1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204

M 503-459-6864

E andrea.thornton@erm.com | **W** www.erm.com

From: Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Sent: Thursday, June 4, 2020 6:19 AM
To: Andrea Thornton <Andrea.Thornton@erm.com>; Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Cc: Justin Moffett <Justin.Moffett@erm.com>; Luke Martinson <lmartinson@west-inc.com>
Subject: RE: North Bakken Expansion - Dakota Skipper Surveys

Hi Andrea,

Sounds like the week of the 15 your folks will be up to complete habitat surveys? I'm supposed to have some other field work for the entirety of that week, but it's in the same general area so I should be able to pop out and meet up with your folks. At this point, I could plan on any day but Monday if that works for you. Our botanist position on the district is currently vacant but the Medora district botanist has been so kind to offer his support until we have a permanent botanist in place again. I will reach out to him for his availability. Let me know if this works.

Best,

Sarah Bickerdyke
Wildlife Biologist
Forest Service

Dakota Prairie Grasslands, McKenzie Ranger District
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f: 701-842-8544
sarah.bickerdyke@usda.gov
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Caring for the land and serving people

From: Andrea Thornton [mailto:Andrea.Thornton@erm.com]
Sent: Monday, May 11, 2020 12:19 PM
To: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Bickerdyke, Sarah - FS <Sarah.Bickerdyke@usda.gov>
Cc: Justin Moffett <Justin.Moffett@erm.com>; Luke Martinson <lmartinson@west-inc.com>
Subject: North Bakken Expansion - Dakota Skipper Surveys

Hi Cale and Sarah –

I hope you are both doing well. I wanted to reach out regarding the upcoming 2020 North Bakken Expansion field season for Dakota Skipper habitat. Part of our scope for this year is to revisit the reproductive habitat

areas that were identified on USFS land in our 2019 surveys with USFS staff present. As you may recall our surveys identified reproductive habitat in areas where the Gunslinger Well Pad EA noted that no habitat was present. Our current plan is for the Dakota Skipper habitat surveys to start the week of June 8th.

I've Cc'd Luke Martinson from WEST on this email who will assist with the coordination of this effort between the USFS and WEST survey crew. Please let us know if there is a day/time in mid-June that would work for you (and your botanist) to schedule a field visit.

Thanks,

Andrea

Andrea Thornton

Principal Consultant

Environmental Resources Management (ERM)

1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204

M 503-459-6864

E andrea.thornton@erm.com | **W** www.erm.com

Pat Robblee

From: Pat Robblee
Sent: Thursday, June 18, 2020 1:02 PM
To: liv.fetterman@usda.gov
Cc: Kevin Malloy
Subject: North Bakken Expansion Project - route change on USFS lands

Hi Liv.

Hope all is well.

Next Thursday, WBI Energy will be meeting with USFS staff (Cale Bickerdyke) in the field to review a potential route change on USFS lands for WBI Energy's North Bakken Expansion Project. The route change, if adopted, would avoid some newly identified routing constraints (including other proposed pipelines). The route change would pass near to Sites 32MZ3319 and 32MZ3320, two prehistoric cairn sites which we are trying to avoid with a 50 foot buffer. WBI Energy has asked if it would be possible for us to pin flag these sites so they are easier to locate during the field review with Mr. Bickerdyke. Given the sensitivity of the two sites, and the fact that our new survey permit is pending, I wanted to check with you to see if it would be ok for us to pin flag the features/boundaries at the two sites. If so, we would pin flag the sites on the morning of the field visit and the flags would be removed on the same day either by WBI Energy or one of our field crew.

Another thing to mention is that the route change, if adopted, would avoid Sites 32MZ2346 and 32MZ3324, both of which are planned for additional testing, though Class III inventory of the new route would be needed.

Pat

Patrick Robblee
Program Director

ERM
T+612 840 8976
E pat.robblee@erm.com I W www.erm.com

ERM
The world's leading sustainability consultancy

From: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>
Sent: Thursday, June 18, 2020 9:11 AM
To: Bickerdyke, Cale E -FS; Linn, Dave; Andrea Thornton
Cc: Grotte, Kim -FS
Subject: RE: Site Visit 6/24

Thanks, see you at the Gunslinger pad on Thursday.

Bob

Bob Stanhope
Survey and GIS Supervisor
406-359-7269 O
406-939-6339 C

From: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Sent: Thursday, June 18, 2020 10:10 AM
To: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>; Linn, Dave <Dave.Linn@WBIEnergy.com>; Andrea Thornton <Andrea.Thornton@erm.com>
Cc: Grotte, Kim -FS <kim.grotte@usda.gov>
Subject: RE: Site Visit 6/24

Sounds Good

Cale Bickerdyke
Minerals and Lands Supervisor

Forest Service
Dakota Prairie Grassland, McKenzie Ranger District

p: 701-842-8502
f: 701-842-8544
cale.bickerdyke@usda.gov

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Watford City, ND 58854
www.fs.fed.us

Caring for the land and serving people

From: Stanhope, Bob [mailto:Bob.Stanhope@WBIEnergy.com]
Sent: Thursday, June 18, 2020 10:52 AM
To: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Linn, Dave <Dave.Linn@WBIEnergy.com>; Andrea Thornton <Andrea.Thornton@erm.com>
Cc: Grotte, Kim -FS <kim.grotte@usda.gov>
Subject: RE: Site Visit 6/24

Cale, how about 10:00 central?

Bob Stanhope
Survey and GIS Supervisor
406-359-7269 O
406-939-6339 C

WBI ENERGY TRANSMISSION
An MDU Resources Group company

From: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Sent: Thursday, June 18, 2020 9:12 AM
To: Linn, Dave <Dave.Linn@WBIEnergy.com>; Andrea Thornton <Andrea.Thornton@erm.com>
Cc: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>; Grotte, Kim -FS <kim.grotte@usda.gov>
Subject: RE: Site Visit 6/24

That will work. 9AM central work?

Cale

Cale Bickerdyke
Minerals and Lands Supervisor

Forest Service
Dakota Prairie Grassland, McKenzie Ranger District

p: 701-842-8502
f: 701-842-8544
cale.bickerdyke@usda.gov

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Watford City, ND 58854
www.fs.fed.us

Caring for the land and serving people

From: Linn, Dave [mailto:Dave.Linn@WBIEnergy.com]
Sent: Wednesday, June 17, 2020 10:05 AM
To: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>; Andrea Thornton <Andrea.Thornton@erm.com>

Cc: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>
Subject: RE: Site Visit 6/24

Unfortunately the later time doesn't work well for us, would the following morning the 25th work for you?

From: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Sent: Wednesday, June 17, 2020 8:52 AM
To: Andrea Thornton <Andrea.Thornton@erm.com>
Cc: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>; Linn, Dave <Dave.Linn@WBIEnergy.com>
Subject: RE: Site Visit 6/24

Andrea,

I got double booked (not by choice) for this day. Can I move this to 3PM?

Cale

Cale Bickerdyke
Minerals and Lands Supervisor
Forest Service
Dakota Prairie Grassland, McKenzie Ranger District
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f: 701-842-8544
cale.bickerdyke@usda.gov
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Watford City, ND 58854
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Caring for the land and serving people

From: Andrea Thornton [mailto:Andrea.Thornton@erm.com]
Sent: Tuesday, June 16, 2020 10:50 AM
To: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Cc: Stanhope, Bob <Bob.Stanhope@WBIEnergy.com>; Linn, Dave <Dave.Linn@WBIEnergy.com>
Subject: Site Visit 6/24

Hi Cale –

WBI and ECS are available to meet next Wednesday to review the reroute and find a way to avoid the pad locations and cultural sites. They will meet you at the gunslinger well pat at 10am central on the 24th.

Thanks,
Andrea

Andrea Thornton
Principal Consultant

Environmental Resources Management (ERM)
1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** www.erm.com

From: Kevin Malloy <Kevin.Malloy@erm.com>
Sent: Tuesday, June 23, 2020 4:47 PM
To: liv.fetterman@usda.gov
Cc: Pat Robblee <Pat.Robblee@erm.com>
Subject: RE: North Bakken Expansion Project - route change on USFS lands

Hi Liv,

I hope this message finds you well. I wanted to follow up on Pat Robblee's message from last week regarding WBI Energy's visit to the USFS lands with Cale Bickerdyke on Thursday (6/25). Given that our permit is still pending, I was hoping to confirm with you that we could be allowed to pin flag the two sites (32MZ3319 and 32MZ3320) that the proposed route change would pass near. Considering the sensitivity of these two sites, the aim is to flag the features/boundaries at both sites to ensure they achieve a 50 ft buffer from the workspace and make the sites easier to identify while they are reviewing the area.

Thank you for your help.

Kind regards,
Kevin

From: Fetterman, Liv K -FS <liv.fetterman@usda.gov>
Sent: Tuesday, June 23, 2020 5:11 PM
To: Kevin Malloy <Kevin.Malloy@erm.com>
Cc: Pat Robblee <Pat.Robblee@erm.com>
Subject: RE: North Bakken Expansion Project - route change on USFS lands

Good afternoon, Kevin,
Apologies, Pat, for my delay. I have family health matters I'm managing and I'm focused on those; my email response time isn't always ideal. I was hoping the permit process would be complete by now. Since it is not, I'm comfortable with you placing pin flags around the two sites with 50 foot buffer. It is so important to the DPG to maintain those resources we know are sensitive and special.

Please don't hesitate to contact me with any other questions or concerns. In the event you are unable to reach me in a timely manner, please try my personal cell phone: 505-793-4231.
Best,
Liv

Liv K. Fetterman
Grasslands Archaeologist,
Heritage Program Manager,
Tribal Relations Program Manager

Forest Service
Dakota Prairie Grasslands

p: 701-989-7306
f: 701-989-7299
liv.fetterman@usda.gov

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Bismarck, ND 58501
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Caring for the land and serving people

From: Kevin Malloy
Sent: Tuesday, June 23, 2020 4:50 PM
To: Fetterman, Liv K -FS
Subject: RE: North Bakken Expansion Project - route change on USFS lands

Hi Liv,

No apologies necessary. I'm so sorry to hear about your family health matter. I certainly understand the focus that those things require, especially in the current state of things.

Thank you for giving us confirmation on going out and placing pin flags. We really want to make sure that those resources remain intact and protected. In addition we noticed a previously recorded site, 32MZ3278, will also be in the area and we would like to go and pin flag that as well.

In regards to the permit – we are planning conducting survey in the next couple of weeks. We are currently working on the schedule but are slated to commence survey of the USFS lands by 3rd week of July. This survey will investigate reroutes that avoid the two sites we had previously been planning on testing.

Thanks for your help and your response. I hope things begin to improve for you and your family.

Best,
Kevin

From: Andrea Thornton
Sent: Monday, June 29, 2020 7:05 AM
To: Bickerdyke, Cale E -FS
Subject: FW: well pads near WBI route
Attachments: gladstone Guslinger pad.jpg

Hi Cale –

Do you have shapefiles of the attached Gladstone well pad that you would be able to share with WBI?

Thanks,
Andrea

Andrea Thornton
Principal Consultant
Pronouns: she/her/hers

Environmental Resources Management (ERM)
1050 SW 6th Avenue, Suite 1650 | Portland, Oregon | 97204
M 503-459-6864
E andrea.thornton@erm.com | **W** www.erm.com

From: Bickerdyke, Cale E -FS <cale.bickerdyke@usda.gov>
Sent: Thursday, October 3, 2019 4:57 AM
To: Andrea Thornton <Andrea.Thornton@erm.com>
Subject: well pads near WBI route

Andrea,

Attached is a map of where the Gladstone and Gunslinger pads are proposed and were approved on Monday.

Cale

Cale Bickerdyke
Minerals and Lands Supervisor
Forest Service
Dakota Prairie Grassland, McKenzie Ranger District
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cale.bickerdyke@usda.gov
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Fax: +1 612 347 6780

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Call Log

Log of Telephone Conversation

Call To/From Whom	Liv Fetterman
Phone number	505.793.4231
Company	USFS
ERM Contact	Kevin Malloy
Phone number	906-285-0361
Date	July 9, 2020
Time of Conversation	10:53 am; 1:42 pm
Reference	WBI – North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

I called Liv Fetterman to enquire about the status of our survey permit application for the 2020 field season and to inform her that our survey crews would be ready to work on the area as soon as early next week. She apologized for the delay and stated that she would be willing to grant temporary approval of the permit, issuing us the permit number so that we have that as a reference in case of any questions that may arise. Liv stated she was going to follow-up with Sandra IronRoad today to see where things stand but will email me later this afternoon.

Update 1:42 pm:

I called Liv Fetterman again to inform her that we planning on start survey on the USFS lands on Monday. She confirmed that was ok and she was going to send me the necessary permit numbers. She asked that we also send her a map of the area we are going to study. I will follow-up with an email and the necessary information.

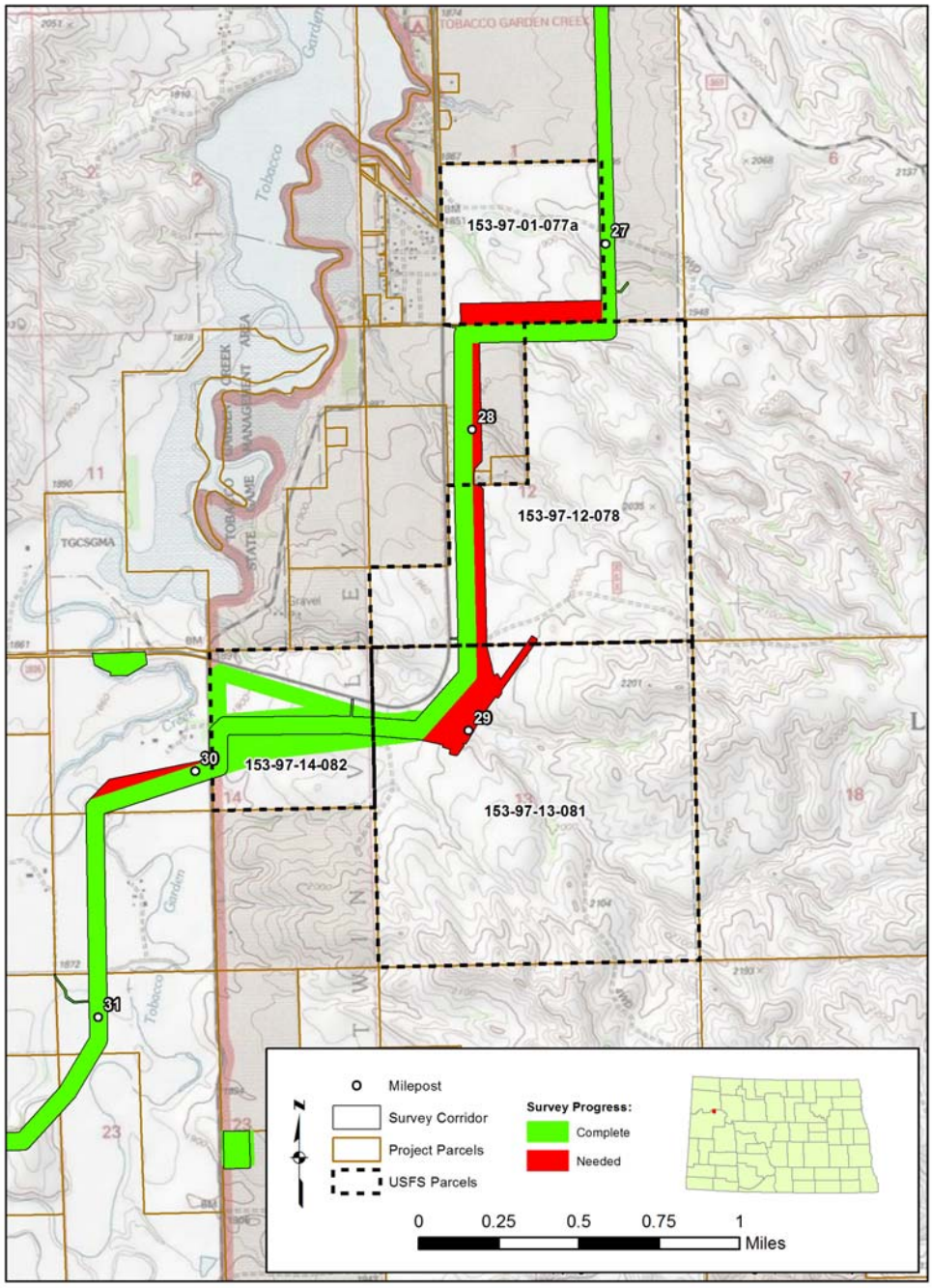
From: Kevin Malloy
Sent: Friday, July 10, 2020 12:26 PM
To: Fetterman, Liv K -FS <liv.fetterman@usda.gov>
Cc: Pat Robblee <Pat.Robblee@erm.com>
Subject: Upcoming Survey Location

Hi Liv,

As per our conversation yesterday, here is a map showing where we will be on USFS land beginning on Monday.

Please feel free to reach out to me with any questions.

Best,
Kevin


153-97-01-077a
27
28
153-97-12-078
29
30
153-97-14-082
153-97-13-081
31
TOBACCO GARDEN CREEK
TGCSGMA
Milepost
Survey Corridor
Project Parcels
USFS Parcels
Survey Progress:
Complete
Needed
0
0.25
0.5
0.75
1
Miles

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Minneapolis, MN 55402

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Fax: +1 612 347 6780

www.erm.com

Call Log

Log of Telephone Conversation

Call To/From Whom	Liv Fetterman
Phone number	505.793.4231
Company	USFS
ERM Contact	Kevin Malloy
Phone number	906-285-0361
Date	July 10, 2020
Time of Conversation	3:02 am; 3:15 pm
Reference	WBI – North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

I called Liv Fetterman to enquire about the status of our survey permit application for the 2020 field season and confirm she received the map I sent earlier in the day. She did not answer so I left a message.

Update 3:15 pm:

Liv returned my call and stated that she had not heard back from Sandra IronRoad with the necessary permit numbers but stated that she had notified that our crews will be on the land on Monday. She also stated she would be in touch with me on Monday with the relevant numbers.

From: IronRoad, Sandra -FS <sandra.ironroad@usda.gov>
Sent: Friday, July 10, 2020 4:47 PM
To: Kevin Malloy <Kevin.Malloy@erm.com>
Cc: Fetterman, Liv K -FS <liv.fetterman@usda.gov>
Subject: Archaeology permit

Good afternoon Kevin,

Liv asked me to send your permit number it is MCK 20018. Please let me know if you have any other questions.

Thank you

Sandra Iron Road
Resource Assistant
Forest Service
Dakota Prairie Grasslands
p: 701-989-7309
f: 701-989-7299
sandra.ironroad@usda.gov
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Bismarck, ND 58501
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From: Kevin Malloy
Sent: Saturday, July 11, 2020 11:21 AM
To: IronRoad, Sandra -FS
Cc: Fetterman, Liv K -FS
Subject: RE: Archaeology permit

Hi Sandra,

Thank you for sending me this! Have a wonderful weekend.

Best,

Kevin

NORTH BAKKEN EXPANSION PROJECT

Agency Correspondence – North Dakota Game and Fish Department (NDGFD)

NORTH BAKKEN EXPANSION PROJECT
CONFERENCE CALL NOTES

MEETING TOPIC:
401 Water Quality Certification – Potential Change in Approach Due to Nationwide Permit 12 Being Unavailable.

DATE OF MEETING:
June 23, 2020 at 1:30 p.m. CST– Project Call

ATTENDEES:

Environmental Resources Management (ERM)
Wade Hammer

North Dakota Department of Environmental Quality (NDDEQ)
Peter Wax

MEETING NOTES:

- Wade Hammer called Peter Wax to discuss the implications of if the North Bakken Expansion Project needed to acquire an Individual Permit (IP) from the U.S. Army Corps of Engineers, due to the Montana district court ruling that has resulted in vacating of Nationwide Permit 12 (NWP 12), and if this would require a 401 Water Quality Certification (401 WQC) from the North Dakota Department of Environmental Quality (NDDEQ). NWP 12 has a blanket 401 WQC approved by NDDEQ with requirements to get a 401 WQC permit for specific state waters excluded from the blanket authorization.

- NWP 12 is vacated, so now without this blanket 401 WQC approval under NWP 12 Peter said that if there is dredge and fill a 401 WQC would be required.

- Peter indicated that he does not need an application, but that he is usually notified once the 404 IP is posted for public notice. He would the plan to review the waterbody crossings that have planned dredge and fill, based on the 404 IP application. He said he would likely handle all of the crossings as one category or type of crossing and issue the 401 WQC based on the general waterbody crossings with some sort of conditions (e.g., “must be completed in 48 hours”, “must return bed and bank to pre-construction conditions”, etc.), similar to what is used for USACE or FERC requirements.

- Peter said his review is typically complete and his 401 WQC done by the time the public notice is complete. He emphasized that he is not interested in holding things up and will work to help move the review along as expeditiously as he can.

- Peter requested that the WBI project team remain in contact with him leading up to the 404 IP submittal to the USACE, and he would reach out to Jason Renschler, the USACE regulatory project manager for the project, to discuss any necessary coordination.

WBI ENERGY TRANSMISSION
An MDU Resources Group company

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July 2, 2020

Craig Thorstenson
Environmental Engineer
North Dakota Department of Environmental Quality
Division of Air Quality
918 East Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947

Subject: North Bakken Expansion Project - Tioga Compressor Station
Williams County, North Dakota

Dear Mr. Thorstenson,

Enclosed please find an updated permit to construct application being submitted by WBI Energy Transmission, Inc. (WBI Energy) for modifications to the Tioga Compressor Station in Williams County, ND. The original application was submitted on February 14, 2020. The existing Tioga compressor station is considered a facility of minor significance for air pollution and a permit to construct was not previously required. The modification will make the existing facility a synthetic minor source which will not be subject to Title V permitting requirements.

The proposed expansion to the Tioga Compressor Station will involve the installation of the following equipment:

- three (3) Caterpillar 3612 natural gas-fired engines [3,750 horsepower (hp) each] coupled to a KBZ-4 compressor unit;
- one (1) Waukesha natural gas-fired generator (840 hp);
- one (1) natural gas-fired boiler (2.47 MMBtu/hr) and one unit heater (0.25 MMBtu/hour);
- one (1) pig launcher and receiver;
- one (1) underground 3,000 gallon pipeline liquids storage tank;
- one (1) underground 3,000 gallon waste oil storage tank; and
- one (1) underground 3,000 gallon floor drain tank to collect wastewater.

In addition to the above listed equipment the compressor station will have emissions associated with compressor blowdowns and leaking components. The expansion of the Tioga Compressor Station will require a permit to construct from the North Dakota Department of Environmental Quality (NDDEQ). Under the North Dakota Administrative Code (NDAQ) 33.1-15-14-02.13, the tanks and comfort heating unit are exempt from permitting requirements.

The enclosed permit application includes a narrative of the project, regulatory review, air dispersion modeling and an air toxics review. Detailed emission calculations are attached as well as a site location map, site plot plan, NDDEQ required forms and additional detail to support the air toxics review. Executable emission calculations and electronic modeling files are available upon request.

A check for $325 was previously submitted to the NDDEQ with the permit to construct application submitted in February 2020 which was deemed incomplete. WBI Energy understands, since that application was not accepted, the nonrefundable filing fee already provided will apply to this application. Please note the project has changed since the February submittal. WBI Energy is now proposing only three compressor engines and a smaller generator engine from the original application. These changes are a result of market factors. WBI Energy understands that the NDDEQ will charge an additional processing fee to cover costs of actual processing time incurred above the initial filing fee.

If you have any questions or need additional information please contact me at (406) 359-7332 or jill.linn@wbienergy.com or Ann Curnow of ERM at (612) 347-7112 or ann.curnow@erm.com .

Sincerely,

Jill Linn
Environmental Manager

Enclosure: Permit to construct application – Tioga Compressor Station

cc: Ann Curnow, ERM
Andrea Thornton, ERM

WBI Energy Transmission

Williams County, North Dakota

Application for Permit to Construct Tioga Compressor Station

Prepared for:

WBI Energy Transmission
2010 Montana Avenue
Glendive, MT 59330

Prepared by:

ERM
1000 IDS Center
80 South Eighth Street
Minneapolis, MN 55402

ERM

July 2020

WBI Energy Transmission
Application for Permit to Construct
Tioga Compressor Station

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1.0 INTRODUCTION

WBI Energy Transmission (WBI) is proposing to add additional compression capacity to the existing Tioga Compressor Station in order to support the North Bakken Expansion Project (or Project), which includes the construction of an approximately 62-mile-long, 24-inch-diameter natural gas pipeline from WBI Energy's existing Tioga Compressor Station near Tioga, North Dakota, to a new interconnect with Northern Border Pipeline Company's mainline southeast of Watford City, North Dakota. The existing compression is electrical driven and the proposed compression will be driven by natural gas-fired engines. A site location map is located in Appendix A.

The existing Tioga Compressor Station was determined by the North Dakota Department of Environmental Quality (NDDEQ) to be a facility of minor significance for air pollution and a Permit to Construct was not required per Subdivision 33.1-15-14-02 of the North Dakota Air Pollution Control Rules. The review by the Department was summarized in a letter dated August 5, 2016 to WBI Energy. The existing Tioga Compressor Station is comprised of one electric driven natural gas compressor, one small natural gas-fired boiler (0.78 MMBtu/hour) for comfort heating, and a few natural gas-fired space heaters also for comfort heating. Fugitive emissions from leaking components (0.15 tons of VOC) are also associated with the existing Tioga Compressor Station.

The proposed expansion to the Tioga Compressor Station will involve the installation of the following equipment:

- Three (3) Caterpillar 3612 natural gas-fired engines [3,750 horsepower (hp)], each coupled to a KBZ-4 compressor unit;
- one (1) Waukesha natural gas-fired generator (840 hp);
- comfort heating: two Weil-McLain LGB-10 (2.47 MMBtu/hr) and one Unit Heater (0.25);
- one (1) pig launcher and receiver;
- one (1) underground 3,000 gallon pipeline liquids storage tank;
- one (1) underground 3,000 gallon waste oil storage tank; and
- one (1) underground 3,000 gallon floor drain tank to collect wastewater.

The expansion of the Tioga Compressor Station will require a permit to construct and subsequently a permit to operate as a synthetic minor source from the NDDEQ. Under North Dakota Administrative Code (NDAQ) 33.1-15-14-02.13, the tanks and the comfort heating unit are exempt from permitting requirements. Other sources of emissions at the compressor station will be blowdown activities and fugitive emissions from leaking components. Pigging activities for pipeline maintenance occur on a 5 to 10 year cycle depending on the pipeline undergoing maintenance. Detailed emission calculations, including emissions from sources exempt from permitting are attached in Appendix B.

1.1 Change in Potential Emissions

Table 1.1-1 summarizes the potential emissions as the facility is currently permitted and the proposed potential emissions after the permit amendment.

Annual operational emissions from the Tioga Compressor Station expansion are listed in Table 1.1-1. Pigging of the pipeline will only occur every 5 to 10 years depending on the line, but pigging emissions are reported as annual as if all pigging occurs in the same year.

TABLE 1.1-1

Tioga Compressor Station Emission Calculation Results

Emission Unit	NO_X (TPY)	CO (TPY)	VOC (TPY)	$PM_{10}/PM_{2.5}$ (TPY)	SO_2 (TPY)	CO_2e (TPY)	Formaldehyde [a] (TPY)	Total HAPs (TPY)
Caterpillar 3612 Engine [b]	18.11	18.11	18.11	1.11/1.11	0.07	13,021	1.45	3.61
Caterpillar 3612 Engine [b]	18.11	18.11	18.11	1.11/1.11	0.07	13,021	1.45	3.61
Caterpillar 3612 Engine [b]	18.11	18.11	18.11	1.11/1.11	0.07	13,021	1.45	3.61
Waukesha Generator	8.92	17.84	6.25	0.72/0.72	0.022	4,336	0.45	0.89
Comfort Heating[c]	2.23	1.87	0.12	0.17/0.17	0.01	2,661	0.07	0.08
Pipeline Liquids Tank	N/A	N/A	0.0058	N/A	N/A	N/A	N/A	0.006
Wastewater Tank	N/A	N/A	0.0058	N/A	N/A	N/A	N/A	0.000
Waste Oil Tank	N/A	N/A	0.00	N/A	N/A	N/A	N/A	0.006
Equipment Leaks (fugitive)	N/A	N/A	0.83	N/A	N/A	203	N/A	0.0002
Pig Launching & Receiving	N/A	N/A	24.22	N/A	N/A	4,648	N/A	0.10
Blowdowns [d]	N/A	N/A	7.90	N/A	N/A	1,931	N/A	0.03
TOTAL PTE [e]	**65.48**	**74.04**	**93.66**	**4.22/4.22**	**0.24**	**52,842**	**4.87**	**11.94**
Title V Threshold	**100**	**100**	**100**	**100**	**100**	**N/A**	**10**	**25**
PSD Major Source Threshold [f]	**250**	**250**	**250**	**250**	**250**	**100,000**	**N/A**	**N/A**

N/A = not applicable; TBD = to be determined

[a] Largest single HAP is methanol from the engine generator but formaldehyde is listed in the table because it is the largest single HAP at the compressor station.

[b] Caterpillar Engines are equipped with oxidation catalysts for reducing emissions of NMNEHC (VOC), CO, and formaldehyde & acrolein.

[c] comfort heating includes: two Weil-McLain LGB-10 (2.47 MMBtu/hr) and one Unit Heater (0.25 MMBtu/hr)

[d] This includes emissions from commissioning of the station prior to commercial operation. The commission blowdown will not be part of annual ongoing emissions. The standard cubic feet (scf) from commissioning and startup is estimated at 448,000 scf and annual operation will be 1,428,000 scf.

[e] Excludes fugitive emissions (equipment leaks) as compressor stations are not one of the 28 listed source categories. The above table includes these sources but they are not included in the Total PTE because they are not to be compared to permitting thresholds.

[f] PSD for CO_2e would only be triggered if the compressor station was an "anyway source" which means triggering PSD for one of the other regulated PSD pollutants. The compressor station is below the PSD threshold for CO_2e. Even if CO_2e was above the threshold, PSD would not be triggered because none of the other pollutants exceed the PSD threshold.

Note: Short tons (2,000 lbs), not long or metric tons, are used in PSD applicability calculations. Metric tons are used in the GHG reporting rule.

TPY	tons per year
NO_X	nitrogen oxide
CO	carbon monoxide
VOC	volatile organic compound
PM	particulate matter
PM_{10}	particulate matter less than or equal to 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in aerodynamic diameter
SO_2	sulfur dioxide
Pb	lead
CO_2e	carbon dioxide equivalent
HAP	hazardous air pollutant
PTE	potential to emit

1.2 Permit to Construct Application

The detailed emission calculations are included in Appendix B. The required permit to construct application forms are included in Appendix C. The forms completed for this application include: SFN 8516, four (4) individual SFN8891, four (4) individual SFN 8532, and four (4) individual SFN 8329. No permit forms are included for the small storage tanks or boiler as these are exempt per North Dakota Administrative Code (NDAQ) 33.1-15-14-02.13. No permit form was included for the pig launch/receiving, as it did not seem to fit any obvious form/format. It should be noted that the total facility emissions shown on Form SFN 8516 are inclusive of the compressor engine as well as the tanks, blowdown, comfort heating, and pig launch/receiving.

The manufacturer specifications for the natural gas-fired engines are included in Appendix D. The air toxics review completed for this project, in accordance with the Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota (Air Toxics Policy) was performed using the American Meteorological Society/ Environmental Protection Agency Regulatory Model (AERMOD), version 19191. AERMOD is a US Environmental Protection Agency (EPA)-approved, steady state Gaussian plume model approved for industrial sources. The electronic modeling archive, which contains all files associated with the air dispersion modeling analysis completed for the Tioga Compressor Station, will be provided to the NDDEQ in electronic format upon request.

2.0 REGULATORY APPLICABILITY

The Project was reviewed for the applicability of Federal and State level requirements for sources of air emissions. The analysis is presented in the sections that follow.

2.1 Federal Requirements

The CAA of 1970, as amended in 1977 and 1990, is the basic federal statute governing air quality. The provisions of the CAA that are potentially applicable to construction and operation of the Project are:

- Prevention of Significant Deterioration (PSD)/Non-Attainment New Source Review (NNSR);
- Federal Class I Area Protection;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- State Regulations.

The following is a brief description of these regulations and their requirements.

Prevention of Significant Deterioration/Non-Attainment New Source Review

The CAA requires any new major stationary source of air pollution, or existing source proposing major modification, to obtain an air pollution permit before commencing construction. Air construction permits for major sources or modifications in an attainment areas are issued under the PSD regulations, whereas air construction permits for sources in a nonattainment area are issued under the NNSR program. The entire program, including both PSD and NNSR permitting, is referred to as the New Source Review program.

Title I of the CAA establishes guidelines for the preconstruction/modification review of large air emission sources. Construction of sources in attainment areas must be reviewed in accordance with the PSD regulations. To be classified as a new major PSD source, the potential emissions from the source must either be greater than 100 tons per year (tpy) for any pollutant regulated by the EPA under the CAA for sources that are among the 28 source categories listed in section 169 of the CAA, or greater than 250 tpy for sources that are not among the 28 source categories. Additionally, greenhouse gas (GHG) emissions of 100,000 tpy also trigger PSD review. Best Available Control Technology analyses and detailed dispersion modeling are required if a new source is classified as a major PSD source.

Natural gas compressor stations are not identified in the list of 28 source categories in section 169 of the CAA; therefore, the applicability threshold for PSD review for the proposed compressor stations is 250 tpy. Fugitive emissions, such as component leaks and pipeline venting for maintenance, do not count toward the PSD threshold because the compressor stations are not considered one of the 28 source categories. Listed sources are required to consider fugitive emissions to evaluate PSD applicability. The primary fugitive emissions at the compressor stations are methane (CH_4) and GHG.

The EPA's May 13, 2010 GHG Tailoring Rule is intended to limit the number of affected sources that account for an estimated 70 percent of GHG emissions from stationary sources while shielding smaller sources such as apartment buildings and schools. As of July 1, 2011, a new industrial facility that is a major source for at least one non-GHG pollutant and will emit or has the potential to emit at least 75,000 tpy of carbon dioxide equivalents (CO_2e) is subject to PSD. Alternatively, a new industrial facility that has the potential to emit 100,000 tpy of CO_2e and will exceed the applicable major source regulation on a mass basis for GHGs will be subject to PSD. In addition, PSD for CO_2e would only be triggered if the compressor stations were "anyway sources" which means triggering PSD for one of the other regulated PSD pollutants. Even if the compressor station was above the PSD threshold for CO_2e (100,000 tpy), PSD would not be triggered if none of the other pollutants exceed the PSD threshold.

The existing Tioga Compressor Station is not subject to PSD. Applicability of the PSD rule was determined for the proposed expansion of the Tioga Compressor but emissions will not exceed 250 tpy for any criteria air pollutant.

Modification and operation of the Tioga Compressor Station will not trigger PSD requirements.

New Source Performance Standards

The NSPS, codified in 40 CFR 60, establishes pollutant emissions limits and monitoring, reporting, and recordkeeping requirements for various emissions sources based on source type and size. The NSPS apply to new, modified, or reconstructed sources. The potentially applicable NSPS are described below, subparts that do not apply to the Project are not listed below.

NSPS subpart JJJJ applies to all new stationary spark ignition internal combustion engines. The Tioga Compressor Station will be installing three 3,750 horsepower (hp) spark ignition internal combustion engines to drive compressors and one 840 hp natural gas-fired generator. The new spark ignition natural gas-fired engines will meet emission standards for NO_x, CO, and VOC. The engines to be purchased by WBI Energy will be certified to meet the requirements of this NSPS. Subpart JJJJ requirements will be included in the applicable state air quality permits.

NSPS Subpart OOOO applies to onshore affected facilities including natural gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels, equipment within process units, and sweetening units. Subpart OOOO only regulates equipment between the wellhead and point of custody transfer to the natural gas transmission and storage segment. Compressors that are associated with natural gas transmission are not subject to Subpart OOOO. This subpart does not apply to the Project.

EPA amended Subpart OOOO to add new regulations affecting CH_4 and VOC emissions. The amended subpart is codified as subpart OOOOa. WBI Energy will meet the requirements of Subpart OOOOa for the Project. Affected sources operated by WBI Energy are fugitive emissions from the compressor station and the reciprocating compressors.

National Emission Standards for Hazardous Air Pollutants

The NESHAPs, codified in 40 CFR Parts 61 and 63, regulate hazardous air pollutants (HAP) emissions. Part 61, which was promulgated prior to the 1990 CAA Amendments (CAAA), regulates only eight types of hazardous substances: asbestos, benzene, beryllium, coke oven

emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The 1990 CAAA established a list of 189 HAPs, resulting in the promulgation of Part 63. This part, also known as the Maximum Achievable Control Technology standards, regulates HAP emissions from major sources of HAP emissions and specific source categories of non-major (area) sources that emit HAPs. Part 63 defines a major source of HAPs as any source that has the potential to emit 10 tpy of any single HAP or 25 tpy of HAPs in aggregate.

The compressor station is not a major source of HAPs since the potential emissions of HAPs will be less than the major source thresholds. The NESHAP subpart ZZZZ for reciprocating internal combustion engines will apply to the engines at the compressor station but for area sources of HAPs, compliance with Subpart ZZZZ is demonstrated by complying with NSPS Subpart JJJJ.

The compressor station will have two small natural gas-fired boilers that will be used for comfort heating. These boilers will be subject to the area source boiler NESHAP subpart JJJJJJ. However, the subpart provides an exemption for boilers only firing natural gas.

Title V Operating Permits

Title V of the 1990 CAA required states to establish an air operating permit program in an effort to standardize air quality permits across the United States. The requirements of Title V are outlined in 40 CFR 70, and the permits required by these regulations are often referred to as Part 70 or Title V permits. North Dakota has promulgated these requirements under North Dakota Administrative Code (NDAC) 33.1-15-14-06 "Title V Permit to Operate."

If a facility's potential to emit exceeds the criteria pollutant or HAP thresholds, the facility is considered a major source. The Title V major source threshold level for an air emission source is 100 tpy for criteria pollutants. The major source HAP thresholds for a source are 10 tpy of any single HAP or 25 tpy of all HAPs in aggregate.

The Tioga Compressor will have emissions below major source thresholds and will not be required to obtain a Title V permit for operations.

2.2 State Regulations

North Dakota air emissions are regulated by the NDDEQ Division of Air Quality, also referred to as the Department, under NDAC 33-15. Listed below are the applicable air quality regulations from the NDAC that apply to the Project as well as required air impact reviews (dispersion modeling).

Applicable North Dakota Air Quality Regulations

NDAC 33.1-15-01 sets the general provisions pertaining to all state level regulations including definitions of terms used by the regulations.

NDAC 33-15-02 establishes ambient air quality standards (AAQS) which are identical to the National Ambient Air Quality Standards (NAAQS) promulgated by the EPA, with the exception of an additional state standard for hydrogen sulfide (H_2S). Emissions of H_2S for the Tioga Compressor Station are negligible.

NDAC 33.1-15-03 restricts emission of visible air contaminants. This regulation applies to both point sources and fugitive sources of visible emissions. WBI will maintain equipment to not exceed opacity standards and perform construction to minimize dust.

NDAC 33.1-15-04 establishes restrictions on open burning. No open burning is planned; however if the need arises, WBI will follow all requirements stipulated in 33.1-15-04 for permissible open burning.

NDAC 33.1-15-05 addresses emission requirements of PM from industrial processes. Emissions of PM during operations of the Project would not exceed any of the emission limitations set forth in NDAC 33.1-15-05 table 3.

NDAC 33.1-15-07-01 & 02 addresses emission requirements for VOC. Per 33.1-15-07-01, all pumps and compressors that handle VOC material will be equipped and operated with properly maintain seals designed for their specific service and operating conditions. Per 33.1-15.07-02 no person is allowed to emit organic compound gases and vapors, except from an emergency vapor blowdown system or emergency relief system, unless these gases and vapors are burned by flares, or an equally effective control device as approved by the Department. Minor sources, as determined by the department and not subject to NSPS, may be granted exemptions to this subsection. If required, each flare is required to be equipped and operated with an automatic igniter or a continuous burning pilot.

NDAC 33.1-15-08 addresses operation and control of internal combustion engines. WBI Energy will comply with the requirements of NDAC 33-15-08-1 and 33-15-08-02 by operating internal combustion engines and exhaust emission control devices in a reasonable and appropriate manner according to manufacturer specifications.

NDAC 33.1-15-17 restricts fugitive emissions from any source, including emissions of particulate (dust) and various gaseous emissions including those subject to an AAQS or PSD increment, an odorous substance, or those subject to the restrictions of a visible air contaminant. WBI Energy will comply with the applicable requirements of this regulation during construction and operation of the Project. Information regarding specific techniques for the control of fugitive dust during construction is included in the Project's *Fugitive Dust Control Plan* (see appendix 1F).

NDAC 33.1-15-22 address emission standards for HAPs. Emission standards for this chapter are the federal NESHAPs incorporated by reference. WBI Energy will comply with NDAC 33.1-15-22 by complying with the federal NESHAPs which were previously addressed in this document.

2.3 North Dakota Dispersion Modeling

In North Dakota, air dispersion modeling is required to obtain a permit to construct for compressor engines pursuant to a Department January 23, 2015 memorandum unless all of the following certain conditions are met.

- Emissions from all compressor engines are controlled with a catalytic emission control system (or an equivalent control technology which is designed to reduce non-methane hydrocarbons emissions by at least 50 percent.
- Emissions from all compressor engines at the facility are vented from a stack height which is greater than or equal to 1.5 times the nearest building height.

- If the facility is located less than 1/4 mile from a residence: combined air toxics emissions from the entire facility are less than 10 tpy, benzene emissions are less than 2 tpy, and formaldehyde emissions are less than 2 tpy. If the facility is located at least 1/4 mile from a residence: combined air toxics emissions from the entire facility are less than 10 tons per year, benzene emissions are less than 3 tpy, and formaldehyde emissions are less than 3 tpy.

The compressor engines at the Tioga Compressor Station are equipped with an oxidation catalyst that reduces non-methane hydrocarbon emission by at least 50 percent. The nearest building peak roof height is 32.5 feet and the compressor stack is at a height of 42 feet from ground level (less than 1.5 times the nearest building height). The emissions for criteria pollutants (NO_2 only) are above the thresholds for sources that contain stacks with heights less than 1.5 times the nearest building height. The nearest residence is approximately 0.42 miles east of the facility, which is further than a quarter mile away. The HAP emissions at the facility are above the modeling thresholds. Air dispersion modeling is required for NO_2 per the NDDEQ publication *Criteria Pollutant Modeling Requirements for a Permit to Construct* published on October 6, 2014. Air dispersion modeling is required for HAP emissions per the NDDEQ publication *Dispersion Modeling Requirements – Compressor Engines and Glycol Dehydration Units*, published on January 23, 2015.

Through conversations with NDDEQ, it was determined that only 1-hour NO_2 would require criteria pollutant air dispersion modeling. According to the NDDEQ *Criteria Pollutant Modeling Requirements for a Permit to Construct* memo published on October 6, 2014, the potential emissions from the facility for CO, PM_{10}, $PM_{2.5}$, and SO_2 were below the significant levels for projects not subject to PSD, and therefore no modeling was required for these pollutants.

As part of the modeling for NO_2, an assessment of significant impacts was included for the Lost Wood National Wildlife refuge, a federal Class I area located within 100 km of the project site.

Description of the Air Quality Dispersion Model

The modeling was performed using AERMOD, version 19191. AERMOD is a US EPA-approved, steady state Gaussian plume model approved for industrial sources and capable of modeling multiple sources in simple and complex terrain. Regulatory default options were used in the analysis.

For NO_2 modeling, a refined approach was used, using default model options for the Ozone Limiting Method (OLM). This analysis is referred to as a Tier III analysis, and includes the specification of source specific 'in-stack' ratio (ISR) values for each source as well as ambient background ozone concentrations in order to compute the conversion of NO to NO_2. Additional details regarding OLM option settings, including ISR values and ozone background data is discussed below.

Receptor Grid

To ensure that the area of maximum effects was accurately sampled, a multi-tier receptor grid extending out to 50 kilometers (km) was used in the model. The configuration of receptor points was as follows:

- 25-meter (m) spacing along the facility fence/property line;

- 50-m spacing from the fence/property line to 500 m;
- 100-m spacing from 500 m to 2 km;
- 250-m spacing from 2 km to 5 km; and
- 500-m spacing from 5 km to 50km.

Public access at the facility will be impeded by fencing and gates.

Terrain

Terrain heights were generated using publicly available ground elevation data from the United States Geological Survey (USGS) National Elevation Data set (USGS 2017). The USGS terrain data selected has 1/3 arcsecond (10-meter) grid spacing to provide sufficient spatial resolution of terrain features. These data were processed for use in AERMOD using the AERMAP (version 18081) processor program. To process the data, a selection of rural or urban land use is required. Urban land use, in the context of the AERMAP analysis, is applicable to city centers and industrial areas that are characterized by multi-story buildings and large areas of land covered with impermeable surfaces such as concrete or asphalt. Rural land use is appropriate for areas ranging from suburban areas predominantly characterized by single family homes, moderately populated rural residential areas, and other areas with land use areas with a mix of vegetative cover and moderate development. Rural land use was selected due to Tioga Compressor Station's location in an area that fits the rural land use definition; the station will not be located in an urban population center.

Meteorology

EPA air quality modeling guidance recommends the use of one year of onsite meteorological data or five years of representative off-site data. There is onsite data from a nearby facility (Hess Gas Plant) which provides the most representative meteorological conditions for this analysis. Section 3 of the report, *Onsite Meteorological Data Processing, Tioga, ND* (Bison Engineering, June 2020), provides the justification for met data selection and provides evidence of QA/QC program for this local monitoring program. A copy of this report is included in Appendix E.

Surface Data

The Hess Tioga Gas Plant (TGP) Station #1 was used as the primary surface data source, located at Latitude 48.409° N, longitude 102.91° W, and elevation 761 meters above mean sea level. The Williston Airport was used as the secondary surface data source, located at latitude 48.195° N, longitude 103.642° W, and elevation 580.6 meters above mean sea level. The station was commissioned as an Automated Surface Observing System (ASOS) station on April 1, 1996. The anemometer height is 10 meters above ground level, at both surface stations. The 2015 surface data KISN were provided by the North Dakota Department of Environmental Quality (NDDEQ) in CD144 format. The data is archived in Central Standard Time (GMT-6).

Upper Air Data

Twice-daily upper air observations from Glasgow, MT airport were provided by NDDEQ in FSL format. The GGW station is located at 48.214° N, 106.621° W and identified with WBAN 94008.

The data was processed with a time shift of 6 hours to match the time zone of the surface station (GMT-6).

Surface Parameters

Surface parameters - albedo, Bowen ratio, and surface roughness length - are needed input for dispersion calculations. These parameters are based on the land use features and moisture conditions, and experience seasonal variations. They are calculated as part of the hourly meteorological data processing with AERSURFACE and AERMET.

The surface parameters for this application were calculated using AERSURFACE version. The land use map is part of the 2016 National Land Cover Data state-wide archive, provided by the USGS, and has 30-meter resolution. AERSURFACE was processed with options recommended by NDDEQ[1]:

Radius of study area used for surface roughness: 1.0 km
Define the surface roughness length for multiple sectors? Yes
Number of sectors: 12
Temporal resolution of surface characteristics: Monthly
Continuous snow cover for at least one month? Yes
Reassign the months to different seasons? Yes
Specify months for each season: Northwest ND
Late autumn after frost and harvest, or winter with no snow: Oct, Nov, Dec, Mar
Winter with continuous snow on the ground: Jan, Feb
Transitional spring (partial green coverage, short annuals): Apr, May
Midsummer with lush vegetation: Jun, Jul, Aug
Autumn with unharvested cropland: Sep
Is this site at an airport?
No (for primary Tioga Gas Plant on-site data);
Yes (for secondary Williston Airport NWS data).
Is the site in an arid region? No
Surface moisture condition at the site: Average

The domain for the primary data site was centered at the location of the Hess Tioga Gas Plant Station #1 in Tioga, North Dakota. The resulting surface parameters for the primary data site are summarized in Table 2.3-2.

The domain for the secondary data site was centered at the location of the airport at Williston, ND. The resulting surface parameters for the secondary site are summarized in Table 2.3-3.

[1] Recommended AERSURFACE Inputs, North Dakota (March 2017)," https://www.deq.nd.gov/publications/AQ/policy/Modeling/AERSURFACE_InputsND.pdf

TABLE 2.3-2

Seasonal Surface Parameters at Tioga, North Dakota

Circular Sector (°)	Winter with snow	Winter with no snow	Spring	Summer	Fall
Albedo (10 x 10 km Domain) [1]					
0 - 360	0.58	0.19	0.16	0.19	0.19
Bowen Ratio (10 x 10 km Domain) - Average Moisture [2]					
0 - 360	0.49	0.79	0.35	0.60	0.79
Surface Roughness Length (m) (1km-radius domain) [3]					
0 - 30	0.007	0.014	0.048	0.100	0.098
30 - 60	0.008	0.017	0.043	0.113	0.128
60 - 90	0.007	0.015	0.045	0.120	0.119
90 - 120	0.007	0.015	0.045	0.121	0.120
120 - 150	0.007	0.014	0.046	0.110	0.109
150 - 180	0.009	0.018	0.042	0.127	0.125
180 - 210	0.017	0.033	0.050	0.168	0.163
210 - 240	0.013	0.028	0.044	0.171	0.169
240 - 270	0.010	0.020	0.052	0.141	0.141
270 - 300	0.006	0.011	0.053	0.102	0.102
300 - 330	0.005	0.010	0.050	0.099	0.099
330 - 360	0.006	0.012	0.050	0.102	0.101

Notes:

[1] Albedo is a non-dimensional measure of the solar reflectivity of a surface.

[2] Bowen Ratio is a non-dimensional measure of the heat transfer for a surface under moisture conditions. Surfaces with higher moisture conditions will result in a lower Bowen Ratio. Typical values range from 0.10 for thick deciduous forest to 0.90 for fresh snow.

[3] Surface Roughness Length is the height (in meters) at which the mean horizontal wind speed is zero.

° = degrees
km = kilometer
m = meter

TABLE 2.3-3

Seasonal Surface Parameters at Williston Airport, North Dakota

Circular Sector (°)	Winter with snow	Winter with no snow	Spring	Summer	Fall
Albedo (10 x 10 km Domain) [1]					
0 - 360	0.52	0.18	0.16	0.17	0.17
Bowen Ratio (10 x 10 km Domain) - Average Moisture [2]					
0 - 360	0.48	0.76	0.41	0.61	0.76
Surface Roughness Length (m) (1km-radius domain) [3]					
0 - 30	0.010	0.017	0.033	0.046	0.040
30 - 60	0.014	0.021	0.031	0.038	0.032
60 - 90	0.013	0.020	0.029	0.036	0.031
90 - 120	0.020	0.028	0.033	0.038	0.033
120 - 150	0.020	0.028	0.037	0.043	0.038
150 - 180	0.012	0.019	0.039	0.055	0.050
180 - 210	0.005	0.011	0.046	0.087	0.086
210 - 240	0.006	0.011	0.043	0.077	0.074
240 - 270	0.008	0.015	0.048	0.081	0.076
270 - 300	0.017	0.025	0.031	0.036	0.031
300 - 330	0.010	0.018	0.024	0.032	0.028
330 - 360	0.010	0.018	0.025	0.035	0.031

Notes:

[1] Albedo is a non-dimensional measure of the solar reflectivity of a surface.

[2] Bowen Ratio is a non-dimensional measure of the heat transfer for a surface under moisture conditions. Surfaces with higher moisture conditions will result in a lower Bowen Ratio. Typical values range from 0.10 for thick deciduous forest to 0.90 for fresh snow.

[3] Surface Roughness Length is the height (in meters) at which the mean horizontal wind speed is zero.

° = degrees
km = kilometer
m = meter

Model Versions and Modeling Options

The latest versions of all the meteorological processors included in the AERMOD system were used. The default modeling options were selected in all cases.

AERMET v.19191 was used. There are three stages to processing the data in AERMET. In the first stage, meteorological data was extracted from archive data files and the surface hourly and upper air twice-daily data were processed for 2015. In the second stage, the sub-hourly ASOS wind data extracted and processed in AERMINUTE v.15272 was added and all meteorological data were merged together in a single file. In the third stage, the merged data were processed and the appropriate surface parameters were incorporated for use by AERMOD, as calculated with AERSURFACE v.20060. A threshold of 0.5 meters per second (m/s) was set for the ASOS wind speed as recommended by EPA Guidelines. The wind speed was considered a scalar quantity and the appropriate adjustment of the friction velocity (ADJ_U*) was not applied.

As show in Table 2.3-4, the resulting 2015 data set provides more than 99 percent coverage of the meteorological conditions.

TABLE 2.3-4

2015 Meteorological Data Set Coverage

Year	Missing Hours	Total Coverage [1] (%)
2015	8	99.9

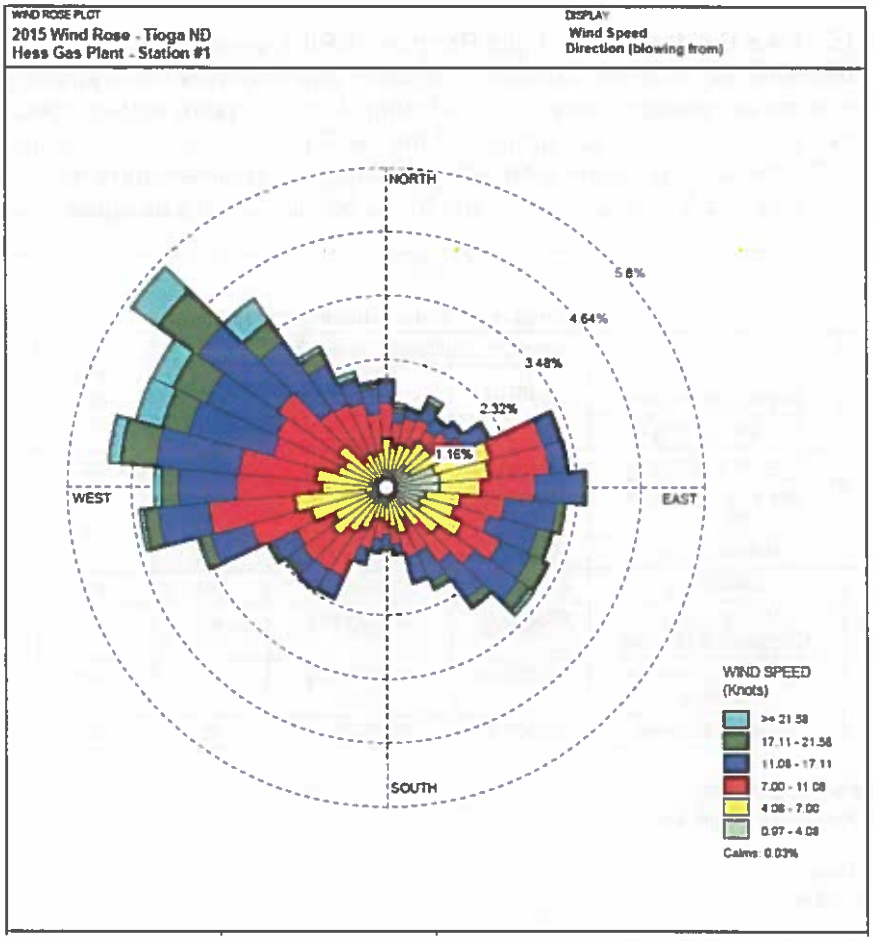
Notes:

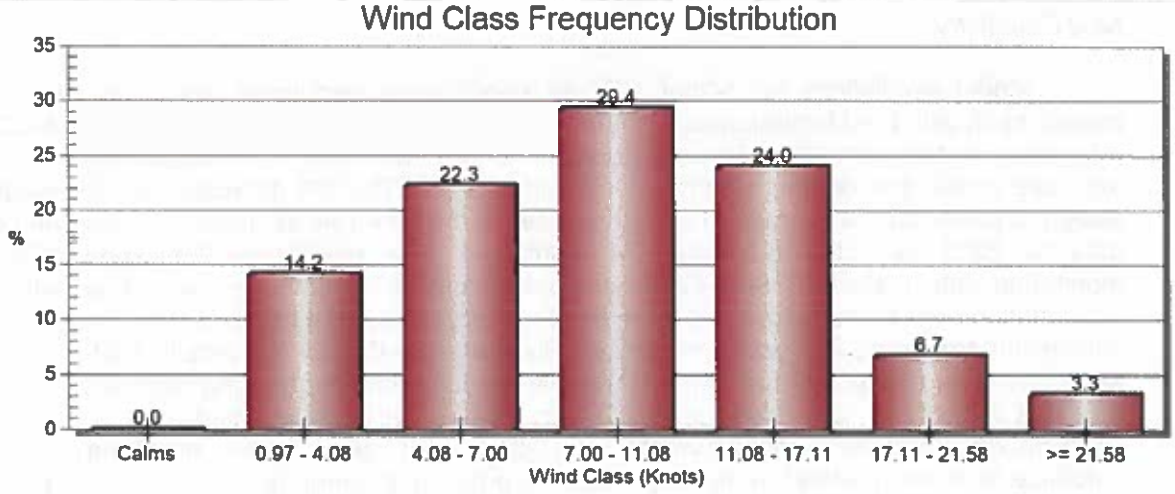
[1] Percent coverage is calculated by removing the missing hours from the total hours in a year (8,760)

% = percentage

Figure 2.3-1 shows the wind rose and wind class and frequency distribution for the 2015 meteorological data set.

Figure 2.3 1 2015 Wind Rose and Distribution from Tioga Gas Plant Station #1





Building Downwash

The US EPA's Building Profile Input Program (BPIP), version 04274, was used to calculate downwash effects for all emission sources. Building and structure configurations and locations relative to the modeled sources were obtained from WBI. All point source release points at the facility are expected to be below the greater of the GEP formula height calculated by BPIP or 65 m (213 feet). The detailed structure element coordinates and dimensions for all onsite buildings are included in Table 2.3-5. Terrain elevations for all buildings were assigned using survey data.

TABLE 2.3-5

Tioga Compressor Station Building Locations

Building ID	Building Description	Location (Southwest Corner)[1,2]		X-Length (ft)	Y-Length (ft)	Eave Height (ft)	Peak Height (ft)
		X (m E)	Y (m N)				
TRNBLDG1	Transfer Building #1	654919.13	5363288.36	50	50	12	13
TRNBLDG2	Transfer Building #2	654938.61	5363308.38	60	100	30	32.5
U1COMP	Unit #1 Compressor Building	654950.80	5363272.44	28	26	11	11
METER	Meter Building	654922.15	5363257399	7.5	7.5	10	10
OFCSHOP	Office/Shop	654919.12	5363248.47	60	40	15	17.3
U23BLDG	Unit #2 & #3 Compressor Building	655023.03	5363280.89	60	100	30	32.5
U4BLDG	Unit #4 Compressor Building	655023.03	5363308.35	60	100	30	32.5
AUX	Auxiliary Building	654967.87	5363273.05	40	80	16	18

Notes:
1 Based on site plot plans.
2 Estimated using Google Earth.

m E = meters Easting
m N = meters Northing
ft = feet

NO_X Chemistry

Model simulations for 1-hour NO_2 emissions were performed using the Tier III level assessment, with the Ozone Limited Method (OLM) option. This option uses specific NO2/NOX ratio data, in-stack ratio (ISR) for each source. For the WBI Tioga Compressor station sources, available similar source data was reviewed from the US EPA ISR database; an ISR value was assigned based on the average of similar sources in the EPA ISR database. Background ozone data for 2015 was obtained from EPA monitoring database for the Lostwood Wilderness monitoring station (site ID 038-13-4); missing data blocks of 3 hours or less were filled with simple interpolation from hours before and after, missing data blocks of 4 hours or more were filled with substitution from a nearby ozone monitor site in McKenzie County ND (site ID 038-53-2). If the same hours were also 'missing' in the McKenzie Co data, then the missing data were filled using a default value of 55 ppb, based on NDDEQ guidance. Other default setting for the use of the OLM option were used; the keyword OLMGROUP ALL was utilized according to NDDEQ guidance to properly allow the model program to properly account for competing NO_X plumes in the conversion of NO to NO_2.

Significant Impact Level Results

Model simulations for 1-hour NO_2 emissions were performed with the AERMOD model using the 2015 meteorological database. The maximum value for the applicable time averaging period was compared to the appropriate significant impact level (SIL). For the SIL analysis, the highest, first-high concentration was compared with the SIL value in Table 2.3-6.

For impacts from the project sources exceeding the SIL, the significant impact area (SIA) for 1-hour NO_2 was determined by calculating the maximum distance to which impacts are greater than the SIL. The grid spacing is resolved to within 50 meters around the maximum predicted project-only impact to assure that the maximum impact value and location had been identified.

Table 2.3-6 summarizes the results of the SIL and SIA analysis.

TABLE 2.3-6

Summary of Project-Only Impacts and SIL/SIA Analysis

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	SIA (km)	SIL ($\mu g/m^3$)	SIL Exceeded and Additional Modeling Required?
NO_2	1-hour	89.0	21.1	7.5	Yes

Notes:

SIA = significant impact area
SIL = significant impact level
$\mu g/m^3$ = micrograms per cubic meter
km = kilometer

As shown in the table above, the maximum predicted 1-hour NO_2 concentration is 89.0 $\mu g/m^3$. This concentration is above the corresponding SIL of 7.5 $\mu g/m^3$, thus, additional dispersion modeling analyses are required for the 1-hour averaging period. The 1-hour NO_2 SIA extends approximately 21.1 km from the facility.

Significant Impact Level Results – Class I area (Lostwood Wilderness)

Pursuant to NDDEQ modeling guidance, an assessment was conducted to determine if there would be a significant impact from the project on any Class I area located within 250 km of the project site. The Lostwood Wilderness area is a Class I area which is approximately 40 km from the Tioga Compressor Station.

Specific receptors defining the extents of the Lostwood Wilderness area were obtained from US EPA. These receptors were included in separate AERMOD simulation for the assessment of significant impacts. Based on discussions with NDDEQ, an assessment of significant impacts was conducted for Annual NO_2. Predicted annual NO_2 impacts from the WBI Tioga Compressor Station sources compared to the NDDEQ Class I SIL thresholds are presented in Table 2.3-7

TABLE 2.3-7

Summary of Project-Only Impacts and CLASS I SIL Analysis

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	SIL ($\mu g/m^3$)	% of SIL	SIL Exceeded and Additional Modeling Required?
NO_2	Annual	0.00788	0.1	7.88	NO

Notes:

SIL = significant impact level
$\mu g/m^3$ = micrograms per cubic meter

NAAQS Results

A NAAQS analysis, using one year of on-site meteorological data from nearby Hess Gas Plant, was performed for 1-hour NO_2. Asd escribed above, the OLM approach for modeling ambient NO_2 impacts was also used in the cumulative analysis; this is a U.S. EPA-approved default model option. The NAAQS analyses are carried out by modeling facility-wide source parameters and emission rates and adding the representative background concentrations to modeled concentrations for comparison with the NAAQS. Through discussions with NDDEQ, it was determined that nearby sources with NO_2 emissions would be included in the analysis. The nearby source to be included is the Hess Gas Plant. As documented in the detailed report *ISR & Volumetric Flow Rate, Data Analysis for Tioga Gas Plant, Tioga, ND* (Bison Engineering, Inc. June 2020), source-specific ISR values were assigned to the Hess Tioga Gas Plant sources based on site-specific measurements and a review of available data from the US EPA ISR Database. A copy of this report is included as Appendix F.

Appendix G provides the source data from the Hess Tioga Gas Plant used in the cumulative modeling for 1-hour NO_2 impacts for comparison to NAAQS.As identified in Table 2.3-7, the project-only impacts exceed the SIL for 1-hour NO_2. As such, impacts from the facility, in combination with the background concentration, were evaluated for 1-hour NO_2 for comparison with the NAAQS. Although the Tioga Compressor Station is an existing facility, there were no NO_2 emissions from any of the existing emission units located at the facility. Based on information from NDDEQ, the Hess Gas Plant was the only additional source to be included with the WBI Tioga Compressor stations sources in the NO_2 cumulative analysis. For the cumulative analysis, the highest, eighth-high concentration was compared, after adding the background concentration, with the NAAQS value in Table 2.3-8.

The initial modeling results show that the 1-hour NO_2 NAAQS is exceeded. Additional refined modeling for source culpability was required to demonstrate that the Tioga Compressor Station would not have significant contribution to the model-predicted exceedance of the 1-hr NO2 NAAQS.

Table 2.3-8 summarizes the results of the initial cumulative NAAQS modeling for 1-hour NO_2 with maximum impacts that exceeded the SILs.

TABLE 2.3-8

Summary of Initial Cumulative NAAQS Analysis

Pollutant	Averaging Period	Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	NAAQS Exceeded?
NO_2	1-hour	354.6	35	389.6	188	YES

Notes:

NAAQS = National Ambient Air Quality Standards
$\mu g/m^3$ = micrograms per cubic meter
km = kilometer

A more refined analysis was conducted to assess the culpability of the Tioga Compressor Station impacts to determine if there was a significant impact from the Tioga Compressor Station at any location and instance of predicted impacts above the ambient standard. This culpability assessment was conducted by re-running AERMOD for only the receptors where there was a predicted impact above the AAQS, using the MAXDCONT keyword to obtain source culpability for each instance at each receptor; there were 1,148 individual receptors where cumulative impacts were predicted above the AAQS.

Results of the MAXDCONT simulation determined that there were 24,207 total instances (at 1,148 unique locations) where predicted impacts from all sources were above the 1-hr NO_2 AAQS. These results were imported into an Excel spreadsheet and sorted based on the total contribution from the Tioga Compressor Station. The maximum contribution from the Tioga Compressor Station for any instance at any location was 2.3 $\mu g/m^3$. This maximum contribution is less than the Significant Impact Level (SIL). Therefore, the Tioga Compressor Station does not cause or contribute in a significant amount to any predicted cumulative impacts which were above the 1-hour NO_2 AAQS.

The detailed electronic modeling files and associated MS EXCEL spreadsheets providing the evaluation of MAXDCONT facility culpability is provided with this application.

2.4 North Dakota Air Toxics Review

North Dakota also requires an air toxics review to be evaluated for applicability for any source that is required to submit a permit to construct that has the potential to emit HAPs. Since the compressor stack is less than 1.5 times higher than the nearest building height, the air toxics analysis is required. The air toxics review is a stepped approach of comparing HAP concentrations to acceptable values by reviewing the maximum individual carcinogenic risk. The analysis allows the Department to determine if the emission sources require additional review.

2.4.1 Tiered Analysis

Tier 1 Analysis

For Tier 1 of the air toxics review, the HAP emissions from all facility sources were compared to the look-up tables in Appendix A and Appendix B provided in Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota (Air Toxics Policy). Using steps 1 through 11 of the Air Toxics Policy, each HAP was evaluated for its health effects. All HAPs were compared to the applicable 1-hour and 8-hour concentrations for each pollutant as found in

Appendix A. In addition, HAPs classified as carcinogenic were compared to the Unit Risk Factors in Appendix B of the Air Toxics Policy. If the emission rate was below the guideline concentration as found in Table 1 of the Air Toxics Policy, the pollutant was screened out from further analysis.

The result of the Tier 1 review for non-carcinogenic pollutants indicated that several specific pollutants (ammonia, acetaldehyde, acrolein, benzene, and formaldehyde) were above their respective 1-hour or 8-hour guideline concentrations. These pollutants were then reviewed per the Tier 2 or Tier 3 analysis. All other pollutants were below their respective guideline concentrations for non-carcinogenic impacts and did not require additional analysis.

For carcinogenic pollutants, the total calculated maximum individual carcinogenic risk (MICR) was summed and compared to the MICR threshold of 1×10^{-5} (0.00001). The total MICR for the facility was calculated as 1.56×10^{-3} which is above the MICR threshold of 1×10^{-5}. Specific carcinogenic HAPs were individually above the MICR threshold of 1×10^{-5} and these compounds were individually evaluated further in a Tier 3 analysis. This Tier 3 analysis is presented later in this section.

Table 2.4-1 summarizes the Tier 1 air toxics analysis. Note that values shown in red/italics indicate that the air toxics analysis for that pollutant was advanced to the Tier 3 assessment.

TABLE 2.4-1

Tier 1 Air Toxics Analysis

Pollutant	Averaging Time	Emissions (g/s)	1-hr Concentration (mg/m^3)	1-hr Guideline Conc. [1] (mg/m^3)	1-hr HI [3]	8-hr Concentration (mg/m^3)	8-hr Guideline Conc. [1] (mg/m^3)	8-hr HI [3]	Annual Concentration ($\mu g/m^3$)	URF [2] ($m^3/\mu g$)	MICR [4]
Ammonia	1-hr, 8-hr	1.61E-01	1.13E+00	0.488	*2.32* [6]	7.91E-01	3.48E-01	*2.27* [6]	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	8-hr	4.11E-04	2.71E-03	N/A	N/A	1.90E-03	2.83E-02	0.07	N/A	N/A	N/A
1,1,2-Trichloroethane	8-hr	3.22E-04	2.06E-03	N/A	N/A	1.44E-03	1.09E+00	1.33E-03	N/A	N/A	N/A
1,1-Dichloroethane	8-hr	2.39E-04	1.53E-03	N/A	N/A	1.07E-03	8.10E+00	1.32E-04	N/A	N/A	N/A
1,3,5-Trimethylbenzene	8-hr	3.23E-04	1.88E-03	N/A	N/A	1.13E-03	2.46E+00	5.34E-04	N/A	N/A	N/A
1,3-Butadiene	annual	3.27E-03	2.76E-02	N/A	N/A	N/A	N/A	N/A	2.21	3.00E-05	*6.62E-05* [6]
1,3-Dichloropropene	annual	2.67E-04	1.71E-03	N/A	N/A	1.20E-03	N/A	N/A	0.137	4.00E-06	5.48E-07
2-Methylnaphthalene	8-hr	3.19E-04	1.85E-03	N/A	N/A	1.29E-03	5.20E-02	0.02	N/A	N/A	N/A
Acetaldehyde	1-hr, annual	8.32E-02	5.19E-01	0.901	*0.58* [6]	N/A	N/A	N/A	41.5	2.20E-06	*9.13E-05* [6]
Acrolein	1-hr	1.51E-02	1.22E-01	0.00459	*26.58* [6]	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	1-hr, 8-hr, annual	5.91E-03	5.48E-02	0.16	0.34	3.84E-02	3.19E-02	*1.20* [6]	4.38	7.80E-06	*3.42E-05* [6]
Benzo(b)fluoranthene	annual	1.59E-06	9.24E-06	N/A	N/A	N/A	N/A	N/A	7.39E-04	1.10E-04	8.13E-08
Carbon Tetrachloride	1-hr, 8-hr, annual	3.71E-04	2.38E-03	1.258	0.0019	1.67E-03	6.29E-01	0.003	0.191	6.00E-06	1.14E-06
Chlorobenzene	8-hr	3.06E-04	1.94E-03	N/A	N/A	1.36E-03	9.21E-01	0.001	N/A	N/A	N/A
Chloroform	8-hr, annual	2.88E-04	1.85E-03	N/A	N/A	1.29E-03	9.77E-01	0.001	1.48E-01	2.30E-05	3.40E-06
Chrysene	annual	6.65E-06	3.86E-05	N/A	N/A	N/A	N/A	N/A	3.09E-03	1.10E-05	3.40E-08
Cyclopentane	8-hr	2.18E-03	1.26E-02	N/A	N/A	8.85E-03	3.44E+01	2.57E-04	N/A	N/A	N/A
Ethylbenzene	1-hr, 8-hr, annual	4.08E-04	2.69E-03	10.855	2.47E-04	1.88E-03	8.68E+00	2.17E-04	2.15E-01	2.50E-06	5.37E-07
Ethylene Dibromide	annual	4.48E-04	2.87E-03	N/A	N/A	N/A	N/A	N/A	2.03E-01	6.00E-04	*1.38E-04* [6]
Formaldehyde	1-hr, annual	1.07E-01	7.75E-01	0.00737	*105.12* [6]	N/A	N/A	N/A	6.20E+-1	1.30E-05	*8.06E-04* [6]
Methanol	1-hr, 8-hr	2.73E-02	1.98E-01	6.552	0.030	1.39E-01	5.24E+00	0.026	N/A	N/A	N/A
Methylcyclohexane	8-hr	1.18E-02	6.85E-02	N/A	N/A	4.79E-02	3.21E+01	0.001	N/A	N/A	N/A
Methylene Chloride	8-hr, annual	2.36E-04	1.90E-03	N/A	N/A	1.33E-03	3.47E+00	3.84E-04	1.52E-01	4.70E-07	7.16E-08
Hexane	8-hr	1.07E-02	6.18E-02	N/A	N/A	4.33E-02	3.53E+00	0.01	N/A	N/A	N/A
Nonane	8-hr	1.06E-03	6.12E-03	N/A	N/A	4.29E-03	2.10E+01	2.04E-04	N/A	N/A	N/A
Octane	8-hr	3.37E-03	1.95E-02	N/A	N/A	1.37E-02	2.80E+01	4.89E-04	N/A	N/A	N/A
Pentane	8-hr	2.50E-02	1.45E-01	N/A	N/A	1.01E-01	3.54E+01	0.003	N/A	N/A	N/A
Naphthalene	1-hr, 8-hr, annual	8.18E-04	6.00E-03	1.573	0.0038	4.20E-03	1.05E+00	0.004	4.80E-01	3.40E-05	*1.63E-05* [6]
PAH [5]	annual	4.08E-04	4.20E-03	N/A	N/A	N/A	N/A	N/A	3.36E-01	1.20E-03	*4.03E-04* [6]
Phenol	8-hr	2.03E-04	1.34E-03	N/A	N/A	9.35E-04	3.85E-01	0.002	N/A	N/A	N/A

TABLE 2.4-1

Tier 1 Air Toxics Analysis

Pollutant	Averaging Time	Emissions (g/s)	1-hr Concentration (mg/m^3)	1-hr Guideline Conc. [1] (mg/m^3)	1-hr HI [3]	8-hr Concentration (mg/m^3)	8-hr Guideline Conc. [1] (mg/m^3)	8-hr HI [3]	Annual Concentration ($\mu g/m^3$)	URF [2] ($m^3/\mu g$)	MICR [4]
Styrene	1-hr, 8-hr	2.39E-04	1.54E-03	3.408	4.53E-04	1.08E-03	1.70E+00	0.001	N/A	N/A	N/A
Toluene	8-hr	4.51E-03	3.34E-02	N/A	N/A	2.34E-02	1.51E+00	0.015	N/A	N/A	N/A
Vinyl Chloride	8-hr, annual	1.51E-04	9.67E-04	N/A	N/A	6.77E-04	5.11E-02	0.013	7.74E-02	8.80E-06	6.81E-07
Xylene	1-hr, 8-hr	1.97E-03	1.40E-02	13.026	0.0011	9.79E-03	8.68E+00	0.001	N/A	N/A	N/A
										Total Facility MICR	**1.56E-03**

Notes:

1 From Appendix A of the Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota.

2 From Appendix B of the Policy for the Control of Hazardous Air Pollutant Emissions in North Dakota.

3 Hazard Index (HI) = Facility Concentration (mg/m^3) ÷ Guideline Concentration (mg/m^3). If HI<1, pollutant is screened out. If HI≥1, pollutant requires further analysis.

4 MICR = Maximum Individual Cancer Risk = annual concentration ($\mu g/m^3$) x URF ($m^3/\mu g$). Dimensionless. If MICR<1.0E-05, pollutant is screened out. If MICR≥1.0E-05, pollutant requires further analysis.

5 PAH analysis was completed by using the URF for dibenz(a,h)anthracene, which is one of the pollutants that make up PAH.

6 ***Pollutants with HI and/or MCIR listed in red/italics did not pass the Tier 1 analysis and required further analysis.***

PAH = Polycyclic Aromatic Hydrocarbons
N/A = Not Applicable
g/s = grams per second
mg/m^3 = milligrams per cubic meter

Tier 2 Analysis

According to the Air Toxics Policy, the Tier 2 analysis involves the use of the EPA SCREEN3 computer screening model. The screening model predicts the highest 1-hour concentration of a pollutant from a matrix of predictions for all plausible meteorological conditions. Instead of running a screen model, a refined air dispersion model as specified in the Tier 3 approach was used.

Tier 3 Analysis

The Tier 3 analysis predicts the health effect of each HAP with a refined EPA computer model by using hour-by-hour meteorological data to determine a maximum concentration. This concentration is then compared to a state-level toxics standard to evaluate the potential risk to human health and the environment. Through guidance with NDDEQ air quality division, the Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values from the California Air Resources Board, last updated in September 2019 (Table 1 in Appendix L), was used to determine compliance with the Air Toxics Policy.

Receptor Grid

To ensure that the area of maximum effects was accurately sampled, a multi-tier receptor grid extending out to 15 kilometers (km) was used in the model. The configuration of receptor points was as follows:

- 25-meter (m) spacing along the facility fence/property line;
- 50-m spacing from the fence/property line to 500 m;
- 100-m spacing from 500 m to 2 km;
- 250-m spacing from 2 km to 5 km; and
- 500-m spacing from 5 km to 15km.

Public access at the facility will be impeded by fencing and gates.

Modeling Results

Modeling was conducted to further assess non-carcinogenic impacts for 1-hour acetaldehyde, 1-hour acrolein, 1-hour and 8-hour ammonia, 8-hour benzene, and 1-hour formaldehyde, using a Tier 3 approach per NDDEQ guidelines. The predicted maximum non-carcinogenic impacts for all compounds, except 1-hour acrolein, are below their respective OEHHA/ARB approved risk assessment health values.

The detailed results summary is presented in Table 2.4-2.

TABLE 2.4-2

AERMOD Results and Tier 3 Air Toxics Compliance Summary – Non-carcinogenic Impacts

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	OEHHA/ARB Risk Assessment Health Value[1] ($\mu g/m^3$)	Hazard Index (HI) [3]
Acetaldehyde	1-hour	4.13	470	0.009
Acrolein	1-hour	0.97	2.5	0.39
Ammonia	1-hour	8.52	3,200	0.003
	8-hour	5.96	3,200 [2]	0.002
Benzene	1-hour	0.45	27	0.017
	8-hour	0.29	3	0.095
Formaldehyde	1-hour	5.93	55	0.11

Notes:

1 From the California Air Resources Board – Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, updated September 19, 2019, Table 1 in Appendix L

2 There is no 8-hour inhalation health value for ammonia in the OEHHA/ARB Risk Assessment Consolidated Table. The 8-hour ammonia project impact was instead compared to the acute inhalation health value.

3 Hazard Index (HI) = Facility Concentration (mg/m^3) ÷ Guideline Concentration (mg/m^3). If HI<1, analysis is complete. If HI≥1, pollutant requires further analysis.

$\mu g/m^3$ = micrograms per cubic meter

Further review was conducted for assessing the 1-hour impacts of acrolein. This review examine the areal extents of the 1-hour impacts of acrolein to confirm that the hazard index at any existing residence was below a hazard index of 1.0. The nearest existing residence is 0.42 miles (2221 feet) east of the Tioga Compressor Station. The furthest extend of 1-hour acrolein impacts only extend to less than 700 feet beyond the property boundary. Therefore, pursuant to the NDDEQ Air Toxics Modeling guidance (NDDEQ memo date January 23, 2015, Section III), the predicted impacts of non-carcinogens are within acceptable limits. A figure depicting the acrolein impacts and nearest residence is attached in Appendix E

Modeling was conducted to further assess carcinogenic impacts for acetaldehyde, 1,3-butadiene, benzene, ethylene dibromide, formaldehyde, and PAH. The predicted MICR for each compound are below the MICR threshold of 1×10^{-5}.

The detailed results summary is presented in Table 2.4-3.

TABLE 2.4-3

AERMOD Results and Tier 3 Air Toxics Compliance Summary - Carcinogenic Impacts

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	OEHHA/ARB Inhalation Unit Risk Value[1] $(\mu g/m^3)^{-1}$	RISK
Acetaldehyde	Annual	0.10058	2.70E-06	2.72E-07
1,3-Butadiene	Annual	0.00535	1.70E-04	9.10E-07
Benzene	Annual	0.01157	2.90E-05	3.36E-07
Chloroform	Annual	0.00035	5.30E-06	1.86E-09
Ethylene Dibromide	Annual	0.00055	7.10E-05	3.91E-08
Formaldehyde	Annual	0.13747	6.00E-06	8.25E-07
Naphthalene	Annual	0.00106	3.40E-05	3.60E-08
PAH	Annual	0.00099	1.10E-03	1.09E-06

Notes:

[1] From the California Air Resources Board – Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, updated September 19, 2019, Table 1 in Appendix L

$\mu g/m^3$ = micrograms per cubic meter

Based on this analysis, the emissions of HAPs from the Tioga Compressor Station do not cause potentially hazardous impacts to existing surrounding residential areas. As such, the Tioga Compressor Station demonstrates compliance with the North Dakota Air Toxics Policy.

Appendix A

Site Location Map and Site Plot Plan

Fence Line

Property Line

0 500 1000 2000 Feet

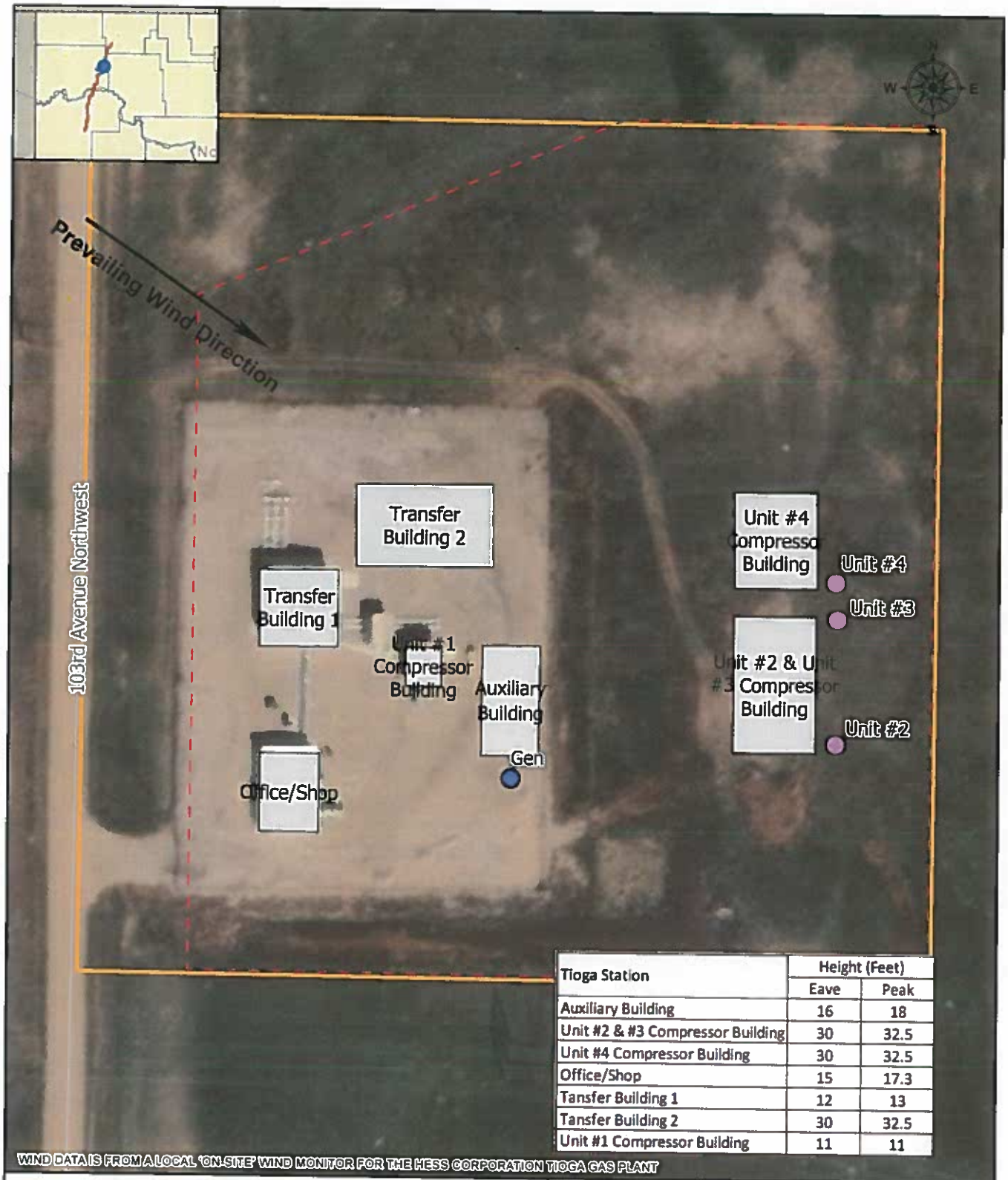
1:12,000

WBI Energy Transmission
Application for Permit to Construct
Tioga Compressor Station
Site Location Map

WBI ENERGY TRANSMISSION

File: H:\Clients\V-X\WBI\North_Bakken_Expansion_ArcGIS\2020\01\Air_PermitMaps\AirPermit_CompressorStations\AirPermit_CompressorStations_v2.aprx | Revised: 1/27/2020

Drawn By: 0239



Tioga Station	Height (Feet)	
	Eave	Peak
Auxiliary Building	16	18
Unit #2 & #3 Compressor Building	30	32.5
Unit #4 Compressor Building	30	32.5
Office/Shop	15	17.3
Tansfer Building 1	12	13
Tansfer Building 2	30	32.5
Unit #1 Compressor Building	11	11

WIND DATA IS FROM A LOCAL 'ON-SITE' WIND MONITOR FOR THE HESS CORPORATION TIOGA GAS PLANT

Compressor Engine Stack
Generator Stack
Fence Line
Property Line
Building

0 50 100 200 Feet

WBI Energy Transmission
Application for Permit to Construct
Tioga Compressor Station
Site Plan

1:1,200

WBI ENERGY TRANSMISSION

File: M:\Clients\V-X\WBI\North_Bakken_Expansion_ArcGIS\2020\01\Air_PermitMaps\AirPermit_CompressorStations\AirPermit_CompressorStations_v2.aprx | Revised: 6/18/2020

Drawn By: 0239

Appendix B

Potential to Emit Calculations

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Potential to Emit Summary

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Emission Unit	Pollutant (TPY[1])										
	NO_X	CO	VOC	PM	PM_{10}	$PM_{2.5}$	SO_2	Lead	Total HAPs	Largest Single HAP (Formaldehyde)	CO_2e
Engine/Compressor #2	18.11	18.11	18.11	1.11	1.11	1.11	0.07	—	3.61	1.45	13,021
Engine/Compressor #3	18.11	18.11	18.11	1.11	1.11	1.11	0.07	—	3.61	1.45	13,021
Engine/Compressor #4	18.11	18.11	18.11	1.11	1.11	1.11	0.07	—	3.61	1.45	13,021
Generator	8.92	17.84	6.25	0.72	0.72	0.72	0.022	—	0.89	0.45	4,336
Pig Launching and Receiving	—	—	24.22	—	—	—	—	—	0.10	NA	4,648
Station Blowdowns	—	—	7.90	—	—	—	—	—	0.03	NA	1,931
Three (3) Tanks	—	—	0.012	—	—	—	—	—	0.01	NA	NA
Comfort Heating	2.23	1.87	0.12	0.17	0.17	0.17	0.01	1.11E-05	0.08	0.071	2,661
Fugitive Emissions Equipment Leaks	—	—	0.83	—	—	—	—	—	0.0002	—	203
Total Facility Unlimited Emissions:	**65.47**	**74.03**	**93.65**	**4.22**	**4.22**	**4.22**	**0.23**	**1.11E-05**	**11.93**	**4.86**	**52,841**
Total Facility Unlimited Emissions without Fugitives:	65.47	74.03	92.82	4.22	4.22	4.22	0.23	NA	11.93	4.79	52,638

[1] TPY - Tons Per Year

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Caterpillar 3612 w/Ariel Compressor

Prepared: AMC
Reviewed: PCB
Date: June 8,2020

Engine/Compressor #2	
Assumptions:	
Natural Gas Fired	
Max. Rated Capacity, bhp	3,750
Fuel Consumption[1], Btu/bhp-hr	6,772
Max. Rated Capacity, MMBtu/hr	25.40
Fuel Consumption Rate, cf/hr	21,284
Conversion Factors:	
ton/ton	2,000
lb/kg	2.204
grams to pounds	453.6
Btu/MMBtu	1,000,000
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298
hours/yr	8,760
Btu/scf (based on gas analysis)[2]	1,193

Pollutant	Emission Factors[3]		Uncontrolled Hourly Emissions[4] (lb/hr)	Uncontrolled Annual Emissions (TPY)	Catalyst Factors[5]		Post Oxidation Catalyst Hourly Emissions (lb/hr)	Post Oxidation Catalyst Annual Emissions (TPY)
NO_x	0.50	grams/bhp-hr	4.13	18.11	NA	NA	NA	NA
CO	2.00	grams/bhp-hr	16.53	72.42	0.90	grams/bhp-hr	4.13	18.11
VOC	0.70	grams/bhp-hr	5.79	25.35	0.90	grams/bhp-hr	4.13	18.11
PM	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
PM_{10}	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
$PM_{2.5}$	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
SO_2	0.00	lb/MMBtu	0.01	0.07	NA	NA	NA	NA
CO_2e[6]	117.1	lb/MMBtu	2,973	13,021	NA	NA	NA	NA
CO_2[7]	116.9	lb/MMBtu	2968.8	13,008	NA	NA	NA	NA
CH_4[8]	0.002	lb/MMBtu	0.06	0.25	NA	NA	NA	NA
N_2O[8]	0.0002	lb/MMBtu	0.01	0.02	NA	NA	NA	NA
Ammonia[9]	19	lb/MMscf	0.36	1.58	NA	NA	NA	NA
Total HAPs	8.13E-02	lb/MMBtu	2.06	9.04	NA	NA	0.82	3.61
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	1.02E-03	4.45E-03	NA	NA	NA	NA
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	8.08E-04	3.54E-03	NA	NA	NA	NA
1,1-Dichloroethene	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
1,2-Dichloropropane	2.69E-05	lb/MMBtu	6.83E-04	2.99E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	3.38E-05	lb/MMBtu	8.58E-04	3.76E-03	NA	NA	NA	NA
1,3-Butadiene	2.67E-04	lb/MMBtu	6.78E-03	2.97E-02	NA	NA	NA	NA
1,3-Dichloropropene	2.64E-05	lb/MMBtu	6.70E-04	2.94E-03	NA	NA	NA	NA
2-Methylnaphthalene	3.32E-05	lb/MMBtu	8.43E-04	3.69E-03	NA	NA	NA	NA
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	6.35E-03	2.78E-02	NA	NA	NA	NA
Acenaphthene	1.25E-06	lb/MMBtu	3.17E-05	1.39E-04	NA	NA	NA	NA
Acenaphthylene	5.53E-06	lb/MMBtu	1.40E-04	6.15E-04	NA	NA	NA	NA
Acetaldehyde	8.36E-03	lb/MMBtu	2.12E-01	9.30E-01	NA	NA	NA	NA
Acrolein	5.14E-03	lb/MMBtu	1.31E-01	5.72E-01	79	%	3.29E-02	1.43E-01
Benzene	4.40E-04	lb/MMBtu	1.12E-02	4.89E-02	NA	NA	NA	NA
Benzo(b)fluoranthene	*1.66E-07*	*lb/MMBtu*	*4.22E-06*	*1.85E-05*	NA	NA	NA	NA
Biphenyl	2.12E-04	lb/MMBtu	5.38E-03	2.36E-02	NA	NA	NA	NA
Carbon Tetrachloride	3.67E-05	lb/MMBtu	9.32E-04	4.08E-03	NA	NA	NA	NA
Chlorobenzene	3.04E-05	lb/MMBtu	7.72E-04	3.38E-03	NA	NA	NA	NA
Chloroethane	1.87E-06	lb/MMBtu	4.75E-05	2.08E-04	NA	NA	NA	NA
Chloroform	2.85E-05	lb/MMBtu	7.24E-04	3.17E-03	NA	NA	NA	NA
Chrysene	*6.93E-07*	*lb/MMBtu*	*1.76E-05*	*7.71E-05*	NA	NA	NA	NA
Cyclopentane	*2.27E-04*	*lb/MMBtu*	*5.76E-03*	*2.52E-02*	NA	NA	NA	NA
Ethylbenzene	3.97E-05	lb/MMBtu	1.01E-03	4.42E-03	NA	NA	NA	NA
Ethylene Dibromide	4.43E-05	lb/MMBtu	1.12E-03	4.93E-03	NA	NA	NA	NA
Formaldehyde (CH_2O)	1.99E-01	grams/bhp-hr	1.67	8.88	0.84	grams/bhp-hr	0.33	1.48
Methanol	2.50E-03	lb/MMBtu	6.35E-02	2.78E-01	NA	NA	NA	NA
Methylcyclohexane	*1.73E-03*	*lb/MMBtu*	*3.12E-02*	*1.37E-01*	NA	NA	NA	NA
Methylene Chloride	2.00E-05	lb/MMBtu	5.08E-04	2.22E-03	NA	NA	NA	NA
Hexane	1.11E-03	lb/MMBtu	2.82E-02	1.23E-01	NA	NA	NA	NA
Nonane	*1.10E-04*	*lb/MMBtu*	*2.79E-03*	*1.22E-02*	NA	NA	NA	NA
Octane	*3.81E-04*	*lb/MMBtu*	*8.81E-03*	3.90E-02	NA	NA	NA	NA
Pentane	*2.60E-03*	*lb/MMBtu*	*6.60E-02*	*2.89E-01*	NA	NA	NA	NA
Naphthalene	7.44E-05	lb/MMBtu	1.89E-03	8.28E-03	NA	NA	NA	NA
PAH	2.69E-05	lb/MMBtu	6.83E-04	2.99E-03	NA	NA	NA	NA
Phenanthrene	1.04E-05	lb/MMBtu	2.64E-04	1.16E-03	NA	NA	NA	NA
Phenol	2.40E-05	lb/MMBtu	6.09E-04	2.67E-03	NA	NA	NA	NA
Styrene	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
Toluene	4.08E-04	lb/MMBtu	1.04E-02	4.54E-02	NA	NA	NA	NA
Vinyl Chloride	1.49E-05	lb/MMBtu	3.78E-04	1.66E-03	NA	NA	NA	NA
Xylene	1.84E-04	lb/MMBtu	4.67E-03	2.05E-02	NA	NA	NA	NA

[1] Fuel consumption from Caterpillar G3612 Gas Engine Site Specific Technical Data sheet, maximum rating at 100% load
[2] Heating value of natural gas taken from WBI Energy gas analysis

[3] Uncontrolled emission factors for CO and VOC based on compliance with 40 CFR Part 60 Subpart JJJJ. Emission factor for NOx and formaldehyde (CH_2O) taken from engine specification sheet. The NOx emission factor from the engine specification uses a factor of safety to raise from 0.30 g/bhp to 0.5 g/bhp. The controlled emission factor for CO, VOC, CH_2O, and acrolein are based on reduction by the catalyst. CO_2, CH_4 and N_2O taken from 40 CFR 98 Subpart C. All other factors based on AP-42 emission factors for an uncontrolled 4-stroke lean burn engines, AP-42 Chapter 3.2 Natural Gas-fired Reciprocating Engines, Table 3.2-2, July 2000

[4] Hourly emissions are based on the maximum design heat input

[5] Catalyst emission factors taken from Miratech specification sheet for oxidation system specifications to be used with Caterpillar G3612 LE A4 Engine. The catalyst emission rates for CO, VOC, acrolein, and formaldehyde include a safety factor.

[6] CO_2e emissions are based on global warming potential of CO_2=1, CH_4=25, and N_2O=298

[7] CO_2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO_2/MMBtu), November 29, 2013

[8] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013

[9] Ammonia emission factor is based on FIRE factor for SCC 20200253

Pollutants listed in italics have listed emission factors in AP-42, but are not HAPs as define Section 112(b) of the Clean Air Act and are not included in the Total HAP emission factor.
Largest single facility-wide HAP shown in bold

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Caterpillar 3612 w/Ariel Compressor

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Engine/Compressor #3	
Assumptions:	
Natural Gas Fired	
Max. Rated Capacity, bhp	3,750
Fuel Consumption[1], Btu/bhp-hr	6,772
Max. Rated Capacity, MMBtu/hr	25.40
Fuel Consumption Rate, cf/hr	21,284
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
grams to pounds	453.6
Btu/MMBtu	1,000,000
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298
hours/yr	8,760
Btu/scf (based on gas analysis)[2]	1,193

Pollutant	Emission Factors[3]		Uncontrolled Hourly Emissions[4] (lb/hr)	Uncontrolled Annual Emissions (TPY)	Catalyst Factors[5]		Post Oxidation Catalyst Hourly Emissions (lb/hr)	Post Oxidation Catalyst Annual Emissions (TPY)
NO_x	0.50	grams/bhp-hr	4.13	18.11	NA	NA	NA	NA
CO	2.00	grams/bhp-hr	16.53	72.42	0.50	grams/bhp-hr	4.13	18.11
VOC	0.70	grams/bhp-hr	5.79	25.35	0.50	grams/bhp-hr	4.13	18.11
PM	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
PM_{10}	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
$PM_{2.5}$	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
SO_2	0.00	lb/MMBtu	0.01	0.07	NA	NA	NA	NA
CO_2e[6]	117.1	lb/MMBtu	2,973	13,021	NA	NA	NA	NA
CO_2[7]	116.9	lb/MMBtu	2969.8	13,009	NA	NA	NA	NA
CH_4[8]	0.002	lb/MMBtu	0.05	0.25	NA	NA	NA	NA
N_2O[8]	0.0002	lb/MMBtu	0.01	0.02	NA	NA	NA	NA
Ammonia[9]	16	lb/MMscf	0.38	1.66	NA	NA	NA	NA
Total HAPs	8.13E-02	lb/MMBtu	2.05	9.04	NA	NA	0.82	3.61
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	1.02E-03	4.45E-03	NA	NA	NA	NA
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	8.08E-04	3.54E-03	NA	NA	NA	NA
1,1-Dichloroethane	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
1,2-Dichloropropane	*2.69E-05*	*lb/MMBtu*	*6.83E-04*	*2.99E-03*	NA	NA	NA	NA
1,3,5-Trimethylbenzene	*3.35E-05*	*lb/MMBtu*	*8.51E-04*	*3.73E-03*	NA	NA	NA	NA
1,3-Butadiene	2.67E-04	lb/MMBtu	6.78E-03	2.97E-02	NA	NA	NA	NA
1,3-Dichloropropene	2.64E-05	lb/MMBtu	6.70E-04	2.94E-03	NA	NA	NA	NA
2-Methylnaphthalene	*3.32E-05*	*lb/MMBtu*	*8.43E-04*	*3.69E-03*	NA	NA	NA	NA
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	6.35E-03	2.78E-02	NA	NA	NA	NA
Acenaphthene	1.25E-06	lb/MMBtu	3.17E-05	1.39E-04	NA	NA	NA	NA
Acenaphthylene	5.53E-06	lb/MMBtu	1.40E-04	6.15E-04	NA	NA	NA	NA
Acetaldehyde	8.36E-03	lb/MMBtu	2.12E-01	9.30E-01	NA	NA	NA	NA
Acrolein	5.14E-03	lb/MMBtu	1.31E-01	5.72E-01	75	%	3.28E-02	1.43E-01
Benzene	4.40E-04	lb/MMBtu	1.12E-02	4.89E-02	NA	NA	NA	NA
Benzo(b)fluoranthene	*1.66E-07*	*lb/MMBtu*	*4.22E-06*	*1.85E-05*	NA	NA	NA	NA
Biphenyl	2.12E-04	lb/MMBtu	5.38E-03	2.36E-02	NA	NA	NA	NA
Carbon Tetrachloride	3.67E-05	lb/MMBtu	9.32E-04	4.08E-03	NA	NA	NA	NA
Chlorobenzene	3.04E-05	lb/MMBtu	7.72E-04	3.38E-03	NA	NA	NA	NA
Chloroethane	1.87E-06	lb/MMBtu	4.75E-05	2.08E-04	NA	NA	NA	NA
Chloroform	2.85E-05	lb/MMBtu	7.24E-04	3.17E-03	NA	NA	NA	NA
Chrysene	*6.93E-07*	*lb/MMBtu*	*1.76E-05*	*7.71E-05*	NA	NA	NA	NA
Cyclopentane	*2.27E-04*	*lb/MMBtu*	*5.76E-03*	*2.52E-02*	NA	NA	NA	NA
Ethylbenzene	3.97E-05	lb/MMBtu	1.01E-03	4.42E-03	NA	NA	NA	NA
Ethylene Dibromide	4.43E-05	lb/MMBtu	1.12E-03	4.93E-03	NA	NA	NA	NA
Formaldehyde (CH_2O)	1.90E-01	grams/bhp-hr	1.57	6.88	8.04	grams/bhp-hr	0.33	1.45
Methanol	2.50E-03	lb/MMBtu	6.35E-02	2.78E-01	NA	NA	NA	NA
Methylcyclohexane	*1.23E-03*	*lb/MMBtu*	*3.12E-02*	*1.37E-01*	NA	NA	NA	NA
Methylene Chloride	2.00E-05	lb/MMBtu	5.08E-04	2.22E-03	NA	NA	NA	NA
Hexane	1.11E-03	lb/MMBtu	2.82E-02	1.23E-01	NA	NA	NA	NA
Nonane	*1.10E-04*	*lb/MMBtu*	*2.79E-03*	*1.22E-02*	NA	NA	NA	NA
Octane	*3.51E-04*	*lb/MMBtu*	*8.91E-03*	*3.90E-02*	NA	NA	NA	NA
Pentane	*2.60E-03*	*lb/MMBtu*	*6.60E-02*	*2.89E-01*	NA	NA	NA	NA
Naphthalene	7.44E-05	lb/MMBtu	1.89E-03	8.28E-03	NA	NA	NA	NA
PAH	2.69E-05	lb/MMBtu	6.83E-04	2.99E-03	NA	NA	NA	NA
Phenanthrene	1.04E-05	lb/MMBtu	2.64E-04	1.16E-03	NA	NA	NA	NA
Phenol	2.40E-05	lb/MMBtu	6.09E-04	2.67E-03	NA	NA	NA	NA
Styrene	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
Toluene	4.08E-04	lb/MMBtu	1.04E-02	4.54E-02	NA	NA	NA	NA
Vinyl Chloride	1.49E-05	lb/MMBtu	3.78E-04	1.66E-03	NA	NA	NA	NA
Xylene	1.84E-04	lb/MMBtu	4.67E-03	2.05E-02	NA	NA	NA	NA

[1] Fuel consumption from Caterpillar G3612 Gas Engine Site Specific Technical Data sheet, maximum rating at 100% load

[2] Heating value of natural gas taken from WBI Energy gas analysis

[3] Uncontrolled emission factors for CO and VOC based on compliance with 40 CFR Part 60 Subpart JJJJ. Emission factor for NO_x and formaldehyde (CH_2O) taken from engine specification sheet. The NO_x emission factor from the engine specification uses a factor of safety to raise from 0.30 g/bhp to 0.5 g/bhp. The controlled emission factor for CO, VOC, CH_2O, and acrolein are based on reduction by the catalyst. CO_2, CH_4, and N_2O taken from 40 CFR 98 Subpart C. All other factors based on AP-42 emission factors for an uncontrolled 4-stroke lean burn engines, AP-42 Chapter 3.2 Natural Gas-fired Reciprocating Engines, Table 3.2-2, July 2000.

[4] Hourly emissions are based on the maximum design heat input.

[5] Catalyst emission factors taken from Miratech specification sheet for oxidation system specifications to be used with Caterpillar G3612 LE A4 Engine. The catalyst emission rates for CO, VOC, acrolein, and formaldehyde include a safety factor

[6] CO_2e emissions are based on global warming potential of CO_2=1, CH_4=25, and N_2O=298

[7] CO_2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO_2/MMBtu), November 29, 2013

[8] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013

[9] Ammonia emission factor is based on FIRE factor for SCC 20200253

Pollutants listed in *italics* have listed emission factors in AP-42, but are not HAPs as define Section 112(b) of the Clean Air Act and are not included in the Total HAP emission factor.
Largest single facility-wide HAP shown in bold

HRM *The business of sustainability*

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Caterpillar 3612 w/Ariel Compressor

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Engine/Compressor #4	
Assumptions:	
Natural Gas Feed	[1]
Max. Rated Capacity, bhp	3,750
Fuel Consumption[1], Btu/bhp-hr	6,772
Max. Rated Capacity, MMBtu/hr	25.40
Fuel Consumption Rate, cf/hr	21,294
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
grams to pounds	453.6
Btu/MMBtu	1,000,000
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298
hours/yr	8,760
Btu/scf (based on gas analysis)[2]	1,193

Pollutant	Emission Factors[3]		Uncontrolled Hourly Emissions[4] (lb/hr)	Uncontrolled Annual Emissions (TPY)	Catalyst Factors[5]		Post Oxidation Catalyst Hourly Emissions (lb/hr)	Post Oxidation Catalyst Annual Emissions (TPY)
NO_x	0.50	grams/bhp-hr	4.13	18.11	NA	NA	NA	NA
CO	2.00	grams/bhp-hr	16.53	72.42	0.50	grams/bhp-hr	4.13	18.11
VOC	0.70	grams/bhp-hr	5.79	25.35	0.50	grams/bhp-hr	4.13	18.11
PM	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
PM_{10}	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
$PM_{2.5}$	0.010	lb/MMBtu	0.25	1.11	NA	NA	NA	NA
SO_2	0.00	lb/MMBtu	0.01	0.07	NA	NA	NA	NA
CO_2e[6]	117.1	lb/MMBtu	2,973	13,021	NA	NA	NA	NA
CO_2[7]	116.9	lb/MMBtu	2968.8	13,008	NA	NA	NA	NA
CH_4[8]	0.002	lb/MMBtu	0.06	0.25	NA	NA	NA	NA
N_2O[8]	0.00022	lb/MMBtu	0.01	0.02	NA	NA	NA	NA
Ammonia[9]	18	lb/MMscf	0.38	1.68	NA	NA	NA	NA
Total HAPs	8.13E-02	lb/MMBtu	2.06	9.04	NA	NA	0.82	3.61
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	1.02E-03	4.45E-03	NA	NA	NA	NA
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	8.08E-04	3.54E-03	NA	NA	NA	NA
1,1-Dichloroethene	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
1,2-Dichloropropane	*2.69E-05*	*lb/MMBtu*	*6.83E-04*	*2.99E-03*	NA	NA	NA	NA
1,3,5-Trimethylbenzene	*3.36E-05*	*lb/MMBtu*	*8.54E-04*	*3.76E-03*	NA	NA	NA	NA
1,3-Butadiene	2.67E-04	lb/MMBtu	6.78E-03	2.97E-02	NA	NA	NA	NA
1,3-Dichloropropene	2.64E-05	lb/MMBtu	6.70E-04	2.94E-03	NA	NA	NA	NA
2-Methylnaphthalene	3.32E-05	lb/MMBtu	8.43E-04	3.69E-03	NA	NA	NA	NA
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	6.35E-03	2.78E-02	NA	NA	NA	NA
Acenaphthene	1.25E-06	lb/MMBtu	3.17E-05	1.39E-04	NA	NA	NA	NA
Acenaphthylene	5.53E-06	lb/MMBtu	1.40E-04	6.15E-04	NA	NA	NA	NA
Acetaldehyde	8.36E-03	lb/MMBtu	2.12E-01	9.30E-01	NA	NA	NA	NA
Acrolein	5.14E-03	lb/MMBtu	1.31E-01	5.72E-01	75	%	3.26E-02	1.43E-01
Benzene	4.40E-04	lb/MMBtu	1.12E-02	4.89E-02	NA	NA	NA	NA
Benzo(b)fluoranthene	*1.66E-07*	*lb/MMBtu*	*4.22E-06*	*1.85E-05*	NA	NA	NA	NA
Biphenyl	2.12E-04	lb/MMBtu	5.38E-03	2.36E-02	NA	NA	NA	NA
Carbon Tetrachloride	3.67E-05	lb/MMBtu	9.32E-04	4.08E-03	NA	NA	NA	NA
Chlorobenzene	3.04E-05	lb/MMBtu	7.72E-04	3.38E-03	NA	NA	NA	NA
Chloroethane	1.87E-06	lb/MMBtu	4.75E-05	2.08E-04	NA	NA	NA	NA
Chloroform	2.85E-05	lb/MMBtu	7.24E-04	3.17E-03	NA	NA	NA	NA
Chrysene	*6.93E-07*	*lb/MMBtu*	*1.76E-05*	*7.71E-05*	NA	NA	NA	NA
Cyclopentane	*2.27E-04*	*lb/MMBtu*	*5.76E-03*	*2.52E-02*	NA	NA	NA	NA
Ethylbenzene	3.97E-05	lb/MMBtu	1.01E-03	4.42E-03	NA	NA	NA	NA
Ethylene Dibromide	4.43E-05	lb/MMBtu	1.12E-03	4.93E-03	NA	NA	NA	NA
Formaldehyde (CH_2O)	1.06E-01	grams/bhp-hr	5.87	6.88	0.84	grams/bhp-hr	0.33	1.45
Methanol	2.50E-03	lb/MMBtu	6.35E-02	2.78E-01	NA	NA	NA	NA
Methylcyclohexane	*1.23E-03*	*lb/MMBtu*	*3.12E-02*	*1.37E-01*	NA	NA	NA	NA
Methylene Chloride	2.00E-05	lb/MMBtu	5.08E-04	2.22E-03	NA	NA	NA	NA
Hexane	1.11E-03	lb/MMBtu	2.82E-02	1.23E-01	NA	NA	NA	NA
Nonane	*1.10E-04*	*lb/MMBtu*	*2.79E-03*	*1.22E-02*	NA	NA	NA	NA
Octane	*3.51E-04*	*lb/MMBtu*	*8.91E-03*	*3.90E-02*	NA	NA	NA	NA
Pentane	*2.60E-03*	*lb/MMBtu*	*6.60E-02*	*2.89E-01*	NA	NA	NA	NA
Naphthalene	7.44E-05	lb/MMBtu	1.89E-03	8.26E-03	NA	NA	NA	NA
PAH	2.69E-05	lb/MMBtu	6.83E-04	2.99E-03	NA	NA	NA	NA
Phenanthrene	1.04E-05	lb/MMBtu	2.64E-04	1.16E-03	NA	NA	NA	NA
Phenol	2.40E-05	lb/MMBtu	6.08E-04	2.67E-03	NA	NA	NA	NA
Styrene	2.36E-05	lb/MMBtu	5.99E-04	2.63E-03	NA	NA	NA	NA
Toluene	4.08E-04	lb/MMBtu	1.04E-02	4.54E-02	NA	NA	NA	NA
Vinyl Chloride	1.49E-05	lb/MMBtu	3.78E-04	1.66E-03	NA	NA	NA	NA
Xylene	1.84E-04	lb/MMBtu	4.67E-03	2.05E-02	NA	NA	NA	NA

[1] Fuel consumption from Caterpillar G3612 Gas Engine 64e Specific Technical Data sheet, maximum rating at 100% load

[2] Heating value of natural gas taken from WBI Energy gas analysis

[3] Uncontrolled emission factors for CO and VOC based on compliance with 40 CFR Part 60 Subpart JJJJ. Emission factor for NO_x and formaldehyde (CH_2O) taken from engine specification sheet. The NO_x emission factor from the engine specification uses a factor of safety to raise from 0.30 g/bhp to 0.5 g/bhp. The controlled emission factor for CO, VOC, CH_2O, and acrolein are based on reduction by the catalyst. CO_2, CH_4 and N_2O taken from 40 CFR 98 Subpart C. All other factors based on AP-42 emission factors for an uncontrolled 4-stroke lean burn engines, AP-42 Chapter 3.2 Natural Gas-fired Reciprocating Engines, Table 3.2-2, July 2000

[4] Hourly emissions are based on the maximum design heat input.

[5] Catalyst emission factors taken from Miratech specification sheet for oxidation system specifications to be used with Caterpillar G3612 LE A4 Engine. The catalyst emission rates for CO, VOC, acrolein, and formaldehyde include a safety factor.

[6] CO_2e emissions are based on global warming potential of CO_2=1, CH_4=25, and N_2O=298

[7] CO_2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO_2/MMBtu), November 29, 2013

[8] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013

[9] Ammonia emission factor is based on FIRE factor for SCC 20200253

Pollutants listed in *italics* have listed emission factors in AP-42, but are not HAPs as define Section 112(b) of the Clean Air Act and are not included in the Total HAP emission factor

Largest single facility-wide HAP shown in bold

GRM *The business of sustainability*

Facility Name: Tioga Compressor Station
Subject: Potential to Emit Calculations
Task: Waukesha Generator (F3524GSI)

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Generator, Waukesha gas engines 3524GSI	
Assumptions:	
Natural Gas Fired	
Standby Power Rated Capacity, kW	851
Fuel Consumption[1], Btu/bhp-hr	9,151
Max. Rated Capacity, MMBtu/hr	8.46
Fuel Consumption Rate, cf/hr	7,090
Horsepower, hp	924
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
grams to pounds	453.6
Btu/MMBtu	1,000,000
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298
hours/yr	8,760
Btu/scf (based on gas analysis)[2]	1,193

Pollutant	Emission Factors[3]		Hourly Emissions[4] (lb/hr)	Unlimited Annual Emissions (TPY)
NO_x	1.00	grams/bhp-hr	2.04	8.92
CO	2.00	grams/bhp-hr	4.07	17.84
VOC (NMHC)	0.70	grams/bhp-hr	1.43	6.25
PM	0.02	lb/MMBtu	0.16	0.72
PM_{10}	0.02	lb/MMBtu	0.16	0.72
$PM_{2.5}$	0.02	lb/MMBtu	0.16	0.72
SO_2	5.88E-04	lb/MMBtu	4.97E-03	2.18E-02
CO_2e[5]	117.1	lb/MMBtu	990	4336
CO_2[6]	116.9	lb/MMBtu	989	4331
CH_4[7]	0.002	lb/MMBtu	0.02	0.08
N_2O[7]	0.0002	lb/MMBtu	1.86E-03	8.16E-03
Ammonia[8]	18	lb/MMscf	0.13	0.56
Total HAPs	6.19E-02	lb/MMBtu	0.20	0.89
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	2.14E-04	9.37E-04
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	1.29E-04	5.67E-04
1,1-Dichloroethane	1.13E-05	lb/MMBtu	9.55E-05	4.18E-04
1,2-Dichloroethane	1.13E-05	lb/MMBtu	9.55E-05	4.18E-04
1,2-Dichloropropane	1.30E-05	lb/MMBtu	1.10E-04	4.81E-04
1,3-Butadiene	6.63E-04	lb/MMBtu	5.61E-03	2.46E-02
1,3-Dichloropropene	1.27E-05	lb/MMBtu	1.07E-04	4.70E-04
Acetaldehyde	2.79E-03	lb/MMBtu	0.02	1.03E-01
Acrolein	2.63E-03	lb/MMBtu	0.02	9.74E-02
Benzene	1.58E-03	lb/MMBtu	0.01	5.85E-02
Butyr/Isobutyraldehyde	4.86E-05	lb/MMBtu	4.11E-04	1.80E-03
Carbon Tetrachloride	1.77E-05	lb/MMBtu	1.50E-04	6.56E-04
Chlorobenzene	1.29E-05	lb/MMBtu	1.09E-04	4.76E-04
Chloroform	1.37E-05	lb/MMBtu	1.16E-04	5.07E-04
Ethane	7.04E-02	lb/MMBtu	5.95E-01	2.61E+00
Ethylbenzene	2.48E-05	lb/MMBtu	2.10E-04	9.16E-04
Ethylene Dibromide	2.13E-05	lb/MMBtu	1.80E-04	7.89E-04
Formaldehyde	**0.05**	g/bhp-hr	**0.102**	**0.446**
Methanol	3.06E-03	lb/MMBtu	0.03	0.11
Methylene Chloride	4.12E-05	lb/MMBtu	3.48E-04	1.53E-03
Naphthalene	9.71E-05	lb/MMBtu	8.21E-04	3.60E-03
PAH	1.41E-04	lb/MMBtu	1.19E-03	5.22E-03
Styrene	1.19E-05	lb/MMBtu	1.01E-04	4.41E-04
Toluene	5.58E-04	lb/MMBtu	4.72E-03	2.07E-02
Vinyl Chloride	7.18E-06	lb/MMBtu	6.07E-05	2.66E-04
Xylene	1.95E-04	lb/MMBtu	1.65E-03	7.22E-03

[1] Fuel consumption from Waukesha gas engines 3524GSI (VHP - F3524GSI) performance data for 110% overload (924 BHP), high heat value (HHV)
[2] Heating value of natural gas taken from WBI Energy gas analysis

[3] Emission factors for NO_x, CO, NMHC from NSPS Subpart JJJJ. Emissions for formaldehyde from Technical Data Sheet for Waukesha3524GSI (VHP - F3524GSI) that was adjusted for a factor of safety. Emission factors for CO_2, CH_4, and N_2O from 40 CFR 98 Subpart C. The remaining factors from AP-42 emission factors are based on uncontrolled 4-stroke rich burn engines, AP-42 Chapter 3.2 Natural Gas-fired Reciprocating Engines, Table 3.2-3, July 2000.

[4] Hourly emissions are based on the maximum design heat input
[5] CO_2e emissions are based on global warming potential of CO_2=1, CH_4=25, and N_2O=298.
[6] CO_2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO_2/MMBtu), November 29, 2013.
[7] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013
[8] Ammonia emission factor is based on FIRE factor for SCC 20200253
Pollutants listed in *italics* have listed emission factors in AP-42, but are not HAPs as define Section 112(b) of the Clean Air Act and are not included in the Total HAP emission factor
Largest single facility-wide HAP shown in bold

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Fugitive Emissions from Leaks

Prepared: AMC
Reviewed: CAB
Date: 8-Jun-20

Fugitive Emissions Leaks	
Assumptions:	
Hours of Operation	8,760
Gas Analysis:	
VOC Weight Percent[1], %	5.53%
CH_4 Weight Percent[2], %	53.93%
CO_2 Weight Percent[3], %	2.568%
HAP Weight Percent[4], %	0.001%
Specific Gravity from Gas Analysis	0.719
Gas Weight, lb/scf	0.058
Conversion Factors:	
specific gravity of air	1
weight of scf air, lb/scf	0.0807
lb/ton	2,000
lb/kg	2.204
hours per year	8,760
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Component	Product	Component Count[5]	20% Buffer to Accommodate any Changes	Emission Factor[6] (scf/comp-hr)	Emission Rate (scf/hr)	Emission Rate (lbs/hr)
Connector	Gas	925	1110	0.02	18.87	1.095
Flanges	Gas	incl. with connectors	incl. with connectors	--	--	--
Valve	Gas	205	246	0.12	29.77	1.728
Other	Gas	280	336	0.02	5.71	0.332
Open Ended Line	Gas	0	0	0.03	0.00	0.000
Pressure Relief Valve	Gas	20	24	0.19	4.63	0.269
Total		1,430	1,716		58.98	3.42

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (TPY)
NO_X	---	---
CO	---	---
VOC	0.19	0.83
PM	---	---
PM_{10}	---	---
$PM_{2.5}$	---	---
SO_2	---	---
HAP	0.0000	0.0002
CO_2e	46	203
CO_2	0.09	0.38
CH_4	1.85	8.09
N_2O	---	---

[1]Weight percent of VOC taken from WBI gas analysis and excludes methane and ethane hydrocarbons.
[2]Weight percent of methane taken from WBI gas analysis.
[3]Weight percent of carbon dioxide taken from WBI gas analysis.
[4]Weight percent of total HAPS is the weight percent of C6 from the WBI gas analysis. This is a conservative estimate of HAPs.
[5]Component counts provided by WBI.
[6]Emission factors obtained from 40 CFR 98 Subpart W Table W-1A for Western U.S. Service Components

https://www.law.cornell.edu/cfr/text/40/appendix-Table_W-1A_to_subpart_W_of_part_98

ERM *The business of sustainability*

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Emissions from Comfort Heating

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Boiler Two Weil-McLain LGB-20 (2.47 MMBtu/hr) and One Unit Heater (0.25)	
Assumptions:	
Natural Gas Fired	
Hours of Operation[1]	8,760
Total Rated Capacity, MMBtu/hr	5.19
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298
hours/yr	8,760
Btu/scf[2]	1,020

Pollutant	**AP-42 Emission Factors[3]**				**Hourly Emissions[4] (lb/hr)**	**Annual Emissions (TPY)**
NO_x	100.00	lb/MMscf	0.10	lb/MMBtu	0.51	2.23
CO	84.00	lb/MMscf	0.08	lb/MMBtu	0.43	1.87
VOC (NMHC)	5.50	lb/MMscf	0.01	lb/MMBtu	0.03	0.12
PM	7.60	lb/MMscf	0.01	lb/MMBtu	0.04	0.17
PM_{10}	7.60	lb/MMscf	0.01	lb/MMBtu	0.04	0.17
PM_{25}	7.60	lb/MMscf	0.01	lb/MMBtu	0.04	0.17
SO_2	0.60	lb/MMscf	5.88E-04	lb/MMBtu	3.05E-03	0.01
Lead	0.0005	lb/MMscf	4.90E-07	lb/MMBtu	2.54E-06	1.11E-05
CO_2e[5]	117.1	lb/MMBtu	---		608	2,661
CO_2[6]	116.9	lb/MMBtu	---		607	2,658
CH_4[7]	0.002	lb/MMBtu	---		0.01	0.05
N_2O[7]	0.0002	lb/MMBtu	---		1.14E-03	5.01E-03
Ammonia[8]	3.20	lb/MMscf	3.14E-03	lb/MMBtu	0.02	0.07
Total HAPs	3.49E+00	lb/MMscf	3.42E-03	lb/MMBtu	1.77E-02	7.77E-02
2-Methylnaphthalene	2.40E-05	lb/MMscf	2.35E-08	lb/MMBtu	1.22E-07	5.35E-07
3-Methylchloranthrene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	lb/MMscf	1.57E-08	lb/MMBtu	8.14E-08	3.57E-07
Acenaphthene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Acenaphthylene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Anthracene	2.40E-06	lb/MMscf	2.35E-09	lb/MMBtu	1.22E-08	5.35E-08
Benz(a)anthracene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Benzene	2.10E-03	lb/MMscf	2.06E-06	lb/MMBtu	1.07E-05	4.68E-05
Benzo(a)pyrene	1.20E-06	lb/MMscf	1.18E-09	lb/MMBtu	6.11E-09	2.67E-08
Benzo(b)fluoranthene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Benzo(g,h,i)perylene	1.20E-06	lb/MMscf	1.18E-09	lb/MMBtu	6.11E-09	2.67E-08
Benzo(k)fluoranthene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Butane	*2.10E+00*	*lb/MMscf*	*2.06E-03*	*lb/MMBtu*	*1.07E-02*	*4.68E-02*
Chrysene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Dibenzo(a,h)anthracene	1.20E-06	lb/MMscf	1.18E-09	lb/MMBtu	6.11E-09	2.67E-08
Dichlorobenzene	1.20E-03	lb/MMscf	1.18E-06	lb/MMBtu	6.11E-06	2.67E-05
Ethane	*3.10E+00*	*lb/MMscf*	*3.04E-03*	*lb/MMBtu*	*1.58E-02*	*6.91E-02*
Fluoranthene	3.00E-06	lb/MMscf	2.94E-09	lb/MMBtu	1.53E-08	6.69E-08
Fluorene	2.80E-06	lb/MMscf	2.75E-09	lb/MMBtu	1.42E-08	6.24E-08
Formaldehyde	**7.50E-02**	**lb/MMscf**	**7.35E-05**	**lb/MMBtu**	**3.82E-04**	**1.67E-03**
Hexane	1.80E+00	lb/MMscf	1.76E-03	lb/MMBtu	9.16E-03	4.01E-02

ERM *The business of sustainability*

Facility Name: Tioga Compressor Station[1]- Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Emissions from Comfort Heating

Prepared: AMC
Reviewed: PCB
Date: 8-Jun-20

Pollutant	AP-42 Emission Factors[2]				Hourly Emissions[3] (lb/hr)	Unlimited Annual Emissions (TPY)
Indeno(1,2,3-cd)pyrene	1.80E-06	lb/MMscf	1.76E-09	lb/MMBtu	9.16E-09	4.01E-08
Naphthalene	6.10E-04	lb/MMscf	5.98E-07	lb/MMBtu	3.10E-06	1.36E-05
Pentane	*2.60E+00*	*lb/MMscf*	*2.55E-03*	*lb/MMBtu*	*1.32E-02*	*5.79E-02*
Phenanathrene	1.70E-05	lb/MMscf	1.67E-08	lb/MMBtu	8.65E-08	3.79E-07
Propane	*1.60E+00*	*lb/MMscf*	*1.57E-03*	*lb/MMBtu*	*8.14E-03*	*3.57E-02*
Pyrene	5.00E-06	lb/MMscf	4.90E-09	lb/MMBtu	2.54E-08	1.11E-07
Toluene	3.40E-03	lb/MMscf	3.33E-06	lb/MMBtu	1.73E-05	7.58E-05
Arsenic	2.00E-04	lb/MMscf	1.96E-07	lb/MMBtu	1.02E-06	4.46E-06
Barium	*4.40E-03*	*lb/MMscf*	*4.31E-06*	*lb/MMBtu*	*2.24E-05*	*9.81E-05*
Beryllium	1.20E-05	lb/MMscf	1.18E-08	lb/MMBtu	6.11E-08	2.67E-07
Cadmium	1.10E-03	lb/MMscf	1.08E-06	lb/MMBtu	5.60E-06	2.45E-05
Chromium	1.40E-03	lb/MMscf	1.37E-06	lb/MMBtu	7.12E-06	3.12E-05
Cobalt	8.40E-05	lb/MMscf	8.24E-08	lb/MMBtu	4.27E-07	1.87E-06
Copper	*8.50E-04*	*lb/MMscf*	*8.33E-07*	*lb/MMBtu*	*4.33E-06*	*1.89E-05*
Manganese	3.80E-04	lb/MMscf	3.73E-07	lb/MMBtu	1.93E-06	8.47E-06
Mercury	2.60E-04	lb/MMscf	2.55E-07	lb/MMBtu	1.32E-06	5.79E-06
Molybdenum	*1.10E-03*	*lb/MMscf*	*1.08E-06*	*lb/MMBtu*	*5.60E-06*	*2.45E-05*
Nickel	2.10E-03	lb/MMscf	2.06E-06	lb/MMBtu	1.07E-05	4.68E-05
Selenium	2.40E-05	lb/MMscf	2.35E-08	lb/MMBtu	1.22E-07	5.35E-07
Vanadium	*2.30E-03*	*lb/MMscf*	*2.25E-06*	*lb/MMBtu*	*1.17E-05*	*5.13E-05*
Zinc	*2.90E-02*	*lb/MMscf*	*2.84E-05*	*lb/MMBtu*	*1.48E-04*	*6.46E-04*

[1] Hours of operation based on the heating year round even though the heating season is likely only half the year

[2] Heating value of natural gas taken from basis of AP-42 emission factors which is listed as 1,020 Btu/scf.

3 AP-42 emission factors are based on uncontrolled small boilers, AP-42 Chapter 1.4 Natural Gas Combustion, Tables 1.4-1 though -4, July 1998.

[4] Hourly emissions are based on the maximum design heat input.

[5] CO_2e emissions are based on global warming potential of CO_2=1, CH_4=25, and N_2O=298.

[6] CO_2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO_2/MMBtu), November 29, 2013.

[7] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013.

[8] Ammonia emission factor is based on FIRE factor for natural gas combustion.

Pollutants listed in *italics* have listed emission factors in AP-42, but are not HAPs as define Section 112(b) of the Clean Air Act and are not included in the Total HAP emission factor.

Largest single facility-wide HAP shown in bold.

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Tank Emissions

Prepared: KAT

Date: 8-Jun-20

Pollutant	Tank	Volume (gal)	Turnovers	Net Throughput[4] (gal/yr)	Operating Hours	Losses (lb)		Emission Rate[6]	
						Working	Standing[5]	lb/yr	TPY
VOC	Tank 1[1]	3,000	5.33	10,658	8,760	11.61	0.00	11.61	0.0058
	Tank 2[2]	3,000	5.33	10,658	8,760	11.61	0.00	11.61	0.0058
	Tank 3[3]	3,000	3.27	6,532	8,760	0.00	0.00	0.00	0.0000
	Total	**9,000**	**3.09**	**27,848**	**26,280**	**23.22**	**0.00**	**23.22**	**0.0116**
HAP	Tank 1	3,000	5.33	10,658	8,760	11.32	0.00	11.32	0.0057
	Tank 2	3,000	5.33	10,658	8,760	11.32	0.00	11.32	0.0057
	Tank 3	3,000	3.27	6,532	8,760	0.00	0.00	0.00	0.0000
	Total	**9,000**	**3.09**	**27,848**	**26,280**	**22.64**	**0.00**	**22.64**	**0.0113**

[1] Tank 1 is a 3,000 gallon underground slop oil fixed roof storage tank that contains pipeline fluids, which consists of any entrained debris and oil from the pipeline that has been filtered from natural gas before the gas sent downstream.

[2] Tank 2 is a 3,000 gallon underground waste oil fixed roof storage tank, which contains waste oil from the engine oil used by the compressor engines.

[3] Tank 3 is a 3,000 gallon underground floor drain fixed roof tank that collects water and oil drippings from the engines when the floor is cleaned.

[4] Tank throughput is calculated by using a ratio of the net throughput of a pipeline fluids storage tank located at a similar site and the HP of the six compressor engines located at Tioga Compressor Station.

[5] Standing losses for underground tanks are assumed to be zero.

[6] Tank emission calculations were completed using the calculations for a fixed roof tank in AP-42 Chapter 7.1 Organic Liquid Storage Tanks, November 2006. Based on meteorological data from Minot, ND.

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Fugitive Emissions from Blowdown, Startup and Operation

Prepared: AMC

Date: 8-Jun-20

Blowdown	
Assumptions:	
Hours of Operation	8,760
Gas Analysis:	
VOC Weight Percent[1], %	5.53%
CH_4 Weight Percent[2], %	53.93%
CO_2 Weight Percent[3] %	2.568%
HAP Weight Percent[4], %	0.022%
Specific Gravity from Gas Analysis	0.719
Gas Weight, lb/scf	0.058
Conversion Factors:	
specific gravity of air	1
weight of scf air, lb/scf	0.0807
lb/ton	2,000
lb/kg	2.204
hours per year	8,760
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Blowdown Event	Number of Events	SCF/Event	Total SCF	Pollutant (TPY)					
				VOC	HAP	CO_2e	CO_2	CH_4	N_2O
Startup and Commissioning									
Full Station	2	125,000	250,000	0.40	0.0016	98.00	0.1863	3.9126	0
Compressor Unit	10	35,000	350,000	0.56	0.0022	137.20	0.2608	5.4776	0
Sub-Total	-	-	600,000	0.96	0.00	235.20	0.45	9.39	0
Annual Operation									
ESD Test Station	1	125,000	125,000	0.20	0.0008	49.00	0.0931	1.9563	0
Compressor Unit	120	35,000	4,200,000	6.74	0.0268	1646.41	3.1294	65.7314	0
Sub-Total	-	-	4,325,000	6.94	0.03	1695.42	3.22	67.69	0
Total			4,925,000	7.90	0.03	1930.62	3.67	77.08	0.00

[1]Weight percent of VOC taken from WBI Energy gas analysis and excludes methane and ethane hydrocarbons.
[2]Weight percent of methane taken from WBI Energy gas analysis.
[3]Weight percent of carbon dioxide taken from WBI Energy gas analysis.
[4]Weight percent of total HAPS is the weight percent of C6 from the WBI Energy gas analysis. This is a conservative estimate of HAPs.
[5]Blowdown quantities provided by WBI Energy.

ERM The business of sustainability

Facility Name: Tioga Compressor Station - Addition of Three Compressor Engines
Subject: Potential to Emit Calculations
Task: Fugitive Emissions from Pigging

Prepared: AMC
Date: 8-Jun-20

Pigging	
Gas Analysis:	
VOC Weight Percent[1], %	5.53%
CH_4 Weight Percent[2], %	53.93%
CO_2 Weight Percent[3],%	2.568%
HAP Weight Percent[4], %	0.022%
Specific Gravity from Gas Analysis	0.719
Gas Weight, lb/scf	0.058
Conversion Factors:	
specific gravity of air	1
weight of scf air, lb/scf	0.0807
lb/ton	2,000
lb/kg	2.204
hours per year	8,760
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Pigging Identification	Frequency (years)	MMSCF/Event	Pollutant (Tons per Event)					
			VOC	HAP	CO_2e	CO_2	CH_4	N_2O
Tioga-Elkhorn Creek 24"	10	9.5	15.24	0.06	3,724	7.08	148.68	0.00
Nesson Loop 12", Nesson Plant Valve (MP 0.0)	10	2.2	3.53	0.01	862	1.64	34.43	0.00
Tioga Plant Lateral 20", Hess Receipt Station (MP 0.0)	5	0.2	0.24	0.00	59	0.11	2.35	0.00
Norse Loop 12", Norse Receipt Station	10	3.3	5.21	0.02	2	2.42	0.00	0.00
Total			**24.22**	**0.10**	**4,648**	**11.25**	**185.46**	**0.00**

Worst-case emissions if all pigging activities would occur in the same year.

[1]Weight percent of VOC taken from WBI Energy gas analysis and excludes methane and ethane hydrocarbons.
[2]Weight percent of methane taken from WBI Energy gas analysis.
[3]Weight percent of carbon dioxide taken from WBI Energy gas analysis.
[4]Weight percent of total HAPs is the weight percent of C6 from the WBI Energy gas analysis. This is a conservative estimate of HAPs.
[5]Blowdown quantities provided by WBI Energy.

Appendix C

Permit Application Forms

PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8516 (3-2019)

SECTION A - FACILITY INFORMATION

Name of Firm or Organization WBI Energy Transmission, Inc.		
Applicant's Name Marc Dempewolf		
Title Director of Pipeline Operations	Telephone Number (406) 359-7309	E-mail Address Marc.Dempewolf@wbienergy.com
Contact Person for Air Pollution Matters Jill Linn		
Title Environmental Manager	Telephone Number (406) 359-7332	E-mail Address Jill.Linn@wbienergy.com
Mailing Address (Street & No.) 2010 Montana Avenue		
City Glendive	State MT	ZIP Code 59330
Facility Name Tioga Compressor Station		
Facility Address (Street & No.) [no street address available at this time]		
City Tioga	State ND	ZIP Code 58852

County Williams	Latitude (Nearest Second) 48.4026	Longitude (Nearest Second) -102.9072

Legal Description of Facility Site Gas Compression Station

Quarter SW1/4	Quarter SW1/4	Section 24	Township 157N	Range 95W

Land Area at Facility Site 9 Acres (or) 392,040 Sq. Ft.	MSL Elevation at Facility 2,270 ft

SECTION B – GENERAL NATURE OF BUSINESS

Describe Nature of Business	North American Industry Classification System Number	Standard Industrial Classification Number (SIC)
Natural Gas Transmission - Gas Compression Station	486210	4922

SECTION C – GENERAL PERMIT INFORMATION

Type of Permit? ☒ Permit to Construct (PTC) ☐ Permit to Operate (PTO)

If application is for a Permit to Construct, please provide the following data:

Planned Start Construction Date April 2021	Planned End Construction Date October 2021

SECTION D – SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION

		Permit to Construct				Minor Source Permit to Operate						
Your Source ID Number	Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	New Source	Existing Source Modification	Existing Source Expansion	Existing Source Change of Location	New Source	Existing Source Initial Application	Existing Source After Modification	Existing Source After Expansion	Existing Source After Change of Location	Existing Source After Change of Ownership	Other
EU02	Engine/Compressor #2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EU03	Engine/Compressor #3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EU04	Engine/Compressor #4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
EU05	Generator	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Add additional pages if necessary

SECTION D2 – APPLICABLE REGULATIONS

Source ID No.	Applicable Regulations (NSPS/MACT/NESHAP/etc.)
Facility-wide	NSPS 40 CFR 60 Subpart OOOOa
EU02 thru EU05	40 CFR 60 Subpart JJJJ, 40 CFR 63 Subpart ZZZZ

SECTION E – TOTAL POTENTIAL EMISSIONS

Pollutant	Amount (Tons Per Year)
NO_x	65.47
CO	74.03
PM	4.22

Pollutant	Amount (Tons Per Year)
PM_{10} (filterable and condensable)	4.22
$PM_{2.5}$ (filterable and condensable)	4.22
SO_2	0.23
VOC	92.82 (without fugitives)
GHG (as CO_2e)	52,638
Largest Single HAP	4.86
Total HAPS	11.93

*If performance test results are available for the unit, submit a copy of test with this application. If manufacturer guarantee is used provide spec sheet.

SECTION F1 – ADDITIONAL FORMS

Indicate which of the following forms are attached and made part of the application

■ Air Pollution Control Equipment (SFN 8532)	☐ Fuel Burning Equipment Used for Indirect Heating (SFN 8518)
☐ Construct/Operate Incinerators (SFN 8522)	■ Hazardous Air Pollutant (HAP) Sources (SFN 8329)
☐ Natural Gas Processing Plants (SFN 11408)	☐ Manufacturing or Processing Equipment (SFN 8520)
☐ Glycol Dehydration Units (SFN 58923)	☐ Volatile Organic Compounds Storage Tank (SFN 8535)
☐ Flares (SFN 59652)	■ Internal Combustion Engines and Turbines (SFN 8891)
☐ Grain, Feed, and Fertilizer Operations (SFN 8524)	☐ Oil/Gas Production Facility Registration (SFN 14334)

SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

1.	Site Location Map & Site Plot Plan	4.	Summary of Air Dispersion Modeling Applicability
2.	Project and Process Description	5.	Summary of Applicable Federal Regulations
3.	Estimated Emissions Calculations	6.	Analysis of Air Toxics

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Environmental Quality and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23.1-06 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

Signature	Date
Jake Depelteau	7-2-26

INSTRUCTIONS

SITE PLANS TO BE ATTACHED TO APPLICATION:

Prepare and attach a plot plan drawn to scale or properly dimensioned, showing at least the following:

a. The property involved and the outlines and heights of all buildings on the property. Identify property lines plainly. Also, indicate if there is a fence around the property that prevents public access.

b. Location and identification of all existing or proposed equipment, manufacturing processes, etc., and points of emission or discharge of air contaminants to the atmosphere.

c. Location of the facility or property with respect to the surrounding area, including residences, businesses and other permanent structures, streets and roadways. Identify all such structures and roadways. Indicate direction (**NORTH**) on the drawing and the prevailing wind direction.

EQUIPMENT PLANS AND SPECIFICATIONS FOR PERMIT TO CONSTRUCT:

Supply plans and specifications, including as a minimum an assembly drawing, dimensioned and to scale, in plan, elevation and as many sections as are needed to show clearly the design and operation of the equipment and the means by which air contaminants are controlled.

The following must be shown:

a. Size and shape of the equipment. Show exterior and interior dimensions and features.

b. Locations, sizes, and shape details of all features which may affect the production, collection, conveying, or control of air contaminants of any kind, location, size, and shape details concerning all material handling equipment.

c. All data and calculations used in selecting or designing the equipment.

d. Horsepower rating of all internal combustion engines driving the equipment.

NOTE: **STRUCTURAL DESIGN CALCULATIONS AND DETAILS ARE NOT REQUIRED.** WHEN STANDARD COMMERCIAL EQUIPMENT IS TO BE INSTALLED, THE MANUFACTURER'S CATALOG DESCRIBING THE EQUIPMENT MAY BE SUBMITTED IN LIEU OF ITEMS a, b, c, and d OF ABOVE, WHICH THE CATALOG COVERS. ALL INFORMATION REQUIRED ABOVE THAT THE CATALOG DOES NOT CONTAIN MUST BE SUBMITTED BY THE APPLICANT.

ADDITIONAL INFORMATION MAY BE REQUIRED:

If the application is signed by an authorized representative of the owner, a LETTER OF AUTHORIZATION must be attached to the application.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

EU02

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (3-2019)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization WBI Energy Transmission, Inc.		
Applicant's Name Marc Dempewolf		
Title Director of Pipeline Operations	Telephone Number (409) 359-7309	E-mail Address Marc.Dempewolf@wbienergy.com
Mailing Address (Street & No.) 2010 Montana Avenue		
City Glendive	State MT	ZIP Code 59330

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Jill Linn		
Title Environmental Manager	Telephone Number (406) 359-7332	E-mail Address Jill.Linn@wbienergy.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 48°24'13"N 102°54'21"W		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 9 Acres (or) 392,040 Sq. Ft.	MSL Elevation at Plant 2,270 feet	

Describe Nature of Business/Process

Natural Gas Transmission - Gas Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 2 feet	Height Above Grade (ft) 42 feet	
Gas Temperature at Exit (°F) 823 F	Gas Velocity at Exit (ft/sec) 126.9 feet / second	Gas Volume (scfm) 9,844 SCFM
Basis of any Estimates (attach separate sheet if necessary) Manufacturer's specifications.		
Are Emission Control Devices in Place? If YES – Complete SFN 8532	(●) Yes	( ) No
Nearest Residences or Building	Distance (ft) 2,317	Direction E
Nearest Property Line	Distance (ft) 40	Direction E

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 EU 02	Mean Particle Diameter (um) N/A
Flow Rate (scfm) 9,844 SCFM	Drift Velocity (ft/sec) N/A
Stream Temperature (°F) 823 F	Particulate Concentration (gr/dscf) N/A
Moisture Content (%) 17 %	Halogens or Metals Present? No
Pressure (in. Hg) N/A	Organic Content (ppmv) NMNEHC 159ppm @ 15% O2
Heat Content (Btu/scfm) 1,193 Btu/scf	O_2 Content (%) 11.6 %

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See calculations in Appendix B	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

Pollutant Emitted	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant	Date 1-22-20

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station
Source ID No. of Equipment being Controlled EU02 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)	

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: Catalytic Oxidizer

Name of Manufacturer	Model Number	Date to Be Installed
MIRATECH	MECB-OX-SB2700-2421-2338-291	April 2021

Application: ☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	CO	NMNEHC	CH2O	
Design Efficiency (%)				
Operating Efficiency (%)	75	29	79	

Describe method used to determine operating efficiency:
Operating Efficiency determined based on difference between inlet emissions and outlet emissions; outlet emissions are based on requested permit limits for mass emissions.

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				9,844 SCFM
Gas Temperature (°F)			550F -1250F	823 F
Gas Pressure (in. H_2O)			not available	not available
Gas Velocity (ft/sec)			not available	not available
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	CO	g/bhp-hr	2.98	0.5
	NMNEHC	g/bhp-hr	0.62	0.5
	CH2O	g/bhp-hr	0.19	0.04

Pressure Drop Through Gas Cleaning Device (in. H_2O)
8 inches of water

INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.

2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.

3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.

4. Please attach the following:

   - A brief description and sketch of the air pollution control device if it is of unusual design or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.

   - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.

   - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.

5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions (CO_2e).

SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU02 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)

Type of Unit (check all that apply)		
	■ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	■ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Caterpillar	G 3612	to be determined

Reciprocating Internal Combustion Engine

■ Spark Ignition ☐ Compression Ignition

■ 4 Stroke ☐ 2 Stroke ☐ Rich Burn ■ Lean Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
3,750 @ 1000 rpm	3,750 @ 1000 rpm

Engine Subject to:
☐ 40 CFR 60, Subpart IIII ■ 40 CFR 60, Subpart JJJJ ■ 40 CFR 63, Subpart ZZZZ
☐ 40 CFR 60, Subpart OOOO ■ 40 CFR 60, Subpart OOOOa

Turbine Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
	3,750		

Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year) 186.5 Million Cubic Feet / year	Percent Sulfur 0.6 %	Percent H_2S negl.
Oil (gal/year) 0 gallons/year	Percent Sulfur N/A	Grade No. N/A
LP Gas (gal/year) 0 gallons/year	Other – Specify: N/A	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EP02		42 feet	
Stack Diameter (feet at top)	Gas Discharged (SCFM)	Exit Temp (°F)	Gas Velocity (FPS)
2 feet	9,844 scfm	823 F	126.9 ft/sec

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
CO	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
PM	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
PM_{10} (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
$PM_{2.5}$ (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
SO_2	0.01	0.07	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
VOC	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
GHG (as CO_2e)	2,973	13,021	CO2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO2/MMBtu), November 29, 2013. CH4 and N2O e
Largest Single HAP	0.33	1.45	largest single HAP is formadehyde
Total HAPS	0.82	3.61	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000, formaldehyde is based on vendor

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

EU03

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (3-2019)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization WBI Energy Transmission, Inc.		
Applicant's Name Marc Dempewolf		
Title Director of Pipeline Operations	Telephone Number (409) 359-7309	E-mail Address Marc.Dempewolf@wbienergy.com
Mailing Address (Street & No.) 2010 Montana Avenue		
City Glendive	State MT	ZIP Code 59330

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Jill Linn		
Title Environmental Manager	Telephone Number (406) 359-7332	E-mail Address Jill.Linn@wbienergy.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 48°24'13"N 102°54'21"W		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 9 Acres (or) 392,040 Sq. Ft.	MSL Elevation at Plant 2,270 feet	

Describe Nature of Business/Process

Natural Gas Transmission - Gas Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 2 feet	Height Above Grade (ft) 42 feet	
Gas Temperature at Exit (°F) 823 F	Gas Velocity at Exit (ft/sec) 126.9 feet / second	Gas Volume (scfm) 9,844 SCFM
Basis of any Estimates (attach separate sheet if necessary)		
Are Emission Control Devices in Place? If YES – Complete SFN 8532	◉ Yes	○ No
Nearest Residences or Building	Distance (ft) 2,320	Direction E
Nearest Property Line	Distance (ft) 39	Direction E

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 EU 03	Mean Particle Diameter (um) N/A
Flow Rate (scfm) 9,844 SCFM	Drift Velocity (ft/sec) N/A
Stream Temperature (°F) 823 F	Particulate Concentration (gr/dscf) N/A
Moisture Content (%) 17 %	Halogens or Metals Present? No
Pressure (in. Hg) N/A	Organic Content (ppmv) NMNEHC 159ppm @ 15% O2
Heat Content (Btu/scfm) 1,193 Btu/scf	O_2 Content (%) 11.6 %

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See calculations in Appendix B	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

Pollutant Emitted	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant	Date 7-2-20

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station
Source ID No. of Equipment being Controlled EU03 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)	

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: Catalytic Oxidizer

Name of Manufacturer	Model Number	Date to Be Installed
MIRATECH	MECB-OX-SB2700-2421-2338-291	April 2021

Application:
☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	CO	NMNEHC	CH2O	
Design Efficiency (%)				
Operating Efficiency (%)	75	29	79	

Describe method used to determine operating efficiency:
Operating Efficiency determined based on difference between inlet emissions and outlet emissions; outlet emissions are based on requested permit limits for mass emissions.

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				9,844 SCFM
Gas Temperature (°F)			550F -1250F	823 F
Gas Pressure (in. H_2O)			not available	not available
Gas Velocity (ft/sec)			not available	not available
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	CO	g/bhp-hr	2.98	0.5
	NMNEHC	g/bhp-hr	0.62	0.5
	CH2O	g/bhp-hr	0.19	0.04

Pressure Drop Through Gas Cleaning Device (in. H_2O)
8 inches of water

INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.

2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.

3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.

4. Please attach the following:

   - A brief description and sketch of the air pollution control device if it is of unusual design or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.

   - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.

   - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.

5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions (CO_2e).

SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU03 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)

Type of Unit (check all that apply)

- ■ Stationary Natural Gas-Fired Engine
- ☐ Stationary Diesel and Dual Fuel Engine
- ☐ Stationary Gasoline Engine
- ☐ Stationary Natural Gas-Fired Turbine
- ☐ Emergency Use Only
- ■ Non-Emergency Use
- ☐ Peaking
- ☐ Demand Response
- ☐ Other – Specify:

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Caterpillar	G 3612	To Be Determined

Reciprocating Internal Combustion Engine

- ■ Spark Ignition ☐ Compression Ignition
- ■ 4 Stroke ☐ 2 Stroke ☐ Rich Burn ■ Lean Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
3,750 @ 1000 rpm	3,750 @ 1000 rpm

Engine Subject to:

- ☐ 40 CFR 60, Subpart IIII
- ■ 40 CFR 60, Subpart JJJJ
- ■ 40 CFR 63, Subpart ZZZZ
- ☐ 40 CFR 60, Subpart OOOO
- ■ 40 CFR 60, Subpart OOOOa

Turbine — Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
	3,750		

Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
186.5 Million Cubic Feet / year	0.6 %	negl.
Oil (gal/year)	**Percent Sulfur**	**Grade No.**
0 gallons/year	N/A	N/A
LP Gas (gal/year)	**Other – Specify:**	
0 gallons/year	N/A	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EP03		42 feet	
Stack Diameter (feet at top)	**Gas Discharged (SCFM)**	**Exit Temp (°F)**	**Gas Velocity (FPS)**
2 feet	9,844 scfm	823 F	126.9 ft/sec

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
CO	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
PM	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
PM_{10} (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
$PM_{2.5}$ (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
SO_2	0.01	0.07	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
VOC	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
GHG (as CO_2e)	2,973	13,021	CO2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO2/MMBtu), November 29, 2013. CH4 and N2O e
Largest Single HAP	0.33	1.45	largest single HAP is formadehyde
Total HAPS	0.82	3.61	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000, formaldehyde is based on vendor

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

EU04

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (3-2019)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization WBI Energy Transmission, Inc.		
Applicant's Name Marc Dempewolf		
Title Director of Pipeline Operations	Telephone Number (409) 359-7309	E-mail Address Marc.Dempewolf@wbienergy.com
Mailing Address (Street & No.) 2010 Montana Avenue		
City Glendive	State MT	ZIP Code 59330

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Jill Linn		
Title Environmental Manager	Telephone Number (406) 359-7332	E-mail Address Jill.Linn@wbienergy.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 48°24'13"N 102°54'21"W		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 9 Acres (or) 392,040 Sq. Ft.	MSL Elevation at Plant 2,270 feet	

Describe Nature of Business/Process

Natural Gas Transmission - Gas Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 2 feet	Height Above Grade (ft) 42 feet	
Gas Temperature at Exit (°F) 823 F	Gas Velocity at Exit (ft/sec) 126.9 feet / second	Gas Volume (scfm) 9,844 SCFM
Basis of any Estimates (attach separate sheet if necessary) Manufacturer's specifications.		
Are Emission Control Devices in Place? If YES – Complete SFN 8532	◉ Yes	○ No
Nearest Residences or Building	Distance (ft) 2,321	Direction E
Nearest Property Line	Distance (ft) 39	Direction E

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 EU 04	Mean Particle Diameter (um) N/A
Flow Rate (scfm) 9,844 SCFM	Drift Velocity (ft/sec) N/A
Stream Temperature (°F) 823 F	Particulate Concentration (gr/dscf) N/A
Moisture Content (%) 17 %	Halogens or Metals Present? No
Pressure (in. Hg) N/A	Organic Content (ppmv) NMNEHC 159ppm @ 15% O2
Heat Content (Btu/scfm) 1,193 Btu/scf	O_2 Content (%) 11.6 %

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See calculations in Appendix B	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

Pollutant Emitted	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Kari L. Despenas	Date 1-2-20

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8532 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must also include forms SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station
Source ID No. of Equipment being Controlled EU04 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)	

SECTION B – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☐ Flare/Combustor
☒ Other – Specify: Catalytic Oxidizer

Name of Manufacturer	Model Number	Date to Be Installed
MIRATECH	MECB-OX-SB2700-2421-2338-291	April 2021

Application: ☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

Pollutants Removed	CO	NMNEHC	CH2O	
Design Efficiency (%)				
Operating Efficiency (%)	75	29	79	

Describe method used to determine operating efficiency:
Operating Efficiency determined based on difference between inlet emissions and outlet emissions; outlet emissions are based on requested permit limits for mass emissions.

SECTION CD – GAS CONDITIONS

Gas Conditions			Inlet	Outlet
Gas Volume (SCFM; 68°F; 14.7 psia)				9,844 SCFM
Gas Temperature (°F)			550F -1250F	823 F
Gas Pressure (in. H_2O)			not available	not available
Gas Velocity (ft/sec)			not available	not available
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	CO	g/bhp-hr	2.98	0.5
	NMNEHC	g/bhp-hr	0.62	0.5
	CH2O	g/bhp-hr	0.19	0.04

Pressure Drop Through Gas Cleaning Device (in. H_2O)
8 inches of water

INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.

2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.

3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.

4. Please attach the following:

   - A brief description and sketch of the air pollution control device if it is of unusual design or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.

   - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.

   - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.

5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions (CO_2e).

SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU04 Caterpillar 3612 natural gas-fired SI RICE (3750 HP)

Type of Unit (check all that apply)		
	■ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	■ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Caterpillar	G 3612	To Be Determined

Reciprocating Internal Combustion Engine

■ Spark Ignition ☐ Compression Ignition

■ 4 Stroke ☐ 2 Stroke ☐ Rich Burn ■ Lean Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
3,750 @ 1000 rpm	3,750 @ 1000 rpm

Engine Subject to:
☐ 40 CFR 60, Subpart IIII ■ 40 CFR 60, Subpart JJJJ ■ 40 CFR 63, Subpart ZZZZ
☐ 40 CFR 60, Subpart OOOO ■ 40 CFR 60, Subpart OOOOa

Turbine Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency
	3,750		

Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
186.5 Million Cubic Feet / year	0.6 %	negl.
Oil (gal/year)	**Percent Sulfur**	**Grade No.**
0 gallons/year	N/A	N/A
LP Gas (gal/year)	**Other – Specify:**	
0 gallons/year	N/A	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EP04		42 feet	
Stack Diameter (feet at top)	**Gas Discharged (SCFM)**	**Exit Temp (°F)**	**Gas Velocity (FPS)**
2 feet	9,844 scfm	823 F	126.9 ft/sec

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ■ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
CO	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
PM	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
PM_{10} (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
$PM_{2.5}$ (filterable and condensable)	0.25	1.11	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
SO_2	0.01	0.07	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000
VOC	4.13	18.11	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
GHG (as CO_2e)	2,973	13,021	CO2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO2/MMBtu), November 29, 2013. CH4 and N2O e
Largest Single HAP	0.33	1.45	largest single HAP is formadehyde
Total HAPS	0.82	3.61	Emission Factors based on AP-42, Ch 3.2, Table 3.2-2, July 2000, formaldehyde is based on vendor

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

■ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

EU05

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8329 (3-2019)

SECTION A1 - APPLICANT INFORMATION

Name of Firm or Organization WBI Energy Transmission, Inc.		
Applicant's Name Marc Dempewolf		
Title Director of Pipeline Operations	Telephone Number (409) 359-7309	E-mail Address Marc.Dempewolf@wbienergy.com
Mailing Address (Street & No.) 2010 Montana Avenue		
City Glendive	State MT	ZIP Code 59330

SECTION A2 - FACILITY INFORMATION

Contact Person for Air Pollution Matters Jill Linn		
Title Environmental Manager	Telephone Number (406) 359-7332	E-mail Address Jill.Linn@wbienergy.com
Facility Address (Street & No. or Lat/Long to Nearest Second) 48°24'13"N 102°54'21"W		
City Tioga	State ND	ZIP Code 58852
County Williams	Number of Employees at Location 2	
Land Area at Plant Site 9 Acres (or) 392,040 Sq. Ft.	MSL Elevation at Plant 2,270 feet	

Describe Nature of Business/Process

Natural Gas Transmission - Gas Compressor Station

SECTION B – STACK DATA

Inside Diameter (ft) 1.33 feet	Height Above Grade (ft) 30 feet	
Gas Temperature at Exit (°F) 1225 F	Gas Velocity at Exit (ft/sec) 53.34 feet / second	Gas Volume (scfm) 1,374 SCFM
Basis of any Estimates (attach separate sheet if necessary) Manufacturer's specifications.		
Are Emission Control Devices in Place? If YES – Complete SFN 8532	○ Yes	◉ No
Nearest Residences or Building	Distance (ft) 2,555	Direction E
Nearest Property Line	Distance (ft) 134	Direction E

SECTION C – EMISSION STREAM DATA

Source ID No. From SFN 8516 EU05	Mean Particle Diameter (um) N/A
Flow Rate (scfm) 1,374 SCFM	Drift Velocity (ft/sec) N/A
Stream Temperature (°F) 1225 F	Particulate Concentration (gr/dscf) N/A
Moisture Content (%) 0 %	Halogens or Metals Present? No
Pressure (in. Hg) N/A	Organic Content (ppmv) NMNEHC 78.9 ppmv
Heat Content (Btu/scfm) 1,193 Btu/scf	O_2 Content (%) 0 %

SECTION D – POLLUTANT SPECIFIC DATA
(Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Calculations in Appendix B	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

Pollutant Emitted	Chemical Abstract Services (CAS) Number
Proposed Emission Rate (lb/hr)	Emission Source (describe)
Source Classification (process point, process fugitive, area fugitive)	Pollutant Class and Form (organic/inorganic - particulate/vapor)
Concentration in Emission Stream (ppmv)	Vapor Pressure (in. Hg @ °F)
Solubility	Molecular Weight (lb/lb-mole)
Absorptive Properties	

(Add additional pages if necessary)

Signature of Applicant Kate Despenas	Date 7-2-20

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 8891 (3-2019)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.
- Must include SFN 8516 or SFN 52858

SECTION A – GENERAL INFORMATION

Name of Firm or Organization	Facility Name
WBI Energy Transmission, Inc.	Tioga Compressor Station

SECTION B – FACILITY AND UNIT INFORMATION

Source ID Number (From form SFN 8516)
EU05 Waukesha VHP - L594GSI natural gas-fired SI RICE (1380 HP)

Type of Unit (check all that apply)		
	■ Stationary Natural Gas-Fired Engine	☐ Emergency Use Only
	☐ Stationary Diesel and Dual Fuel Engine	■ Non-Emergency Use
	☐ Stationary Gasoline Engine	☐ Peaking
	☐ Stationary Natural Gas-Fired Turbine	☐ Demand Response
	☐ Other – Specify:	

SECTION C – MANUFACTURER DATA

Make	Model	Date of Manufacture
Waukesha	VHP - F3524GSI	to be determined

Reciprocating Internal Combustion Engine

■ Spark Ignition ☐ Compression Ignition

■ 4 Stroke ☐ 2 Stroke ■ Rich Burn ☐ Lean Burn

Maximum Rating (BHP @ rpm)	Operating Capacity (BHP @ rpm)
840 @ 1200 rpm	840 @ 1200 rpm

Engine Subject to:
☐ 40 CFR 60, Subpart IIII ■ 40 CFR 60, Subpart JJJJ ■ 40 CFR 63, Subpart ZZZZ
☐ 40 CFR 60, Subpart OOOO ■ 40 CFR 60, Subpart OOOOa

Turbine Dry Low Emissions? ☐ Yes ☐ No

Heat Input (MMBtu/hr)	Maximum Rating (HP)	75% Rating (HP)	Efficiency

Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK

SECTION D – FUELS USED

Natural Gas (10^6 cu ft/year)	Percent Sulfur	Percent H_2S
62.1 million cubic feet / year	0 %	negl.
Oil (gal/year)	**Percent Sulfur**	**Grade No.**
0 gal/year	N/A	N/A
LP Gas (gal/year)	**Other – Specify:**	
0 gal/year	N/A	

SECTION E – NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year	Peak Production Season (if any)
24	7	52	8760	

SECTION F – STACK PARAMETERS

Emission Point ID Number		Stack Height Above Ground Level (feet)	
EP05		30 feet	
Stack Diameter (feet at top)	**Gas Discharged (SCFM)**	**Exit Temp (°F)**	**Gas Velocity (FPS)**
1.33 feet	1,374 SCFM	1225	53.34

SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☒ No ☐ Yes – Complete and attach form SFN 8532

SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

Pollutant	Maximum Pounds Per Hour	Amount (Tons Per Year)	Basis of Estimate*
NO_x	2.04	8.92	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
CO	4.07	17.84	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
PM	0.16	0.72	Emission Factors based on AP-42, Ch 3.2, Table 3.2-3, July 2000
PM_{10} (filterable and condensable)	0.16	0.72	Emission Factors based on AP-42, Ch 3.2, Table 3.2-3, July 2000
$PM_{2.5}$ (filterable and condensable)	0.16	0.72	Emission Factors based on AP-42, Ch 3.2, Table 3.2-3, July 2000
SO_2	0.005	0.022	Emission Factors based on AP-42, Ch 3.2, Table 3.2-3, July 2000
VOC	1.43	6.25	Emission factor based on compliance with 40 CFR 60 Subpart JJJJ
GHG (as CO_2e)	990	4,336	CO2 emission factor from 40 CFR 98 Subpart C Table C-1 (53.06 kg CO2/MMBtu), November 29, 2013 CH4 and N2O e
Largest Single HAP	0.102	0.446	largest single HAP is formaldehyde
Total HAPS	0.20	0.89	Emission Factors based on AP-42, Ch 3.2, Table 3.2-3, July 2000, formaldehyde based on engine vendor

* If performance test results are available for the unit, submit a copy of test with this application, if manufacture data used, submit manufacturers specification sheets.

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS?

☒ YES ☐ NO

If "NO" a Compliance Schedule (SFN 61008) must be completed and attached.

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

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Bismarck, ND 58501-1947
(701) 328-5188

Appendix D

Manufacturer Specifications

G3612

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	7.6	APPLICATION:	GAS COMPRESSION
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	CONTINUOUS
AFTERCOOLER - STAGE 2 INLET (°F):	130	FUEL:	NAT GAS
AFTERCOOLER - STAGE 1 INLET (°F):	174	FUEL SYSTEM:	GAV WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	190	FUEL PRESSURE RANGE(psig): (See note 1)	58.0-70.3
ASPIRATION:	TA	FUEL METHANE NUMBER:	85
COOLING SYSTEM:	JW+1AC, OC+2AC	FUEL LHV (Btu/scf):	905
CONTROL SYSTEM:	ADEM4	ALTITUDE CAPABILITY AT 100°F INLET AIR TEMP. (ft):	8492
EXHAUST MANIFOLD:	DRY		
COMBUSTION:	LOW EMISSION		
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5		

RATING		NOTES	LOAD	100%	75%	50%
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	3750	2813	1875
ENGINE EFFICIENCY	(ISO 3046/1)	(3)	%	38.9	37.8	35.4
ENGINE EFFICIENCY	(NOMINAL)	(3)	%	38.0	36.9	34.5

ENGINE DATA						
FUEL CONSUMPTION	(ISO 3046/1)	(4)	Btu/bhp-hr	6540	6737	7192
FUEL CONSUMPTION	(NOMINAL)	(4)	Btu/bhp-hr	6700	6902	7367
AIR FLOW (77°F, 14.7 psia)	(WET)	(5) (6)	ft3/min	9023	6820	4678
AIR FLOW	(WET)	(5) (6)	lb/hr	40009	30242	20744
FUEL FLOW (60°F, 14.7 psia)			scfm	463	358	254
COMPRESSOR OUT PRESSURE			in Hg(abs)	97.7	74.2	52.6
COMPRESSOR OUT TEMPERATURE			°F	354	281	200
AFTERCOOLER AIR OUT TEMPERATURE			°F	132	133	133
INLET MAN. PRESSURE		(7)	in Hg(abs)	97.1	73.7	52.0
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(8)	°F	132	133	133
TIMING		(9)	°BTDC	18	17	16
EXHAUST TEMPERATURE - ENGINE OUTLET		(10)	°F	850	904	972
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(11) (6)	ft3/min	23520	18538	13378
EXHAUST GAS MASS FLOW	(WET)	(11) (6)	lb/hr	41279	31222	21441

EMISSIONS DATA - ENGINE OUT					
NOx (as NO2)	(12)(13)	g/bhp-hr	0.50	0.50	0.50
CO	(12)(14)	g/bhp-hr	2.20	2.20	2.20
THC (mol. wt. of 15.84)	(12)(14)	g/bhp-hr	3.96	4.15	4.14
NMHC (mol. wt. of 15.84)	(12)(14)	g/bhp-hr	0.37	0.38	0.38
NMNEHC (VOCs) (mol. wt. of 15.84)	(12)(14)(15)	g/bhp-hr	0.25	0.26	0.26
HCHO (Formaldehyde)	(12)(14)	g/bhp-hr	0.20	0.21	0.24
CO2	(12)(14)	g/bhp-hr	419	432	461
EXHAUST OXYGEN	(12)(16)	% DRY	11.4	11.1	10.7
LAMBDA	(12)(16)		1.99	1.95	1.88

ENERGY BALANCE DATA					
LHV INPUT	(17)	Btu/min	418752	323515	230236
HEAT REJECTION TO JACKET WATER (JW)	(18)(26)	Btu/min	39508	32125	26890
HEAT REJECTION TO ATMOSPHERE	(19)	Btu/min	17382	16643	13753
HEAT REJECTION TO LUBE OIL (OC)	(20)(27)	Btu/min	18844	17147	15196
HEAT REJECTION TO EXHAUST (LHV TO 77°F)	(21)(22)	Btu/min	145179	117268	86382
HEAT REJECTION TO EXHAUST (LHV TO 350°F)	(21)	Btu/min	91329	76935	59691
HEAT REJECTION TO A/C - STAGE 1 (1AC)	(23)(26)	Btu/min	28779	12900	2098
HEAT REJECTION TO A/C - STAGE 2 (2AC)	(24)(27)	Btu/min	7074	5204	3442
PUMP POWER	(25)	Btu/min	2957	2957	2957

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	<10	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	100
SET POINT TIMING	-	16	16	16	16	16	16	16	16	16	17	17	17	17	18	18	18	18
DERATION FACTOR	0	0.50	0.62	0.75	0.87	1	1	1	1	1	1	1	1	1	1	1	1	1

WOBBE INDEX(MJ/Nm3)	700	850	1550	1870
DERATION FACTOR	0.77	1	1	0.85

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1	1	1	1	1	0.98	0.95	0.91	0.88	0.84	0.81	0.77	0.74
120	1	1	1	1	1	1	1	0.96	0.92	0.87	0.83	0.79	0.74
110	1	1	1	1	1	1	1	1	0.97	0.91	0.86	0.81	0.75
100	1	1	1	1	1	1	1	1	1	0.97	0.90	0.83	0.77
90	1	1	1	1	1	1	1	1	1	0.98	0.91	0.84	0.77
80	1	1	1	1	1	1	1	1	1	1	0.93	0.85	0.78
70	1	1	1	1	1	1	1	1	1	1	0.94	0.86	0.78
60	1	1	1	1	1	1	1	1	1	1	0.96	0.87	0.79
50	1	1	1	1	1	1	1	1	1	1	0.98	0.89	0.79

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.33	1.38	1.43	1.48	1.54	1.59	1.64	1.70	1.76	1.81	1.82	1.82	1.82
120	1.27	1.31	1.36	1.41	1.47	1.52	1.57	1.63	1.68	1.74	1.74	1.74	1.74
110	1.20	1.25	1.30	1.34	1.40	1.45	1.50	1.55	1.61	1.66	1.67	1.67	1.67
100	1.13	1.18	1.23	1.28	1.32	1.38	1.43	1.48	1.53	1.59	1.59	1.59	1.59
90	1.06	1.11	1.16	1.21	1.25	1.30	1.35	1.41	1.46	1.51	1.52	1.52	1.52
80	1	1.04	1.09	1.14	1.18	1.23	1.28	1.33	1.39	1.44	1.44	1.44	1.44
70	1	1	1.02	1.07	1.11	1.16	1.21	1.26	1.31	1.36	1.37	1.37	1.37
60	1	1	1	1	1.04	1.09	1.14	1.19	1.24	1.29	1.29	1.29	1.29
50	1	1	1	1	1	1.02	1.07	1.11	1.16	1.21	1.22	1.22	1.22

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	750	750	750	750	750	750	750	750	750	750	750	750	750
120	750	750	750	750	750	750	750	750	750	750	750	750	750
110	750	750	750	750	750	750	750	750	750	750	750	750	750
100	750	750	750	750	750	750	750	750	750	750	750	750	750
90	750	750	750	750	750	750	750	750	750	750	750	750	750
80	750	750	750	750	750	750	750	750	750	750	750	750	750
70	750	750	750	750	750	750	750	750	750	750	750	750	750
60	750	750	750	750	750	750	750	750	750	750	750	750	750
50	750	750	750	750	750	750	750	750	750	750	750	750	750

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing adjustment may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation.
The Fuel Lower Heating Value (LHV) table shows the derate factor required for a given fuel. To determine the actual power available, use the lowest factor between the Fuel LHV table and the Caterpillar Methane Number table.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site. The derate factors shown do not account for the external cooling system capacity. The derate factors provided assume the external cooling system can maintain the specified cooling water temperatures at site conditions.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).
1) Fuel Usage Guide Deration
2) 1-((1-Altitude/Temperature Deration) + (1-RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See notes 26 and 27 for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM):

This table shows the minimum allowable engine turndown speed where the engine will maintain the Rated Speed's Torque for the given ambient conditions.

NOTES:

1. Fuel pressure range specified is to the engine gas shutoff valve (GSOV). Additional fuel train components should be considered in pressure and flow calculations.
2. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.
3. ISO 3046/1 engine efficiency tolerance is (+)0, (-)5% of full load % efficiency value. Nominal engine efficiency tolerance is ± 2.5% of full load % efficiency value.
4. ISO 3046/1 fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal fuel consumption tolerance is ± 2.5% of full load data.
5. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
6. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
7. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
8. Inlet manifold temperature is a nominal value with a tolerance of ± 9°F.
9. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
10. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
11. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
12. Emissions data is at engine exhaust flange prior to any after treatment.
13. NOx values are the maximum values expected under steady state conditions.
14. CO, CO2, THC, NMHC, NMNEHC, and HCHO are the maximum values expected under steady state conditions. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.
15. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
16. Exhaust Oxygen tolerance is ± 0.5, Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
17. LHV rate tolerance is ± 2.5%.
18. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
19. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
20. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
21. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
22. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
23. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
24. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
25. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
26. Total Jacket Water Circuit heat rejection is calculated as: (JW x 1.1) + (1AC x 1.05) + [0.99 x (1AC + 2AC) x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
27. Total Second Stage Aftercooler Circuit heat rejection is calculated as: (OC x 1.2) + (2AC x 1.05) + [(1AC + 2AC) x 0.01 x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	3750	124.5	91.5	93.1	94.2	99.4	101.9	107.8	107.6	108.9	110.8	111.5
75	2813	122.9	89.8	92.2	95.9	99.1	101.7	106.9	107.5	109.0	110.7	111.1
50	1875	121.5	87.1	92.6	95.5	98.3	101.6	107.0	108.4	109.7	110.8	110.8

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	3750	111.8	113.3	111.8	112.1	114.6	114.7	111.4	118.4	111.9	107.8	107.1
75	2813	111.0	112.3	111.2	111.4	113.4	113.9	111.7	111.3	110.0	107.8	102.9
50	1875	110.7	111.5	110.3	109.7	111.4	111.0	108.1	107.2	107.0	105.4	101.0

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	3750	146.8	107.3	111.5	115.3	116.7	114.8	116.7	118.6	117.9	119.0	126.4
75	2813	146.6	105.1	109.5	111.1	110.4	109.2	113.3	114.4	113.9	116.6	124.8
50	1875	144.0	103.0	103.2	103.8	103.6	103.2	107.1	109.2	110.2	114.4	122.9

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	3750	127.0	130.5	132.3	135.3	137.0	138.8	139.3	138.4	137.7	136.2	134.1
75	2813	127.0	130.1	132.0	135.6	137.4	139.6	139.9	138.1	136.2	134.2	131.4
50	1875	126.1	129.5	130.9	133.4	136.9	138.3	135.3	134.0	132.4	128.8	125.6

SOUND PARAMETER DEFINITION:
Sound Power Level Data - DM8702-03

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:
Sound power level -- Mechanical
Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 3747. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A. Exhaust data is post-catalyst on gas engine ratings labeled as "Integrated Catalyst".

Measurements made in accordance with ISO 3747 and ISO 6798 for mechanical and exhaust sound level only. Frequency bands outside the displayed ranges are not measured, due to physical test, and environmental conditions that affect the accuracy of the measurement. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.

Equipment Specification

Proposal Information

Proposal Number:	JB-20-000397 Rev(1)	Date:	2/10/2020
Project Reference:	Enerflex - Q1200012/13 - WBI Station - Cat 3612 A4		

Engine Information

Engine Make:	Caterpillar	Speed:	Rated
Engine Model:	G 3612 A4	Power Output:	3,750 bhp
Rated Speed:	1000 RPM	Exhaust Flow Rate:	23,913 acfm (cfm)
Fuel Description:	Natural Gas	Exhaust Temperature:	823 F
Hours Of Operation:	8760 Hours per year	Fuel Consumption:	6,772 btu/bhp-hr
Load:	100%	O_2:	11.6%
		H_2O:	17%

Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	*g/kW-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*lb/MW-hr*	*g/bhp-hr*	*g/kW-hr*	*tons/yr*	*ppmvd @ 15% O_2*	*ppmvd*	*lb/MW-hr*	
NO_x*	*0.3*	0.402	10.86	27	42	0.89							
CO	*2.98*	3.996	107.91	439	691	8.81	0.21	0.28	7.55	31	48	0.62	93%
THC	6.46	8.663	221.45	1,812	2,488	19.1							
NMNEHC**	*0.62*	0.831	22.45	159	251	1.83	0.31	0.416	11.23	80	126	0.92	50%
CH_2O	*0.19*	0.255	6.88	26	41	0.56	*0.03*	0.04	1.09	4	6	0.09	84.2%

System Specifications

Oxidation (SP-PT-72-16080005-XH4B0, SP-PTH-72-TBD-HSG)

Design Exhaust Flow Rate:	23,914 acfm (cfm)
Design Exhaust Temperature:	823°F
Housing Model Number:	SP-PT-72-16080005-HSG, SP-PTH-72-TBD-HSG
Element Model Number:	MECB-OX-SB2700-2421-2338-291
Number of Catalyst Elements:	4
Number of Spare Catalyst Tracks:	0
System Pressure Loss:	8.0 inches of WC (Clean) (19.9 mBar)
Sound Attenuation:	30-35 dBA insertion loss
Exhaust Temperature Limits***:	550 – 1250°F (catalyst inlet); 1350°F (catalyst outlet) – °C (catalyst inlet); °C (catalyst outlet)

* MW referenced as NO_2

** MW referenced as CH_4. Propane in the exhaust shall not exceed 15% by volume of the NMNEHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMNEHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

*** General catalyst temperature operating range. Performance is based on the Design Exhaust Temperature.

EngCalc 3524GSI Tioga field gas - Tioga ND

Waukesha Pearce Industries Bill Balough 412-951-9028 balough@wpi.com

VHP - F3524GSI

Power Generation

ENGINE SPEED (rpm):	1200	NOx SELECTION (g/bhp-hr):	0.15
DISPLACEMENT (in3):	3520	COOLING SYSTEM:	JW, IC + OC
COMPRESSION RATIO:	8:1	INTERCOOLER WATER INLET (°F):	130
IGNITION SYSTEM:	ESM2	JACKET WATER OUTLET (°F):	180
EXHAUST MANIFOLD:	Water Cooled	JACKET WATER CAPACITY (gal):	49
COMBUSTION:	Rich Burn, Turbocharged	AUXILIARY WATER CAPACITY (gal):	8
ENGINE DRY WEIGHT (lbs):	16000	LUBE OIL CAPACITY (gal):	72
AIR/FUEL RATIO SETTING:	0.38% CO	MAX. EXHAUST BACKPRESSURE (in. H2O):	18
ENGINE SOUND LEVEL (dBA)	101	MAX. AIR INLET RESTRICTION (in. H2O):	15
IGNITION TIMING:	ESM2 Controlled	EXHAUST SOUND LEVEL (dBA)	110
FREQUENCY (Hz):	60	PHASE:	3
GENERATOR TYPE:	Synchronous	PHASE ROTATION:	T1-T2-T3
VOLTAGE:	480		

SITE CONDITIONS:

FUEL:	Natural Gas	ALTITUDE (ft):	2305
FUEL PRESSURE RANGE (psig):	30 - 50	MAXIMUM INLET AIR TEMPERATURE (°F):	100
FUEL HHV (BTU/ft3):	1,188.6	FUEL WKI:	64.7
FUEL LHV (BTU/ft3):	1,074.5		

SITE SPECIFIC TECHNICAL DATA

POWER RATING	UNITS	110% OVERLOAD SITE DATA (See note 18)	MAX RATING AT 100 °F AIR TEMP	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE OF 100 °F		
				100%	75%	55%
CONTINUOUS ENGINE POWER	BHP	924	840	840	630	464
OVERLOAD	% 2/24 hr	Note 18	10	10	-	-
ELECTRICAL EFFICIENCY (LHV)	%	29.1	28.8	28.8	27.8	26.7
GENERATOR OUTPUT	kWe	651	592	592	444	327
GENERATOR kVA	kVA	814	740	740	555	409
GENERATOR CURRENT	Amps	980	891	891	668	493
based on 94.5% generator efficiency at 0.8 PF, no auxiliary engine driven equipment						
FUEL CONSUMPTION						
FUEL CONSUMPTION (LHV)	BTU/BHP-hr	8272	8366	8367	8871	9030
FUEL CONSUMPTION (HHV)	BTU/BHP-hr	9151	9254	9255	9591	9989
FUEL FLOW *based on fuel analysis LHV*	SCFM	119	109	109	85	65
HEAT REJECTION						
JACKET WATER (JW)	BTU/hr x 1000	2373	2209	2209	1771	1389
LUBE OIL (OC)	BTU/hr x 1000	353	345	345	321	294
INTERCOOLER (IC)	BTU/hr x 1000	162	146	146	98	49
EXHAUST	BTU/hr x 1000	2182	1968	1968	1451	1061
RADIATION	BTU/hr x 1000	370	357	357	324	297
EMISSIONS (CATALYST OUT):						
NOx (NO + NO2)	g/bhp-hr	0.15	0.15	0.15	0.15	0.15
CO	g/bhp-hr	0.3	0.3	0.3	0.3	0.3
THC	g/bhp-hr	1.7	1.7	1.7	1.7	1.7
NMHC	g/bhp-hr	0.75	0.75	0.75	0.75	0.75
NM,NEHC (VOC)	g/bhp-hr	0.23	0.23	0.23	0.23	0.23
CO2	g/bhp-hr	547	553	553	572	596
CO2e	g/bhp-hr	571	577	577	596	619
CH2O	g/bhp-hr	0.00	0.001	0.001	0.001	0.001
CH4	g/bhp-hr	0.95	0.95	0.95	0.95	0.95
AIR INTAKE / EXHAUST GAS						
INDUCTION AIR FLOW	SCFM	1387	1275	1275	991	760
EXHAUST GAS MASS FLOW	lb/hr	6457	5937	5936	4614	3539
EXHAUST GAS FLOW *at exhaust temp, 14.5 psia*	ACFM	4896	4446	4445	3338	2480
EXHAUST TEMPERATURE	°F	1246	1225	1225	1168	1117

HEAT EXCHANGER SIZING[12]			
TOTAL JACKET WATER CIRCUIT (JW)	BTU/hr x 1000	2691	2505
TOTAL AUXILIARY WATER CIRCUIT (IC + OC)	BTU/hr x 1000	585	557

COOLING SYSTEM WITH ENGINE MOUNTED WATER PUMPS		
JACKET WATER PUMP MIN. DESIGN FLOW	GPM	225
JACKET WATER PUMP MAX. EXTERNAL RESTRICTION	psig	15
AUX WATER PUMP MIN. DESIGN FLOW	GPM	48
AUX WATER PUMP MAX. EXTERNAL RESTRICTION	psig	22

All data provided per the conditions listed in the notes section on page three.

Data Generated by EngCalc Program Version 4.0 INNIO Waukesha Gas Engines, Inc.

5/21/2020 7:57 AM

EngCalc 3524GSI Tioga field gas - Tioga ND

Waukesha Pearce Industries Bill Balough 412-951-9028 balough@wpi.com

VHP - F3524GSI

Power Generation

FUEL COMPOSITION

HYDROCARBONS:		Mole or Volume %
Methane	CH4	67.48
Ethane	C2H6	19.9
Propane	C3H8	5.163
Iso-Butane	I-C4H10	0.157
Normal Butane	N-C4H10	0.319
Iso-Pentane	I-C5H12	0.0175
Normal Pentane	N-C5H12	0.0174
Hexane	C6H14	0
Heptane	C7H16	0
Ethene	C2H4	0
Propene	C3H6	0
	SUM HYDROCARBONS	93.054
NON-HYDROCARBONS:		
Nitrogen	N2	6.02
Oxygen	O2	0
Helium	He	0
Carbon Dioxide	CO2	0.924
Carbon Monoxide	CO	0
Hydrogen	H2	0
Water Vapor	H2O	0
	TOTAL FUEL	99.998

FUEL:	Natural Gas
FUEL PRESSURE RANGE (psig):	30 - 50
FUEL WKI:	64.7
FUEL SLHV (BTU/ft3):	1055.79
FUEL SLHV (MJ/Nm3):	41.52
FUEL LHV (BTU/ft3):	1074.49
FUEL LHV (MJ/Nm3)	42.25
FUEL HHV (BTU/ft3):	1188.60
FUEL HHV (MJ/Nm3):	46.74
FUEL DENSITY (SG):	0.74

Standard Conditions per ASTM D3588-91 [60°F and 14.696psia] and ISO 6976:1996-02-01[25, V(0;101.325)]

Based on the fuel composition, supply pressure and temperature, liquid hydrocarbons may be present in the fuel. No liquid hydrocarbons are allowed in the fuel. The fuel must not contain any liquid water. Waukesha recommends both of the following:

1) Dew point of the fuel gas to be at least 20°F (11°C) below the measured temperature of the gas at the inlet of the engine fuel regulator.

2) A fuel filter separator to be used on all fuels except commercial quality natural gas.

Refer to the 'Fuel and Lubrication' section of 'Technical Data' or contact the Waukesha Application Engineering Department for additional information on fuels, or LHV and WKI* calculations.

FUEL CONTAMINANTS

Total Sulfur Compounds	0	% volume
Total Halogen as Cloride	0	% volume
Total Ammonia	0	% volume
Siloxanes		
Tetramethyl silane	0	% volume
Trimethyl silanol	0	% volume
Hexamethyldisiloxane (L2)	0	% volume
Hexamethylcyclotrisiloxane (D3)	0	% volume
Octamethyltrisiloxane (L3)	0	% volume
Octamethylcyclotetrasiloxane (D4)	0	% volume
Decamethyltetrasiloxane (L4)	0	% volume
Decamethylcyclopentasiloxane (D5)	0	% volume
Dodecamethylpentasiloxane (L5)	0	% volume
Dodecamethylcyclohexasiloxane (D6)	0	% volume
Others	0	% volume

Total Sulfur Compounds	0 µg/BTU
Total Halogen as Cloride	0 µg/BTU
Total Ammonia	0 µg/BTU
Total Siloxanes (as Si)	0 µg/BTU

Calculated fuel contaminant analysis will depend on the entered fuel composition and selected engine model.

No water or hydrocarbon condensates are allowed in the engine. Requires liquids removal.

NOTES

1. All data is based on engines with standard configurations unless noted otherwise.

2. Power rating is adjusted for fuel, site altitude, and site air inlet temperature, in accordance with ISO 3046/1 with tolerance of ± 3%.

3. Fuel consumption is presented in accordance with ISO 3046/1 with a tolerance of -0 / +5% at maximum rating. Fuel flow calculation based on fuel LHV and fuel consumption with a tolerance of -0/+5 %. For sizing piping and fuel equipment, it is recommended to include the 5% tolerance.

4. Heat rejection tolerances are ± 30% for radiation, and ± 8% for jacket water, lube oil, intercooler, and exhaust energy.

5. Emission levels for engines with Waukesha supplied 3-way catalyst are given at catalyst outlet flange. For all other engine models, emission levels are given at engine exhaust outlet flange prior to any after treatment. Values are based on a new engine operating at indicated site conditions, and adjusted to the specified timing and air/fuel ratio at rated load. Catalyst out emission levels represent emission levels the catalyst is sized to achieve. Manual adjustment may be necessary to achieve compliance as catalyst/engine age. Catalyst-out emission levels are valid for the duration of the engine warranty. Emissions are at an absolute humidity of 75 grains H2O/lb (10.71 g H2O/kg) of dry air. Emission levels may vary subject to instrumentation, measurement, ambient conditions, fuel quality, and engine variation. Engine may require adjustment on-site to meet emission values, which may affect engine performance and heat output. NOx, CO, THC, and NMHC emission levels are listed as a not to exceed limit, all other emission levels are estimated. CO2 emissions based on EPA Federal Register/Vol. 74, No. 209/Friday, October 30, 2009 Rules and Regulations 56398, 56399 (3) Tier 3 Calculation Methodology, Equation C-5.

6. Air flow is based on undried air with a tolerance of ± 7%.

7. Exhaust temperature given at engine exhaust outlet flange with a tolerance of ± 50°F (28°C).

8. Exhaust gas mass flow value is based on a "wet basis" with a tolerance of ± 7%.

9. Inlet air restrictions based on full rated engine load. Exhaust backpressure based on 158 PSI BMEP and 1200 RPM. Refer to the engine specification section of Waukesha's standard technical data for more information.

10. Cooling circuit capacity, lube oil capacity, and engine dry weight values are typical.

11. Fuel must conform to Waukesha's "Gaseous Fuel Specification" S7884-7 or most current version. Fuel may require treatment to meet current fuel specification.

12. Heat exchanger sizing values given as the maximum heat rejection of the circuit, with applied tolerances and an additional 5% reserve factor.

13. Fuel volume flow calculation in english units is based on 100% relative humidity of the fuel gas at standard conditions of 60°F and 14.696 psia (29.92 inches of mercury; 101.325 kPa).

14. Fuel volume flow calculation in metric units is based on 100% relative humidity of the fuel gas at a combustion temperature of 25°C and metering conditions of 0°C and 101.325 kPa (14.696 psia; 29.92 inches of mercury). This is expressed as [25, V(0;101.325)].

15. Engine sound data taken with the microphone at 1 m (3.3 ft) from the side of the engine at the approximate front-to-back centerline. Microphone height was at intake manifold level. Engine sound pressure data may be different at front, back and opposite side locations. Exhaust sound data taken with microphone 1 meter (3.3 ft) away and 1 meter (3.3 ft) to the side of the exhaust outlet.

16. Due to variation between test conditions and final site conditions, such as exhaust configuration and background sound level, sound pressure levels under site conditions may be different than those tabulated above.

17. Cooling system design flow is based on minimum allowable cooling system flow. Cooling system maximum external restriction is defined as the allowable restriction at the minimum cooling system flow.

18. Continuous Power Rating: The highest load and speed that can be applied 24 hours per day, seven days per week, 365 days per year except for normal maintenance at indicated ambient reference conditions and fuel. It is permissible to operate the engine at the indicated overload power, for two hours in every 24 hour period.

19. emPact emission compliance available for entire range of operable fuels; however, fuel system and/or O2 set point may need to be adjusted in order to maintain compliance.

20. In cold ambient temperatures, heating of the engine jacket water, lube oil and combustion air may be required. See Waukesha Technical Data.

21. Available Turndown Speed Range refers to the constant torque speed range available. Reduced power may be available at speeds outside of this range. Contact application engineering.

SPECIAL REQUIREMENTS

Site conditions over 100 °F or 1500 ft may require a special generator or radiator. Contact Application Engineering.

Appendix E

Onsite Meteorological Data Processing, Tioga, ND
(Bison Engineering, June 2020)

On-Site Meteorological Data Processing Tioga, ND

Presented to:

North Dakota Department of Environmental Quality
Environmental Health Section
918 E. Divide Ave.
Bismarck, ND 58501-1947

Prepared for:

Hess Corporation
Tioga Gas Plant
10340 68th Street NW
Tioga, ND 58852

Prepared by:

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3143 E. Lyndale
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June 16, 2020

1) Introduction

Dispersion modeling has been required as an integral measure for the purpose of obtaining a Permit-To-Construct (PTC) for WBI Energy, Inc. (WBI) from the North Dakota Department of Environmental Quality (NDDEQ). To that end, WBI has submitted an air quality permit application for the construction and operation of a new gas compressor and processing station to be located near the town of Tioga, ND. Among the requirements is a demonstration that the facility of interest (WBI) along with all other significant sources, including background concentrations, does not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS)[1] or the North Dakota Ambient Air Quality Standards (NDAAQS)[2].

Among the air pollutants to be included in the dispersion modeling simulations include NO_2. EPA and North Dakota guidelines[3] have indicated that in addition to the WBI facility itself, emissions from the Hess Corporation (Hess) Tioga Gas Plant (TGP) also need to be included in the modeling effort.

Bison Engineering, Inc. (Bison) has processed a meteorological dataset to be used for the air dispersion modeling analyses near Tioga, ND. The dataset uses one year of on-site surface meteorological data collected for the Hess TGP as a condition to their air quality permit. The data is processed within the AERMET pre-processor for use in the AERMOD modeling system.

The following sections detail the selection and processing of the data utilized to create the AERMET files, including surface and upper air data selections, surface characterizations, and technical selections within AERMET.

[1] The NAAQS are found in 40 CFR 50.

[2] https://www.epa.gov/sites/production/files/2018-07/documents/33-15-2-ambient air quality standards final.pdf

[3] NDDEQ Modeling Guideline (June 2013): https://deq.nd.gov/publications/AQ/policy/Modeling/ND_Air_Dispersion_Modeling_Guide.pdf and Appendix W (January 2017): https://www3.epa.gov/ttn/scram/guidance/guide/appw_17.pdf

2) Data Processing

The AERMET pre-processor was used to prepare meteorological data for use in AERMOD. Guidance provided in the most recent AERMET Implementation Guide (EPA, 2019) was utilized. AERMET uses three steps to pre-process and combine the surface and upper-air soundings to output data in a format that is compatible with AERMOD. The first step extracts the data and performs a brief quality assurance check of the data. The second step merges the meteorological data sets. The third step outputs the data in the AERMOD-compatible format while also incorporating surface characteristics surrounding the collection or application site.

The output from the AERMET model consists of two separate files—the surface conditions file (*.SFC) and a vertical profile dataset (*.PFL). AERMOD uses these two files in the dispersion-modeling algorithm to predict pollutant concentrations resulting from a source's emissions.

The AERSURFACE program was used to determine the surface characteristics surrounding the monitoring site. AERSURFACE was developed by the EPA to assist in determining surface characteristics by using U.S. Geological Survey (USGS) land use maps and converting the land use type to values described in the AERMET User's Guide (EPA, 2004). AERSURFACE uses a 1-km radius surrounding the monitoring site to determine surface roughness values for each sector, and a 10x10-km area to determine the mid-day albedo and daytime Bowen Ratio. Average site precipitation data over a 30-year period is also analyzed to determine if individual years rate as dry, average, or wet in the context of AERSURFACE.

The noontime albedo, daytime Bowen ratio, and surface roughness lengths are considered when conducting the Stage 3 AERMET processing. Collectively these are described as surface characteristics. Surface characteristics can vary by season and region (sector) around the data collection site.

The mid-day albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption. The daytime Bowen ratio is an indicator of surface moisture, which is the ratio of the sensible heat flux to the latent heat flux. The Bowen ratio is used to determine the planetary boundary layer parameters for convective conditions. Surface roughness length is related to the height of obstacles to the wind flow and is the height at which the mean horizontal wind speed is zero. The AERMOD model uses the surface characteristics to define dispersion coefficients in the model.

The latest EPA-recommended versions of the modeling programs were used, including:

Program	Version
AERMET	19191
AERMINUTE	15272
AERSURFACE	20060

3) Data Selection

AERMET utilizes surface and upper air meteorological data files to provide information on wind speed and direction, ambient temperature, and cloud cover. These parameters are used to estimate dispersion parameters within AERMOD.

The following observational meteorological data were used in this analysis:

Surface Data (Primary):	Tioga, ND; Station #1 (Hess)
Surface Data (Secondary):	Williston, ND; Station KISN
Upper Air Data:	Glasgow, MT; Station KGGW

Surface Meteorological Data

Primary Data

One year of data collected on-site at the TGP in 2015 was utilized as the primary surface meteorological dataset in AERMET. The rationale and selection of this data is presented below.

The dispersion modeling guidelines[4] suggest that the meteorological data used should be representative of the project area. The guidelines go on to state:

> *"Site-specific measured data are, therefore, preferred as model input, provided that appropriate instrumentation and quality assurance procedures are followed, and that the data collected are adequately representative (free from inappropriate local or microscale influences) and compatible with the input requirements of the model to be used."* 40 CFR 51, Appendix W. Section 8.4.4.1.

Hess has operated a nearby meteorological station from 1986 to 2016. The monitoring site included the measurement of hourly wind speed, wind direction, wind sigma and temperature. This was known as Station #1. The meteorological station (including an ambient SO_2 monitor) began moving to a new location (now referred to as Station #4) in late 2016. The new site is located roughly 7 km to the northeast of the TGP. Station #1, on the other hand, was less than 1 km from the plant boundary.

The old site (Station #1) was decommissioned as an integral part of implementing the Data Requirements Rule (DDR).[5] The "new" (relocated) station became operational and

[4] NDDEQ Modeling Guideline (June 2013): https://deq.nd.gov/publications/AQ/policy/Modeling/ND_Air_Dispersion_Modeling_Guide.pdf and Appendix W (January 2017): https://www3.epa.gov/ttn/scram/guidance/guide/appw_17.pdf

[5] DRR refers to the "Data Requirements Rule" which is found at 40 CFR 51.1200 – 1205. The rule generally outlines the ambient monitoring and/or dispersion modeling analyses that need to be conducted in order to determine the appropriate attainment classification for the 2010 national ambient air quality standard for sulfur dioxide.

collecting valid data (SO_2 and meteorology) around January 2017. Bison, on behalf of the Hess TGP, has been submitting quarterly ambient SO_2 and meteorological data from all monitoring sites to the NDDEQ since 1986.

The 2015 dataset was chosen for this modeling analysis. The reasons are two-fold:

1) Proximity to Facilities.

   Among the dataset and years of choice, Station #1 is located the closest to both the TGP and the proposed WBI facility. The station was located less than 1 km from the northern fenceline of TGP and about ½ km from the proposed WBI facility.

   The new location (late 2016) is about 7 kilometers from TGP and about 6 kilometers from the proposed WBI station. Given the terrain characterization of the area, this is sufficiently close to the facility for modeling purposes. However, it would seem imprudent to use this "new" site when there is recent data available from a location that is much closer to the facilities of interest.

   Therefore, Station #1 was chosen as the preferred meteorological site due to its proximity and its availability of recent data.

2) Data Completeness and Quality.

   The meteorological data collected at both Station #1 (through most of 2016) and the "new" Station #4 (beginning 2017) has been provided to NDDEQ in the form of quarterly reports. Insofar as data quality is concerned the data has been acceptable for most years and quarters.

   The meteorological data system (new and old location) is subject to frequent calibration and annual audits per QA guidelines. It is believed that the reported data meets minimum quality assurance requirements. A review of this data, 2015 in particular, shows a high degree of quality. Performance audits were conducted in all four quarters that year (March, June, August and December) and results were all within acceptable values.

   However, a review of the 2017 through 2019 data (when the meteorological station was relocated to Station #4), indicates at least one quarter in each year which had low data recovery (due to instrument freezing issues) for wind speed and direction. Calendar years 2017, 2018 and 2019 had one quarter with less than 54%, 28% and 16% data recovery, respectively. This drove the annual recovery below what might normally be acceptable (usually 90%). The less than typical recovery during each quarter of the three years did not meet desired levels for selection of a representative and complete dispersion modeling year.

Therefore, 2015 is the first available year with excellent data recovery (and QC) at Station #1. The data quality and quantity for this year is outstanding. Each month and quarter of that year had a data recovery of greater than 90%. The yearly data recovery was 97%, 98% and 98%; respectively for wind speed, wind direction (including wind sigma) and temperature.

Calendar year simultaneously yielded excellent quality data. As it regards meteorological data, monitoring guidelines suggest that an audit of the meteorological system should be conducted on a semi-annual basis. For this project, however, quarterly audits were conducted thus exceeding the minimum quality requirement.

As noted previously, audit and calibration data are found in the quarterly reports submitted to NDDEQ in 2015 and early 2016 for this site. Prior to presenting the data, it is worth noting that the results of all four audits indicated good comparison to the audit values. That being the case, it was decided that no calibrations (i.e. measuring and adjusting instrument output) of the equipment were necessary since the audit indicated an excellent comparison between the challenged parameter and instrumentation/system response.

Attachment 1 of this document provides a complete summary of the 2015 meteorological data. It includes the quantity and quality of results for each month, quarter, and year along with the results of all 4 quarterly audits of the site.

Because 2015 is the most recent year with the best combination of data recovery and quality, it was chosen as the year for analysis. That calendar year was further affirmed based on the quantity and quality of collected ozone data from the Lostwood monitoring station during the same time span. That data was also an important parameter in the eventual model runs.

Additionally, the Hess TGP Ambient Monitoring Program produces a Quality Assurance Project Plan (QAPP) and subsequent revisions, as needed, when changes are made to the monitoring network. The objective of the QAPP is to document the quality assurance organization, responsibilities, procedures, documentation, audits, control limits, and other criteria that have been established for the TGP to meet the monitoring objectives. QAPP Revisions have been submitted to NDDEQ on an ongoing basis.

A single year of on-site meteorological data was deemed acceptable for use in the modeling analysis since it represents wind conditions on site (as opposed to a NWS station at Williston 60 kilometers to the southwest). It is consistent with modeling guidelines (Section 8.4.2 of Appendix W) and was discussed with NDDEQ in a meeting on April 6, 2020.

Site-Specific Data Representativeness

As previously stated, the NDDEQ dispersion modeling guideline and Appendix W maintains that "*site-specific measured data are…preferred as model input*" given that appropriate instrumentation and quality assurance procedures are followed, and that the data collected are adequately representative of the local area. It continues to detail a minimum requirement for site-specific measurements to include ambient air temperature, transport wind speed and direction, and the variables necessary to estimate atmospheric dispersion. The Meteorological Monitoring Guidance for Regulatory Modeling Applications (MMGRMA) provides additional technical guidance in determining the representativeness of site-specific measurements.[6] It expands on data requirements and provides guidance for the collection and processing of meteorological data for general use in air quality modeling applications.

The MMGRMA document indicates that one of the most important decisions in preparing for an air quality modeling analysis is the selection of meteorological data. Ultimately, the data and site selection must be evaluated on the representativeness of the area – whether selecting a site for a monitoring station or selecting a station from an existing data base. As general rules, meteorological stations should be located outside of the influence from obstructions. They should also be located in an area representative of the meteorological conditions of the area of interest. Thirdly, stations should be routinely inspected for quality assurance. Station #1 at the TGP largely qualifies for these general rules. It operated in open, simple terrain located away from influence from nearby buildings, trees, and structures. This aided in the quality of data collected and in capturing representative conditions of the area of interest. Appropriately, Station #1 was located about ½ km from the proposed WBI facility which provides a meteorological dataset directly in the area of interest for the WBI model. Furthermore, the station was audited quarterly which provides ample routine quality assurance activities and site inspections to verify the siting and exposure of the sensors and instrumentation. To that point, Station #1 qualifies to the general rules provided in the MMGRMA guidance document.

However, it is important to further expand on the representativeness of the data selection. The MMGRMA guidance document defines representativeness as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application". It continues to state that "meteorological data should be representative of conditions affecting the transport and dispersion of pollutants in the 'area of interest' as determined by the locations of the sources and receptors being modeled."

The representativeness of the meteorological data used in an air quality modeling analysis is generally dependent upon the proximity of the meteorological monitoring site to the "area-of-interest". Intuitively, a station closer to the project area should provide data representative of the local conditions and provide the closest approximation to the actual conditions in the same space-time domain. In this case, the next available dataset is the

[6] Meteorological Monitoring Guidance for Regulatory Modeling Applications (Feb 2000): https://www3.epa.gov/ttn/scram/guidance/met/mmgrma.pdf

Williston, ND Airport ASOS station used as the secondary surface dataset in the modeling analysis. It is located approximately 60-km away from the project area which is outside of the recommended technical range (50-km) of AERMOD when evaluating modeled concentration impacts.[7] Station #1 provides representative surface characteristics within the same space-time domain as the project-site and should provide accurate meteorological characteristics in place of the Williston dataset, where possible.

The WBI analysis utilizes a steady-state modeling application assessed in conjunction with steady-state meteorological conditions in the modeling domain. The project area represents open, simple terrain where it is acceptable for the meteorological measurements from a single location to apply at all locations within the modeling domain. Per the MMGRMA guidance, this requires a meteorological station that is located somewhere near the evaluated sources and at a location where meteorological conditions are consistent over the spatial domain of the application. Factors to consider include surface characteristics such as ground cover, surface roughness, and the presence of water bodies.

The surface roughness over an area reflects general surface features, land cover, and man-made/natural obstructions. These elements effect horizontal and vertical wind patterns. Additionally, the surface roughness length within AERMOD influences the surface shear stress and factors into the determination of mechanical turbulence and boundary layer stability. The collection of wind parameters at Station #1 matched with the surface roughness characteristics of the project area provide the most accurate representation of wind speed and direction parameters within the model. This further supports the representativeness and use of the meteorological data parameters collected at Station #1.

The MMGRMA document also points out that it is important to recognize that certain meteorological variables may be considered unrepresentative of another site (such as, wind direction or wind speed) while other variables may be representative (such as temperature, dew point, cloud cover). Exclusion of one variable from a meteorological site does not necessarily exclude all. In this case, the Williston dataset is not a misrepresentation of the project site. Rather, the meteorological data collected at Station #1 provides more representative data for the parameters collected at the site. Fortunately, the Williston dataset provides a robust secondary dataset to be used in support to the Station #1 data. This provides supplemental data for parameters missing from the Station #1 dataset as is described in the following section.

[7] The EPA does not recommend using AERMOD for long-range transport modeling (>50 km) because meteorological conditions can change quite drastically over longer distances or time scales. However, data from meteorological stations located beyond 50-km can still be used to evaluate model results given the station is representative of the project area. The evaluation of modeled concentration impacts is not recommended beyond 50-km.

Secondary Data

A secondary surface meteorological dataset was used to supplement missing data from the on-site dataset. The Williston Basin International Airport in Williston, ND (WBAN 94017) was selected as a secondary surface dataset. The airport meteorological tower is approximately 60 kilometers west-southwest of the project site and data is collected at an Automated Surface Observing System (ASOS) station that records minutely data. The 1-minute ASOS data was also processed using the AERMINUTE preprocessor and is supplemented into the AERMET dataset when required. ASOS is largely the favorable dataset used in modeling analyses in the absence of on-site data. The following information describes the qualifications of an ASOS meteorological station:

> **Automated Surface Observing System (ASOS)** units are operated and controlled cooperatively in the United States by the National Weather Service (NWS), Federal Aviation Administration (FAA), and Department of Defense (DOD). ASOS systems generally report at hourly intervals, but also report special observations if weather conditions change rapidly and cross aviation operation thresholds. Besides serving commercial aviation needs, the ASOS serves as a primary climatological observing network in the United States, designated as the first-order network of climate stations. The program supports forecast activities, aviation operations, and the needs of the meteorological, hydrological, and climatological research communities. The ASOS stations provide a more complete data record and are generally subjected to more rigorous quality assurance.

National Weather Surface (NWS) surface data from the Williston Basin International Airport station were downloaded from the National Climatic Data Center (NCDC) website in standard Integrated Surface Hourly Data (ISHD) format for 2015.[8]

Station metadata is included in Table 1 for both surface meteorological stations.

[8] NCDC data located at ftp://ftp.ncdc.noaa.gov/pub/data/noaa/

Table 1: Surface Meteorological Station Metadata

Location	Station Type	Call Name	WBAN	Lat	Lon	Elev. (m)
Hess TGP Station #1 Tioga, ND	On-Site	NA	NA	48.40875	-102.9088	761
Williston Basin International Airport Williston, ND	ASOS	KISN	94014	48.1737	-103.6373	580

Table 2 is a summary of the percent completeness of wind speed and wind direction data of the AERMET processed *.SCF file that utilizes both the primary and secondary surface datasets. Both parameters have 99.9% data completeness indicating an acceptable dataset for use in AERMOD.

Table 2: Meteorological Data Completeness of Wind Speed and Direction

Parameter	2015 *.SFC
Valid Wind Speed Observations	8752
Possible Observations	8760
% Complete	99.91%
Valid Wind Direction Observations	8751
Possible Observations	8760
% Complete	99.90%

Upper Air Meteorological Data:

Twice-daily upper air soundings required by AERMET were collected at the Glasgow, MT meteorological station, KGGW (WBAN 94008). Data were downloaded from the radiosonde data website in standard Forecast Systems Laboratory (FSL) format.[9] Glendive, MT is the closest upper air station to the project site. It is also the recommended upper-air site to be used with Williston surface data per the NDDEQ AERMET Surface Meteorology Stations (2004-2008) document. The document also recommends using a time zone adjustment factor of +6 for the Glasgow upper-air site when paired with Williston surface data. This time adjustment was used in the corresponding AERMET processing, as directed, since the Williston surface data is used as the secondary dataset and the TGP on-site dataset is in the same approximate area of North Dakota as Williston.

Land Surface Data:

Land Use data collected in the National Land Cover Database (NLCD) format was used in the AERSURFACE analysis. The newest version of AERSURFACE now supports

[9] Radiosonde data located at http://esrl.noaa.gov

newer data than the 1992 format so the 2016 dataset for North Dakota was downloaded from the Multi-Resolution Land Characteristics (MRLC) Consortium and used in the analysis.[10] NLCD data from 2016 is the most current dataset available for use in AERFURFACE. This analysis utilized the land cover, tree canopy, and impervious data files as required by AERSURFACE Version 20060.

Site precipitation data and snow cover data was not collected at the TGP Station #1 monitoring station. Therefore, the recommended AERSURFACE inputs were used in processing the meteorological data as outlined in the NDDEQ document, "Recommended AERSURFACE Inputs North Dakota (March 2017).[11] The document states that "other input values may be used, but require Department approval prior to use." Therefore, the recommended values are presumed to be acceptable selections since no site-specific data is readily available for Station #1. Therefore, the following AERSURFACE selections for the TGP Station #1 and Williston surface meteorological stations as presented in Table 3. Both stations utilize the same parameter unless specified.

Table 3: AERSURFACE Parameters for TGP Station #1 and the Williston Basin International Airport Meteorological Stations

Parameter	Value
Radius of Study Area	1.0 km (Default)
Number of Sectors	12
Temporal Resolution	Monthly
Continuous Snow Cover	Yes
Re-assign Months Different Seasons	Yes
Station Rank	Primary (TGP) Secondary (Williston)
Airport Site	No (TGP) Yes (Williston)
Arid Region	Yes
Surface Moisture Condition	Average

The months were re-assigned to the corresponding seasons of northwest North Dakota as listed in the Recommended AERSURFACE Inputs document. They are listed as follows:

[10] LULAC16 data located access at https://www.mrlc.gov
[11] Recommended AERSURFACE Inputs North Dakota (March 2017) located at https://deq.nd.gov/publications/AQ/policy/Modeling/AERSURFACE_InputsND.pdf

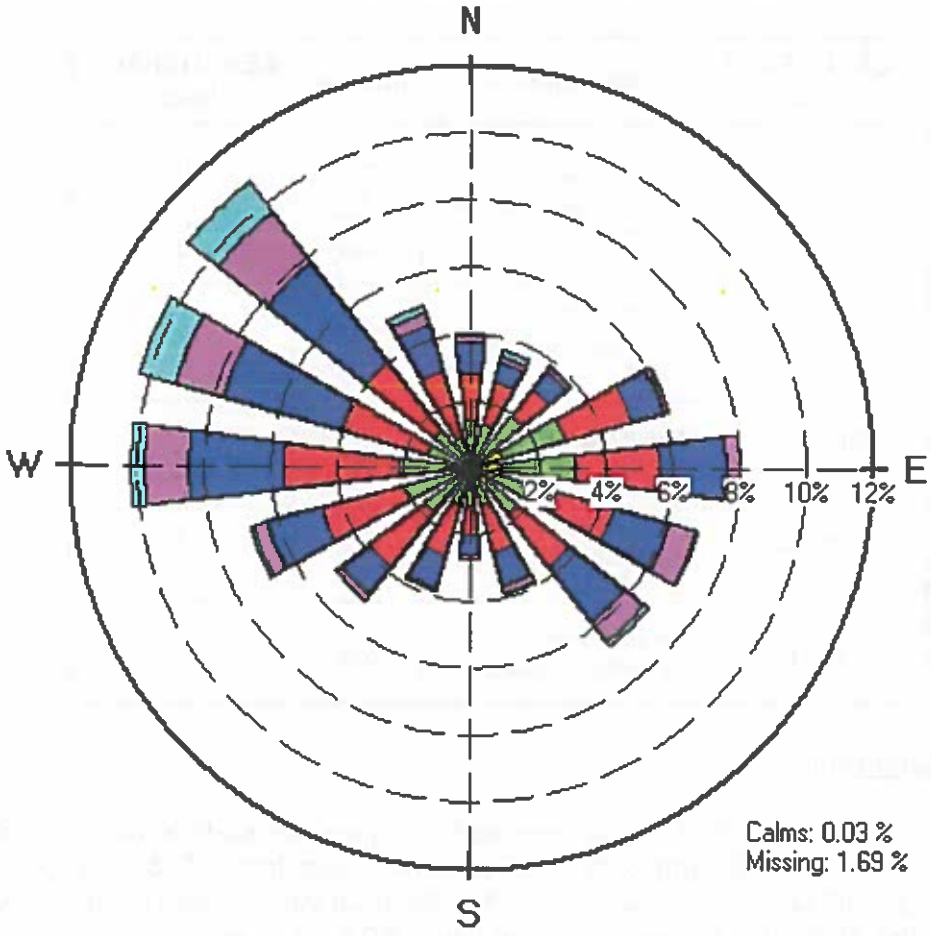
Table 4: Corresponding Months to Seasons for Northwest North Dakota

AERSURFACE Input	Description	Months	AERSURFACE Values
WINTERNS	Late autumn after first and harvest, or winter with no snow	Oct Nov Dec Mar	10 11 12 3
WINTERWS	Winter with continuous snow cover	Jan Feb	1 2
SPRING	Traditional Spring	Apr May	4 5
SUMMER	Midsummer with lush vegetation	Jun Jul Aug	6 7 8
FALL	Autumn with harvested cropland	Sep	9

Technical Selections

As previously stated, AERMET was processed using on-site surface data, NWS ASOS surface data, AERMINUTE data, and NWS upper-air data from 2015. The on-site data underwent a QA/QC process and was formatted for input into AERMET. Minute data was processed in the AERMINUTE pre-processor using a 0.5 m/s threshold wind speed. Data has been processed without the ADJ_U* switch enabled or the Bulk Richardson number Algorithm.[12] Calm hour distribution of the period is approximately 0.03% and missing data accounts for only 1.69% of the data period. For interest, a wind rose of the *.SCF file is included below. All AERMET selections are summarized in Attachment 2.

[12] The preamble to Appendix W suggests ADJ_U* not be used when turbulence data (wind sigma in this case) is used with on-site met data which is the case for this project. *82 FR 5187.*



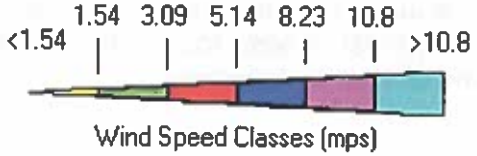


Figure 1
WINDROSE

On-Site Hess TGP Station #1
Secondary:
Station No. 94014
Williston Basin International AP

Note: Diagram of the frequency of occurrence of each wind direction.

Met File Type: AERMET SFC
File: OSWG15.SFC

Attachment 1

On-Site Meteorological Data Summary: Quality and Quantity

Meteorological Audit and Data Recovery Results
Calendar Year 2015
Station #1 – Tioga, ND

This attachment contains a brief summary of the results of meteorological audits conducted at Station #1 near Tioga, ND. The data also includes a summary (month, quarter and year) of the data recovery analysis. The data presented is in reference to data collected during calendar year 2015. This attachment is an integral part of an analysis and justification for using this data as input to an air dispersion modeling effort.

As a side note, it is worth mentioning a full EPA Technical System Audit (TSA) has been scheduled for the site. Had it not been for the Covid-19 virus outbreak, the site portion of the audit would have likely already been completed. Nonetheless, Hess/Bison have previously completed multiple forms and data requested associated with the TSA. That information has been submitted to NNDEQ and is available if a casual review would prove useful.

It is noted that all of the information presented herein is a summary of data previously provided to the North Dakota Department of Environmental Quality (NDDEQ). Quarterly reports are prepared and submitted to NDDEQ on a routine basis. This includes quarterly reports for calendar year 2015. Those reports provide detailed information regarding the results of ambient monitoring and meteorological data. It includes hourly data along with the results of audits, data recovery and other salient data. As a result, this document is only a summary of that information for purposes of the dispersion modeling study.

Data Recovery

The number of hours of collected valid meteorological data for calendar year 2015 is shown below by month, quarter and year. It is expressed as both the number of hours and the % of recovery (# Hours ÷ Total hours).

Quarter #1:

Parameter	Readings Possible	Valid Readings	Percent Recovery
January 2015			
Wind Speed (Station #1)	744	742	99.7
Wind Direction (Station #1)	744	744	100.0
Temperature (Station #1)	744	744	100.0
February 2015			
Wind Speed (Station #1)	672	665	99.0
Wind Direction (Station #1)	672	672	100.0
Temperature (Station #1)	672	672	100.0
March 2015			
Wind Speed (Station #1)	744	738	99.2
Wind Direction (Station #1)	744	741	99.6
Temperature (Station #1)	744	741	99.6
Quarter 1			
Wind Speed (#1)	2,160	2,145	99.3
Wind Direction (#1)	2,160	2,157	99.9
Temperature (#1)	2,160	2,157	99.9

Quarter #2:

Parameter	Readings Possible	Valid Readings	Percent Recovery
April 2015			
Wind Speed (Station #1)	720	720	100.0
Wind Direction (Station #1)	720	720	100.0
Temperature (Station #1)	720	720	100.0
May 2015			
Wind Speed (Station #1)	744	690	92.7
Wind Direction (Station #1)	744	720	100.0
Temperature (Station #1)	744	720	100.0
June 2015			
Wind Speed (Station #1)	720	717	99.6
Wind Direction (Station #1)	720	717	99.6
Temperature (Station #1)	720	717	99.6
Quarter 2			
Wind Speed (#1)	2,184	2,127	97.4
Wind Direction (#1)	2,184	2,181	99.9
Temperature (#1)	2,184	2,181	99.9

Quarter #3:

Parameter	Readings Possible	Valid Readings	Percent Recovery
July 2015			
Wind Speed (Station #1)	744	599	80.5
Wind Direction (Station #1)	744	599	80.5
Temperature (Station #1)	744	599	80.5
August 2015			
Wind Speed (Station #1)	744	684	91.9
Wind Direction (Station #1)	744	684	91.9
Temperature (Station #1)	744	684	91.9
September 2015			
Wind Speed (Station #1)	720	720	100.0
Wind Direction (Station #1)	720	720	100.0
Temperature (Station #1)	720	711	98.8
Quarter 3			
Wind Speed (#1)	2,208	2,003	90.7
Wind Direction (#1)	2,208	2,003	90.7
Temperature (#1)	2,208	1,994	90.3

Quarter #4:

Parameter	Readings Possible	Valid Readings	Percent Recovery
October 2015			
Wind Speed (Station #1)	744	744	100.0
Wind Direction (Station #1)	744	744	100.0
Temperature (Station #1)	744	744	100.0
November 2015			
Wind Speed (Station #1)	720	720	100.0
Wind Direction (Station #1)	720	720	100.0
Temperature (Station #1)	720	720	100.0
December 2015			
Wind Speed (Station #1)	744	739	99.3
Wind Direction (Station #1)	744	739	99.3
Temperature (Station #1)	744	739	99.3
Quarter 4			
Wind Speed (#1)	2,208	2,203	99.8
Wind Direction (#1)	2,208	2,203	99.8
Temperature (#1)	2,208	2,203	99.8

Calendar Year 2015 Summary

Parameter	Readings Possible	Valid Readings	Percent Recovery
2015			
Wind Speed (Station #1)	8760	8478	96.8
Wind Direction (Station #1)	8760	8544	97.5
Temperature (Station #1)	8760	8535	97.4

The data indicates a high degree of recovery. Thus, the data is ideal for input into a dispersion model.

Meteorological Audits/Calibrations

Ambient monitoring guidelines suggest that an audit of the meteorological system should be conducted on a semi-annual basis. For this project, however, quarterly audits were conducted thus exceeding the minimum quality requirement.

As noted previously, audit and calibration data are found in the quarterly reports submitted to NDDEQ in 2015 and early 2016 for this site. Prior to presenting the data, it is worth noting that the results of all four audits indicated good comparison to the audit values. That being the case, it was decided that no calibrations (i.e. measuring and adjusting instrument output) of the equipment were necessary since the audit indicated an excellent comparison between instrument and data output compared to the challenged value. The following is a summary of that information.

Quarter #1 Audit:

March 27, 2015			
	Measured Value	Sensor Response	Difference
Temperature (degrees F)	14.0	14.8	0.8
RM Young – Model 41342	68.0	67.8	-0.2
	122.0	121.1	-0.9
Wind Direction (degrees)	CW Results		
RM Young – Model 05305	90	88	-2
	180	178	-2
	270	272	2
	360	360	0
	CCW Results		
	90	88	-2
	180	178	-2
	270	272	2
	360	360	0
Wind Speed	0.0	0.0	0.0
(miles per hour)	3.4	3.4	0.0
Synchronous Motor	6.9	6.9	0.0
RM Young – Model 05305	10.9	11.0	0.1

Quarter #2 Audit:

June 10, 2015			
	Measured Value	Sensor Response	Difference
Temperature (degrees F)	43.1	43.5	0.4
RM Young – Model 41342	61.5	62.0	0.5
	71.4	71.7	0.3
Wind Direction (degrees)	360	356	-4
RM Young – Model 05305	45	45	0
	90	93	3
	135	139	4
	180	182	2
	225	225	0
	270	274	4
	315	318	3
Wind Speed	0.00	0.00	0.00
(miles per hour)	3.44	3.48	0.04
Synchronous Motor	5.73	5.78	0.05
RM Young – Model 05305	6.87	6.94	0.07
	10.88	10.98	0.10

Quarter #3 Audit:

August 27, 2015			
	Measured Value	**Sensor Response**	**Difference**
Temperature (degrees F) RM Young – Model 41342	15.3 68.0 121.5	15.4 68.2 121.4	0.1 0.2 -0.1
Wind Direction (degrees) RM Young – Model 05305	CW 360 90 180 270 CCW 360 90 180 270	 360 89 179 271 360 89 179 271	 0 -1 -1 1 0 -1 -1 1
Wind Speed (miles per hour) Synchronous Motor RM Young – Model 05305	0.00 3.44 6.87 10.88	0.0 3.5 6.9 10.9	0.0 0.06 0.03 0.02

Quarter #4 Audit:

December 10, 2015			
	Audit	**Station**	
Temperature (degrees F)	91.9	92.5	0.6
RM Young – Model 41342	62.3	62.6	0.3
	28.6	29.3	0.7
Wind Direction (degrees)	CW0/360	5.5/356	
RM Young – Model 05305	45	46	1
	90	87	-3
	135	135	0
	180	181	1
	225	228	3
	270	270	0
	315	316	1
	CCW 0/360	0.3/356	
	45	46	1
	90	92	2
	135	139	4
	180	181	1
	225	227	2
	270	272	2
	315	316	1
Wind Speed	0.00	0.0	0.0
(miles per hour)	3.44	3.43	-0.01
Synchronous Motor	5.73	5.72	-0.01
RM Young – Model 05305	6.87	6.93	0.06
	10.88	10.95	0.07
Wind Sensor Starting Threshold Torque Measured Value:			0.8 gm-cm

Given the excellent 2015 data recovery and four quarterly audits, the data is suitable for use in dispersion modeling and many other meteorological data analyses.

Attachment 2

AERMET Processing Summary: Data Inputs and Selections

Datasets			
	Surface	Onsite (Primary)	Hess TGP Station #1
		NWS (Secondary)	Williston, ND
	Upper Air	NWS	Glasgow, MT
	Aerminute	NWS	Williston, ND
	Aersurface	NLCD 2016	North Dakota
		Primary	Hess TGP Station #1
		Secondary	Williston, ND
Date Range			
	Start	1-Jan-15	
	End	31-Dec-15	
Onsite Surface Data			
	Site	Hess TGP Station #1	
	Location	Tioga, ND	
	Network Type	Hess Ambient Monitoring Program	
	File Name	OS15	
	File Type	PRN	
	Time Adjust	0	
	Site ID	555	
	Latitude (N)	48.409	
	Longitude (W)	102.91	
	Elevation (m)	761	
	Threshold Wind Speed (m/s)	0.5	
	Anemometer Height (m)	10	
	Bulk Richardson Number Algorithm	Not Selected	
	Fortran		
	Read Statement	OSYR OSMO OSDY OSHR WD01 WS01 TT01	
	Fortran Statement	(4(I2,1X),F8.0,F8.1,F8.1,)	
NWS Surface Data			
	Site	Williston Basin International Airport	
	Location	Williston, ND	
	Network Type	ASOS	
	File Name	727670-94014-2015	
	File Format	ISHD	
	Time Adjust	6	
	Site ID	94014	
	Latitude (N)	48.183	
	Longitude (W)	103.633	
	Elevation (m)	581	

NWS Upper Air Data		
	Site	Glasgow Valley County Airport
	Location	Glasgow, MT
	Database	NOAA/ESRL Radiosonde
	File Name	UA_GLAS_2015
	File Format	FSL
	Time Adjust	6
	Site ID	94008
	Latitude (N)	48.214
	Longitude (W)	106.621
AERMINUTE DATA		
	Site	Williston Basin International Airport
	Location	Williston, ND
	Network Type	ASOS
	File Names	64050KISN201501 to 64050KISN201512
	File Type	DAT
AERSURFACE OPTIONS		
	See Report Tables 3 and 4	
Output Options		
	Wind Sectors	
	Primary	12
	Secondary	12
	NWS Wind Directions	Randomize
	Adjust ASOS Wind Speeds	Selected
	Adjust Surface Velocity (U*)	Not Selected
	Wind Measurement Height (m)	10
	Surface Characteristics Frequency	
	Primary	Monthly
	Secondary	Monthly

Appendix F

ISR & Volumetric Flow Rate, Data Analysis for Tioga Gas Plant, Tioga, ND
(Bison Engineering, Inc. June 2020)

ISR & Volumetric Flow Rate Data Analysis for Tioga Gas Plant Tioga, ND

Presented to:

North Dakota Department of Environmental Quality
Environmental Health Section
918 E. Divide Ave.
Bismarck, ND 58501-1947

Prepared for:

Hess Corporation
Tioga Gas Plant
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May 28, 2020

1) Introduction

Dispersion modeling has been required as an integral measure for the purpose of obtaining a Permit-To-Construct (PTC) for WBI Energy, Inc. (WBI) from the North Dakota Department of Environmental Quality (NDDEQ). To that end, WBI has submitted an air quality permit application for the construction and operation of a new gas compressor and processing station to be located near the town of Tioga, ND. Among the requirements is a demonstration that the facility of interest (WBI) along with all other significant sources, including background concentrations, does not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS)[1] or the North Dakota Ambient Air Quality Standards (NDAAQS)[2].

Among the air pollutants to be included in the dispersion modeling simulations include NO_2. EPA and North Dakota guidelines[3] have indicated that in addition to the WBI facility itself, emissions from the Hess Tioga Gas Plant also need to be included in the modeling effort.

One of the important parameters necessary for model execution for NO_2 includes the: In-Stack Ratio (ISR). ISR is the ratio of NO_2:NO in the stack itself just prior to being emitted into the ambient atmosphere. The reason this is an important variable in the modeling calculations is that the ambient standard itself is expressed as NO_2 (nitrogen dioxide) while emissions testing is usually only reported as NOx (total of NO and NO_2). The model is able to consider this differential, among other variables, to predict ambient concentrations of NO_2, not just NOx.

Another parameter necessary for model execution of stack exit volume/velocity. Previously, modeling exercises has relied on data provided to NDDEQ during a 2013 data request by the agency. That information was reviewed and adjusted accordingly for this modeling exercise.

It is the purpose of this document to review recent emissions data and EPA data base numbers in order to determine appropriate ISR values and appropriate stack parameters (primarily exit velocity) to be input into the dispersion model.

Section 2 provides a summary of available recent data and Section 3 provides a summary of those results and conclusions. Section 4 discusses the results of stack testing data as it pertains to stack exit volumetric and velocity flow data.

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[1] The NAAQS are found in 40 CFR 50.

[2] https://www.epa.gov/sites/production/files/2018-07/documents/33-15-2-ambient air quality standards final.pdf

[3] NDDEQ Modeling Guideline (June 2013): https://deq.nd.gov/publications/AQ/policy/Modeling/ND_Air_Dispersion_Modeling_Guide.pdf and Appendix W (January 2017): https://www3.epa.gov/ttn/scram/guidance/guide/appw_17.pdf

2) ISR Data Analysis

For purposes of this analysis, there are two potential sources of data to be investigated:

- EPA ISR Database:
- On-Site Stack Testing Data

Before investigating data sources, it is worth summarizing the various sources of emissions of NOx at the Tioga Gas Plant (TGP). There are six categories to be considered:

Category	Description / Name	Comment
Clark Compressor Engines	C-1A, C-1B, C-1C, C-1E, C-1G	1,920 hp @
Retrofit Compressor Engines	C-1D & C-1F	2,350 hp @
Turbine Engines	C-30100, C-30200 & C-30300	1,480 hp @
Boilers	B-1, B-2, B-3, B-4 & B-5	16.8 or 20.1 x 10^6 BTU/hr
Furnaces	F-1, F-2, F-3 & F-5A	25 x 10^6 BTU/hr
SRU Incinerator	S-302	

The most accurate ISR data would, of course, come from on-site emissions testing for the exact emitting units noted above. To that end, recent testing (past few years) documentation was sought to determine if the testing person/team measured both NO and NO_2 during the various testing campaigns. It was discovered that NO and NO_2 were simultaneously measured during testing of the Clark and Retrofit engines during 2017 and 2018. It appears that these two compounds were not measured simultaneously during the 2019 testing. Since there were recent available data, it was decided to review that data and use those testing results for ISR values for the tested sources.

The 2017 and 2018 testing were conducted in accordance with Sections 9, 10 and 11 of Title V permit T5-082002. The testing was conducted by Hess personnel on the Clark engines, Retrofit engines, and the Turbine engines.

Year:	2017
Test Date(s):	October 17 – 18
Engines Tested:	Clark, Retrofit, and Turbines
Report Date:	November 21, 2017
Sample Runs:	3 per engine
Sample Duration:	21 minutes per run

Year:	2018
Test Date(s):	October 16
Engines Tested:	Clark, Retrofit, and Turbines
Report Date:	November 20, 2018
Sample Runs:	3 per engine
Sample Duration:	21 minutes per run

Those reports previously provided to NDDEQ show the detailed results of these tests. Thus, all of the details of the testing are not provided here. The reader is referred to these reports for information.

However, it is important to provide a summary of the raw collected data as it related to a determination of ISR. That information is provided below.

Hess
Tioga Gas Plant Data Source: 2017 and 2018 Hess Testing
NO : NO_2 Portable Testing Results
In-Stack Ratio (ISR)

Date	Engine	Run	NO	NO_2	ISR	CO	O_2
10/16/2018	C - 1G	1	990	94		293	15.5
		2	972	91		292	15.5
		3	924	96		294	15.4
		Mean =	962	94	0.089	293	15.5
10/16/2018	C-1D	1	107	63		176	14.8
		2	96	65		172	14.7
		3	103	60		173	14.6
		Mean =	102	63	0.381	174	14.7
10/16/2018	C-1B	1	1,219	112		184	13.8
		2	1,213	117		188	13.8
		3	1,233	119		191	13.8
		Mean =	1,222	116	0.087	188	13.8
10/16/2018	C-30300	1	20	9		23	17.5
		2	17	9		22	17.5
		3	15	9		22	17.6
		Mean =	17	9	0.342	22	17.5
10/16/2018	C-30200	1	18	7		23	17.3
		2	13	8		24	17.4
		3	13	9		24	17.5
		Mean =	15	8	0.353	24	17.4
10/16/2018	C-30100	1	13	8		18	17.4
		2	17	8		18	17.3
		3	19	9		15	17.1
		Mean =	16	8	0.338	17	17.3
10/17/2017	C - 1G	1	758	69		180	15.7
		2	724	64		178	15.8
		3	723	65		183	15.8
		Mean =	735	66	0.082	180	15.8
10/17/2017	C - 1F	1	92	44		191	16.0
		2	98	47		191	16.0
		3	96	46		195	16.0
		Mean =	95	46	0.324	192	16.0
10/17/2017	C - 1D	1	136	38		246	14.9
		2	129	37		122	15.0
		3	127	37		232	14.9
		Mean =	131	37	0.222	200	14.9
10/17/2017	C - 1C	1	1,164	87		215	14.6
		2	1,277	99		238	14.1
		3	1,287	101		241	14.0
		Mean =	1,243	96	0.071	231	14.2
10/17/2017	C - 30200	1	38	6		20	17.6
		2	39	7		21	17.5
		3	40	8		21	17.5
		Mean =	39	7	0.152	21	17.5
10/17/2017	C - 30300	1	58	13		26	16.1
		2	51	13		28	16.4
		3	57	14		28	16.1
		Mean =	55	13	0.194	27	16.2
10/17/2017	C - 1B	1	1,192	115		276	14.2
		2	1,168	116		281	14.2
		3	1,126	112		268	14.2
		Mean =	1,162	114	0.090	275	14.2
10/17/2017	C - 30100	1	38	11		27	17.0
		2	39	12		20	16.7
		3	38	11		28	16.8
		Mean =	38	11	0.228	25	16.8

The reader will note that not every engine was tested during the two test periods. This was due to several engines not in operation as facility demand dictated at the time of the test. Nonetheless, there appears to be sufficient information and consistency among groups to provide a realistic on-site estimate of ISR for all the engines for dispersion modeling purposes. The information in the table above may now be compiled into a more usable format for each engine type.

Results by Engine

Engine	NO (ppm)	NO_2 (ppm)	ISR
C-1A	No data	No data	No data
C-1B	1,192	115	0.0881
C-1C	1,243	96	0.0715
C-1D	116	50	0.3006
C-1E	No data	No data	No data
C-1F	95	46	0.3239
C-1G	849	80	0.0860
C-30100	27	10	0.2646
C-30200	27	8	0.2184
C-30300	36	11	0.2351

Results by Engine Group

Engine Group	NO (ppm)	NO_2 (ppm)	ISR
Clark (A, B, C, E, G)	1,094	97	0.0819
Retrofit (D and F)	106	48	0.3122
Turbines	30	10	0.2394

The values in the table above were then used as model input for those engines.

For the boilers and furnaces, there was no on-site stack testing data for use with these sources. For these units, the EPA ISR database was reviewed.[4]

The information is provided by EPA in an Excel spreadsheet[5] and contains ISR data that has been submitted via formal collection initiated by OAQPS.[6]

This review was done to determine reasonable ISR values used for the boilers and furnaces; the data was filtered for that source class and approximate size (<100 MMBtu/hr). This was accomplished by filtering various columns of information. After filtering ISR data, to remove internal combustion engines and turbines, the dataset was left with 12 entries. The figure below is a screenshot of the filtered data.

Screenshot: First ISR Database selected for boilers

Site Name	Facility Description	Equipment class	Equipment description	Equipment capaci	Operation mo	Avg N	Ratio
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	68	0.0074
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	64	0.0063
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	79	0.0013
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	76	0.0053
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	93	0.0129
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	124	0.0073
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	100	0.018
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	97	0.0082
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	112	0.0009
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	113	0.0044
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	79	0.0076
Dutch Harbor Seafood Processing Facility - Captain's Bay Plant	Seafood Processor	Boiler	Cleaver-Brooks Fire Tube Boiler	29.3 MMBtu/hr	Routine	86	0.0023

Calculating the average yields: ISR = 0.006815.

[4] https://www3.epa.gov/scram001/no2_isr_database.htm
[5] NO2_ISR_database(2).xls. Available at: https://www3.epa.gov/scram001/no2_isr_database.htm
[6] OAQPS = EPA Office of Air Quality Planning and Standards

3) ISR Data Summary

Below is a compiled list of ISR values appropriate for the Hess Tioga gas processing facility. The values were determined from on-site NO and NO_2 emissions testing and the EPA ISR database when no on-site data was available.

Source Category	Emitting Units	ISR
Clark (Old) Engines	C-1A, C-1B, C-1C, C-1E & C-1G	0.0819
Retrofit Engines	C-1D & C-1F	0.3122
Turbine Engines	C-30100, C-30200 & C-30300	0.2394
Other (Boilers, Furnaces ...)	B-1, B-2, B-3, B-4, S-302, F-1, F-2, and F-3	0.00681

4) Stack and Building Parameters

The initial modeling efforts by NDDEQ and others used stack parameters that were supplied to the agency in 2013. Although the information was supplied in good faith, it has since been discovered that some of that information may be dated or in some cases the origin is not clear. Thus, a review of important information supplied to the model was undertaken.

To begin, building locations and heights were reviewed. The plant personnel have provided an update to those parameters and they have now been incorporated into the modeling input files (primarily BPIP). No details of those parameters are provided in this document and are instead reflected in the modeling files themselves.

Along with a review of the heights and location of the buildings, verification of the stack location, height, and diameter were also investigated. Those familiar with the facility or plant personnel themselves confirmed that the stack height and stack diameter presented in the 2013 document were, to the best of their knowledge, reasonable estimates. Thus, that data (stack height and diameter) were carried forward to the current modeling effort. Stack locations were adjusted to coincide with the aerial imagery in Google Earth. Locations were then verified and further adjusted by Hess personnel. These adjustments are also not provided in this document but instead reflected in the modeling files.

The final parameter of interest is the velocity and/or volumetric flow estimates from each stack. As a model input parameter, the velocity term is entered and the program, as needed, calculates a flow parameter which is related to the buoyancy flux and to some extent momentum flux.

A discussion of velocity or volumetric flow rate in the model is now appropriate. The model, as part of its many simulations, determines the amount of plume rise above (and distance downwind) the top of the stack for each emitting unit. This value is dependent upon numerous parameters such as wind speed, atmospheric stability, ambient temperature, exit temperature, etc. One of these important parameters is expressed as buoyancy flux or momentum flux. The two are effectively mutually exclusive. The model must decide as to whether buoyancy (volume and heat) flux dominates plume rise or whether momentum (velocity & volume/mass) flux dominates plume rise. The model makes that decision based on what it calls a crossover temperature. Without a detailed review of the mathematics, the model will assume buoyancy flux when the difference in temperature between ambient air and exit temperature is "large" (i.e. greater than the crossover ΔT). For purposes of this discussion, it is fair to state (without proof) the ΔT for these units is sufficiently large such that buoyancy flux will be used in all or nearly all the internal calculations.

The term buoyancy flux as originally developed by Briggs, is as follows:

$$F_b = g v_s d_s^2 \left(\frac{\Delta T}{4T_s}\right)$$

v_s = stack exit velocity
d_s = stack diameter
ΔT = stack temperature – ambient temperature
T_s = stack temperature
g = gravitational acceleration coefficient

We draw the reader's attention to the velocity and diameter terms. It should be clear that these terms (velocity * diameter^2) is directly proportional to volumetric air flow by a factor of 4. From that observation it becomes clear that the amount of plume rise is directly dependent upon the volume of air exiting the stack and not necessarily proportional to velocity, except as that term is used to determine volume rate.

This leads to the need to determine the volumetric flow rates that are appropriate for this modeling exercise. Once the volumetric flow rate is determined, then the velocity term is calculated and entered into the model. (Velocity is the variable term in the model used to calculate flow rate based on a given stack diameter).

To determine an appropriate exit velocity (matching an appropriate volumetric flow rate) recent stack testing of the subject stacks was consulted. As a matter of convenience and consistency with ISR, the same stack tests conducted in 2017 and 2018 were used to calculate velocity/volume.

As noted earlier, the data is taken from reports submitted to NDDEQ. Below is a brief summary of the testing dates.

Year:	2017
Test Date(s):	October 17 – 18
Engines Tested:	Clark, Retrofit, and Turbines
Report Date:	November 21, 2017
Year:	2018
Test Date(s):	October 16
Engines Tested:	Clark, Retrofit, and Turbines
Report Date:	November 20, 2018

The testing data relative to flow and velocity calculations is contained in the following table.

Hess
Tioga Gas Plant
NO : NO_2 Portable Testing Results

Data Source: 2017 and 2018 Hess Testing

Stack Flow Analysis

Date	Source	Run	10^6 DSCF/Day	10^6 Wet-SCF/Day	% Full Load	Stk Temp °F	Elevation Factor	acfm	acfm @ 100%	Stk Dia (ft)	ft/sec Stk Velocity @ 100%	Source
10/16/2018	C - 1G	1	13.10	13.89	92.0%							
		2	13.15	13.94	92.0%							
		3	13.05	13.85	93.0%							
		Mean =	13.10	13.89	92.3%	750	1.081	23,924	25,910	1.63	206.94	C - 1G
10/16/2018	C-1D	1	8.85	9.45	73.0%							
		2	8.71	9.31	73.0%							
		3	8.57	9.17	73.0%							
		Mean =	8.71	9.31	73.0%	750	1.081	16,031	21,961	2.44	78.28	C-1D
10/16/2018	C-1B	1	9.86	10.64	91.0%							
		2	9.86	10.64	91.0%							
		3	9.86	10.64	91.0%							
		Mean =	9.86	10.64	91.0%	750	1.081	18,322	20,134	1.63	160.81	C-1B
10/16/2018	C-30300	1	14.06	14.60	82.0%							
		2	14.00	14.54	81.0%							
		3	14.48	15.02	81.0%							
		Mean =	14.18	14.72	81.3%	310	1.081	16,128	19,829	4.33	22.44	C-30300
10/16/2018	C-30200	1	14.39	14.97	88.0%							
		2	14.31	14.87	85.0%							
		3	14.57	15.13	84.0%							
		Mean =	14.42	14.99	85.7%	310	1.081	16,423	19,171	4.33	21.70	C-30200
10/16/2018	C-30100	1	15.00	15.59	90.0%							
		2	13.47	14.01	82.0%							
		3	13.27	13.84	85.0%							
		Mean =	13.91	14.48	85.7%	310	1.081	15,865	18,519	4.33	20.96	C-30100
10/17/2017	C - 1G	1	10.34	10.95	70.0%							
		2	10.58	11.19	71.0%							
		3	10.69	11.30	71.0%							
		Mean =	10.54	11.15	70.7%	750	1.081	19,194	27,161	1.63	216.94	C - 1G
10/17/2017	C - 1F	1	13.53	14.27	89.0%							
		2	13.58	14.32	89.0%							
		3	13.48	14.22	89.0%							
		Mean =	13.53	14.27	89.0%	750	1.081	24,572	27,609	2.44	98.41	C - 1F
10/17/2017	C - 1D	1	8.25	8.81	67.0%							
		2	8.42	8.98	67.0%							
		3	8.26	8.82	67.0%							
		Mean =	8.31	8.87	67.0%	750	1.081	15,274	22,797	2.44	81.25	C - 1D
10/17/2017	C - 1C	1	8.16	8.73	66.0%							
		2	7.49	8.06	66.0%							
		3	7.41	7.99	66.0%							
		Mean =	7.69	8.26	66.0%	750	1.081	14,223	21,551	1.63	172.12	C - 1C
10/17/2017	C - 30200	1	18.29	18.98	103.0%							
		2	17.95	18.63	103.0%							
		3	17.86	18.54	104.0%							
		Mean =	18.03	18.72	103.3%	310	1.081	20,506	19,845	4.33	22.46	C - 30200
10/17/2017	C - 30300	1	13.30	14.02	107.0%							
		2	13.56	14.24	103.0%							
		3	13.69	14.43	111.0%							
		Mean =	13.52	14.23	107.0%	310	1.081	15,591	14,571	4.33	16.49	C - 30300
10/17/2017	C - 1B	1	8.70	9.35	75.0%							
		2	8.68	9.33	75.0%							
		3	8.67	9.32	75.0%							
		Mean =	8.68	9.33	75.0%	750	1.081	16,072	21,429	1.63	171.15	C - 1B
10/17/2017	C - 30100	1	13.89	14.50	93.0%							
		2	12.82	13.42	90.0%							
		3	12.69	13.28	88.0%							
		Mean =	13.13	13.73	90.3%	310	1.081	15,047	16,657	4.33	18.85	C - 30100

Elevation Factor = 29.92 / (29.92 - 2.244)

The data from the test report and calculations above may be summarized as follows.

Results by Engine Stack: Flow

Engine	Diameter (ft)	ACFM	Velocity (ft/sec)
C-1A	1.63	*No data*	*No data*
C-1B	1.63	20,781	166
C-1C	1.63	21,551	172
C-1D	2.44	22,379	80
C-1E	1.63	*No data*	*No data*
C-1F	2.44	27,609	98
C-1G	1.63	26,536	212
C-30100	4.33	17,588	20
C-30200	4.33	19,508	22
C-30300	4.33	17,200	20

Results by Engine/Stack Group: Flow

Engine Group	Diameter (ft)	ACFM	Velocity (ft/sec)
Clark (A, B, C, E, G)	1.63	22,956	183
Retrofit (D and F)	2.44	24,994	89
Turbines	4.33	18,099	21

The values in the table above were then used as model input for those engines.

Appendix G

Detailed Source Information for 1-Hour NO_2 NAAQS Modeling

Hess Tioga Gas Plant Sources

Hess Tioga Gas Plant Sources included in 1-hour NO_2 NAAQS modeling

Source ID	Stack Release Type	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temperature	Exit Velocity	Stack Diameter	NO_2 Emission Rate		ISR Value
			(m)	(m)	(m)	(m)	(K)	(m/s)	(m)	(g/s)		
378B1	DEFAULT	EU B-1 Natural gas-fired boiler rated at 20.1 MMBtu/hr	654212.02	5362800.5	685.76	12.19	478	9.75	0.60	0.231		0.000681
378B2	DEFAULT	EU B-2 Natural gas-fired boiler rated at 16.8 MMBtu/hr	654206.44	5362799.81	685.85	12.19	478	9.75	0.60	0.197		0.000681
378B3	DEFAULT	EU B-3 Natural gas-fired boiler rated at 16.8 MMBtu/hr	654200.47	5362799.66	685.94	13.11	478	9.75	0.60	0.208		0.000681
378B4	DEFAULT	EU B-4 Natural gas-fired boiler rated at 16.8 MMBtu/hr	654189.94	5362800.13	686.13	13.11	478	9.75	0.60	0.219		0.000681
378B5	DEFAULT	EU B-5 Natural gas-fired boiler rated at 20.1 MMBtu/hr	654182.72	5362789.78	687.63	12.192	478	9.7536	0.60	0	**	
378C1A	DEFAULT	EU C-1A Natural gas pipeline compressor engine rated at 1,920 bhp (built 1954)	654268.5	5362828.79	685.72	22.86	672	55.88	0.50	12.411		0.0819
378C1B	DEFAULT	EU C-1B Natural gas pipeline compressor engine rated at 1,920 bhp (built 1954)	654277.78	5362847.14	686.11	22.86	672	55.89	0.50	12.411		0.0819
378C1C	DEFAULT	EU C-1C Natural gas pipeline compressor engine rated at 1,920 bhp (built 1954)	654278.95	5362829.14	685.68	22.86	672	55.89	0.50	12.411		0.0819
378C1D	DEFAULT	EU C-1D Natural gas pipeline compressor engine rated at 2,350 bhp (rebuilt 4/23/04)	654287.85	5362847.64	686.06	22.86	672	27.15	0.74	1.625		0.3122
378C1E	DEFAULT	EU C-1E Natural gas pipeline compressor engine rated at 1,920 bhp (built 1954)	654292.31	5362829.6	685.61	22.86	672	55.89	0.50	12.411		0.0819
378C1F	DEFAULT	EU C-1F Natural gas pipeline compressor engine rated at 2,350 bhp (built 7/5/03)	654302.88	5362847.65	685.94	22.86	672	27.15	0.74	1.625		0.3122
378C1G	DEFAULT	EU C-1G Natural gas pipeline compressor engine rated at 1,920 bhp (built 1954)	654302.9	5362829.84	685.51	22.86	672	55.88	0.50	12.411		0.0819
378C100	DEFAULT	EU C-30100 Natural gas turbine rated at 1,480 bhp with a 5.77 MMBtu/hr natural gas-fired duct burner	654350.59	5362912.07	688.97	7.92	428	6.24	1.32	0.731		0.2394
378C200	DEFAULT	EU C-30200 Natural gas turbine rated at 1,480 bhp with a 5.77 MMBtu/hr natural gas-fired duct burner	654358.74	5362912.27	688.83	7.92	428	6.24	1.32	0.731		0.2394
378C300	DEFAULT	EU C-30300 Natural gas turbine rated at 1,480 bhp	654367.43	5362912.86	688.74	7.92	428	6.24	1.32	0.655		0.2394
378S302	DEFAULT	EU S-302 Amine gas sweetening unit	654196.99	5362702.07	685.02	50.29	600	21.34	0.71	0.265		0.000681
378S101	DEFAULT	EU S-101 Acid/Wet Gas Flare	654588.91	5362838.32	683.67	65.532	1000	40	1.10	0	**	
378F1	DEFAULT	EU F-1 Natural gas-fired heater rated at 26.7 MMBtu/hr (Heater #5210)	654555.23	5362744.89	679.91	35.97	498	1.22	1.25	0.202		0.000681
378F2	DEFAULT	EU F-2 Natural gas-fired heater rated at 93.0 MMBtu/hr (Heater #5704)	654570.59	5362745.95	679.98	41.76	500	4.88	2.08	0.702		0.000681
378F3	DEFAULT	EU F-3 Natural gas-fired heater rated at 93.0 MMBtu/hr (Heater #5714)	654563.33	5362728.28	678.64	41.76	500	4.88	2.08	0.702		0.000681

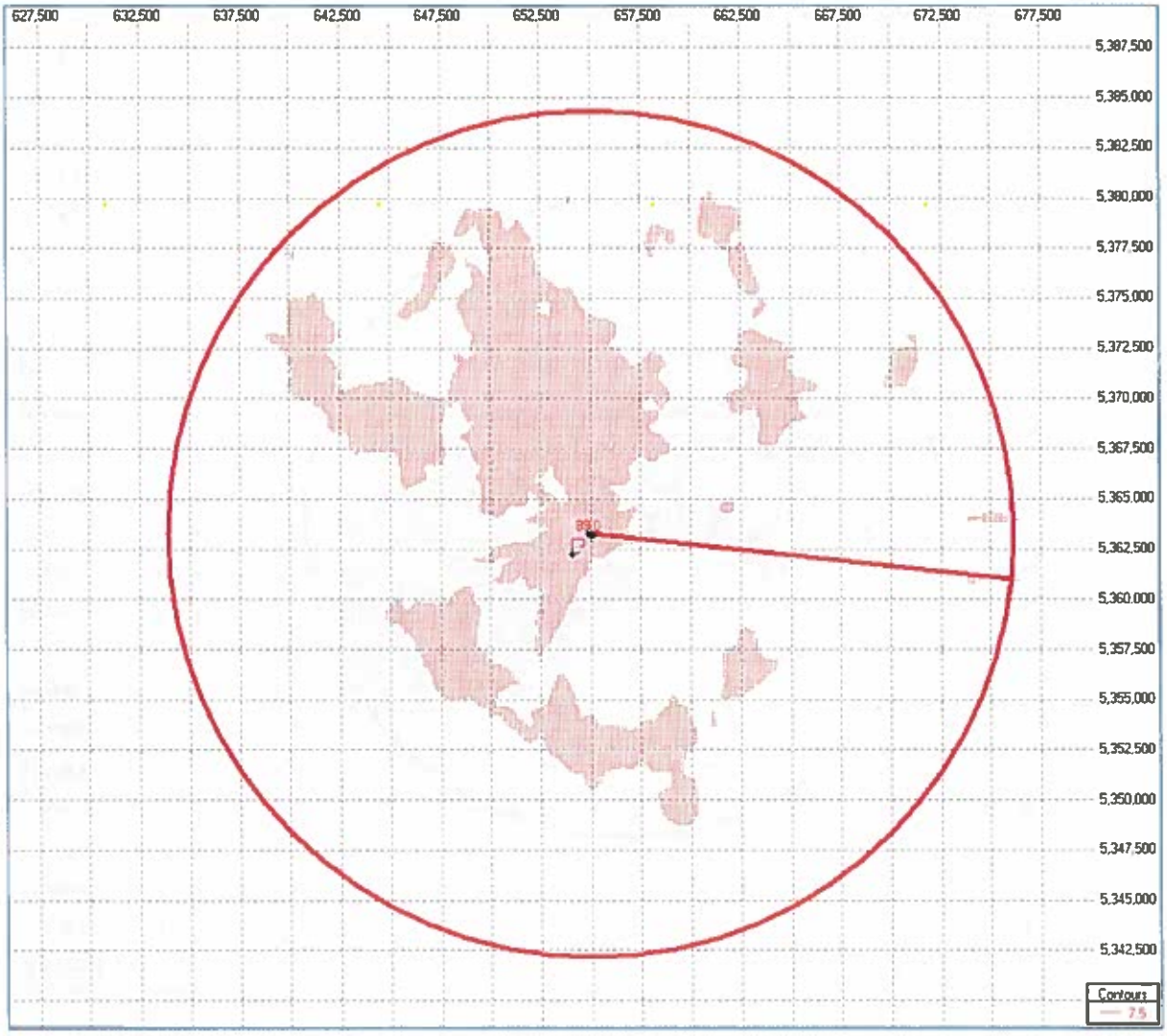
** Source not included in modeling for NAAQS, as this source not operating under normal cnoditions

Appendix H

Modeling Plots – SIL & NAAQS

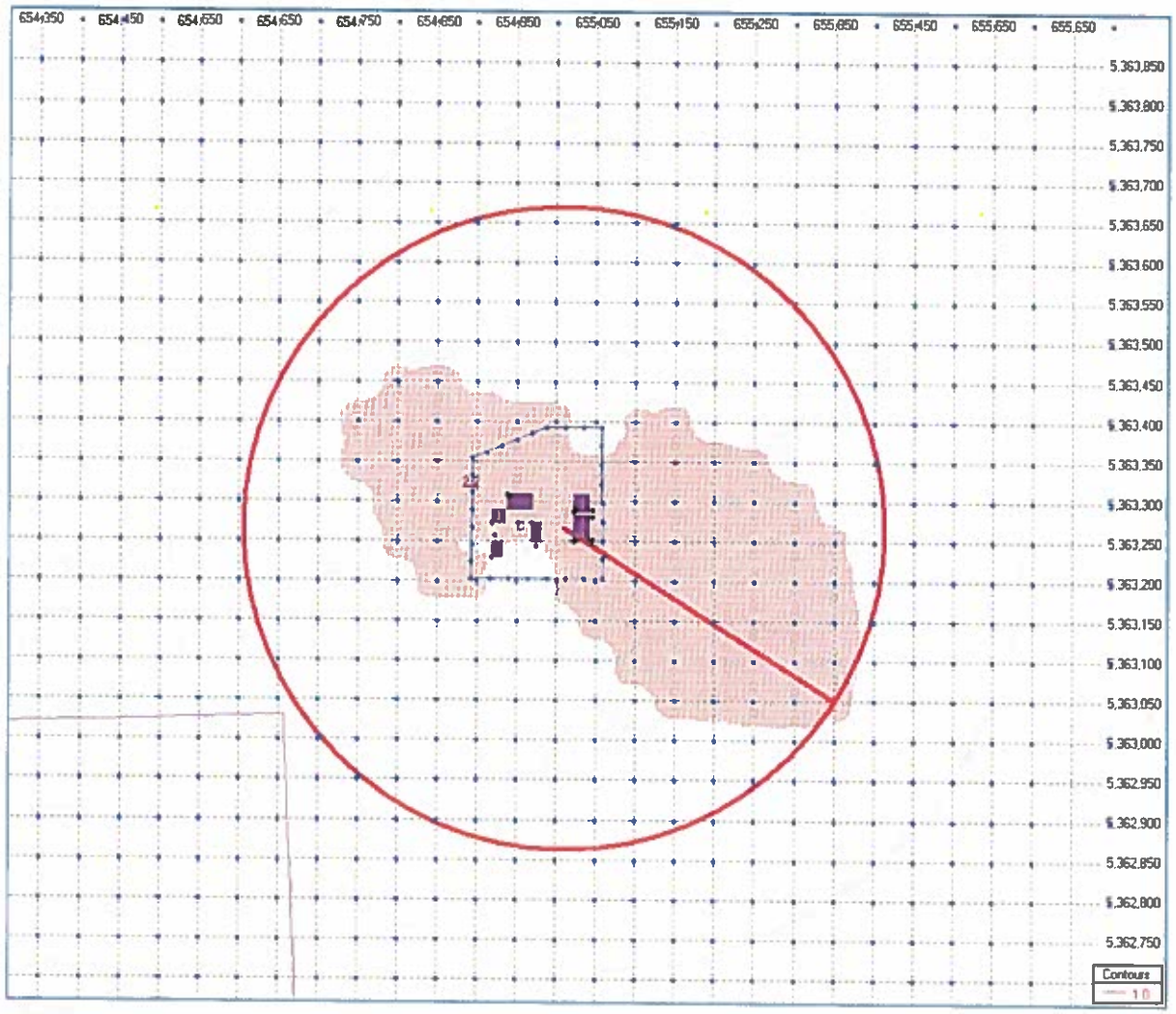
1-hr NO_2 SIL Radius of Impact above 7.5 µg/m^3

Radius = 21.1 km

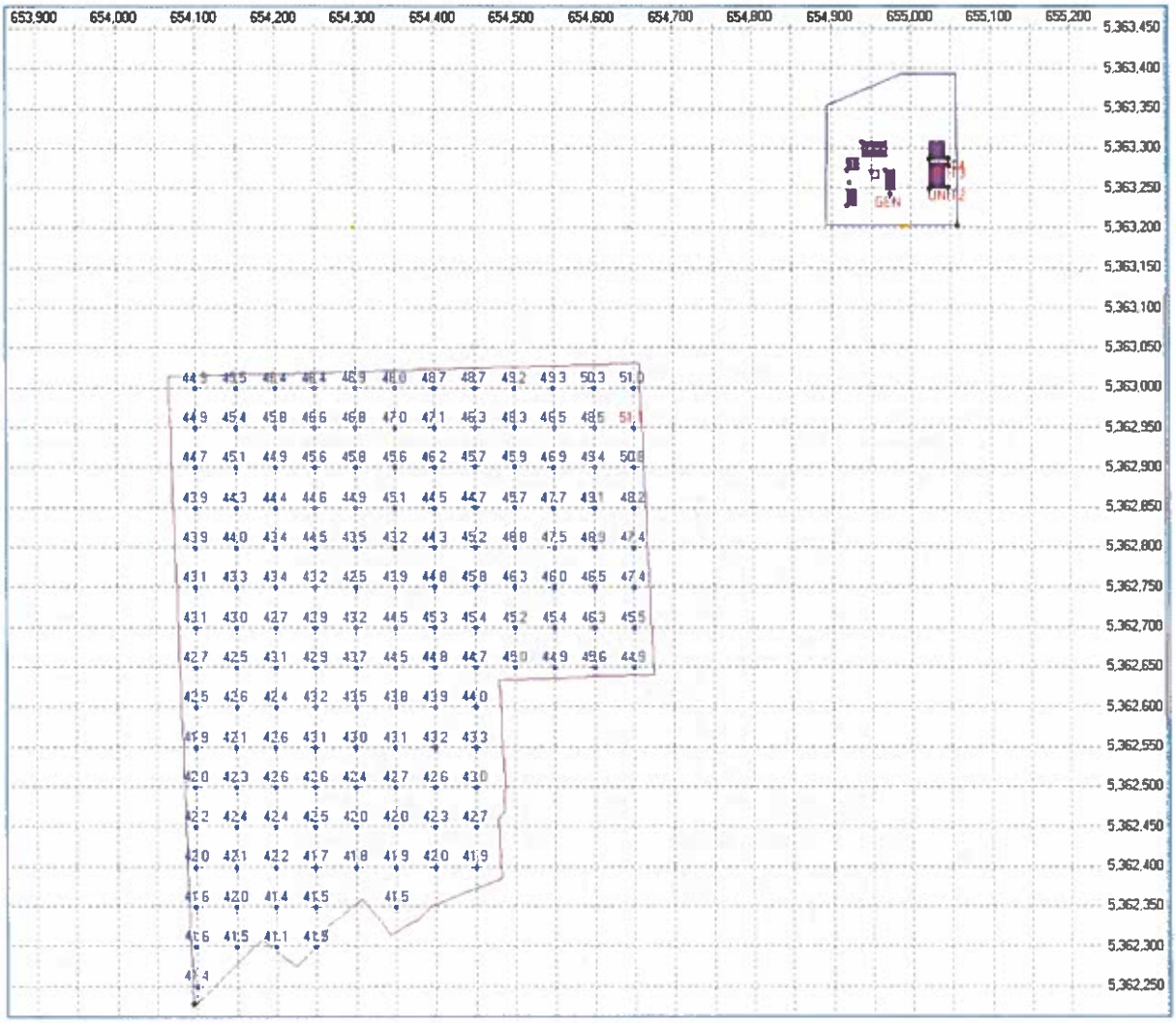


Annual NO_2 SIL Radius of Impact above 1.0 µg/m³

Radius = 403.2 m

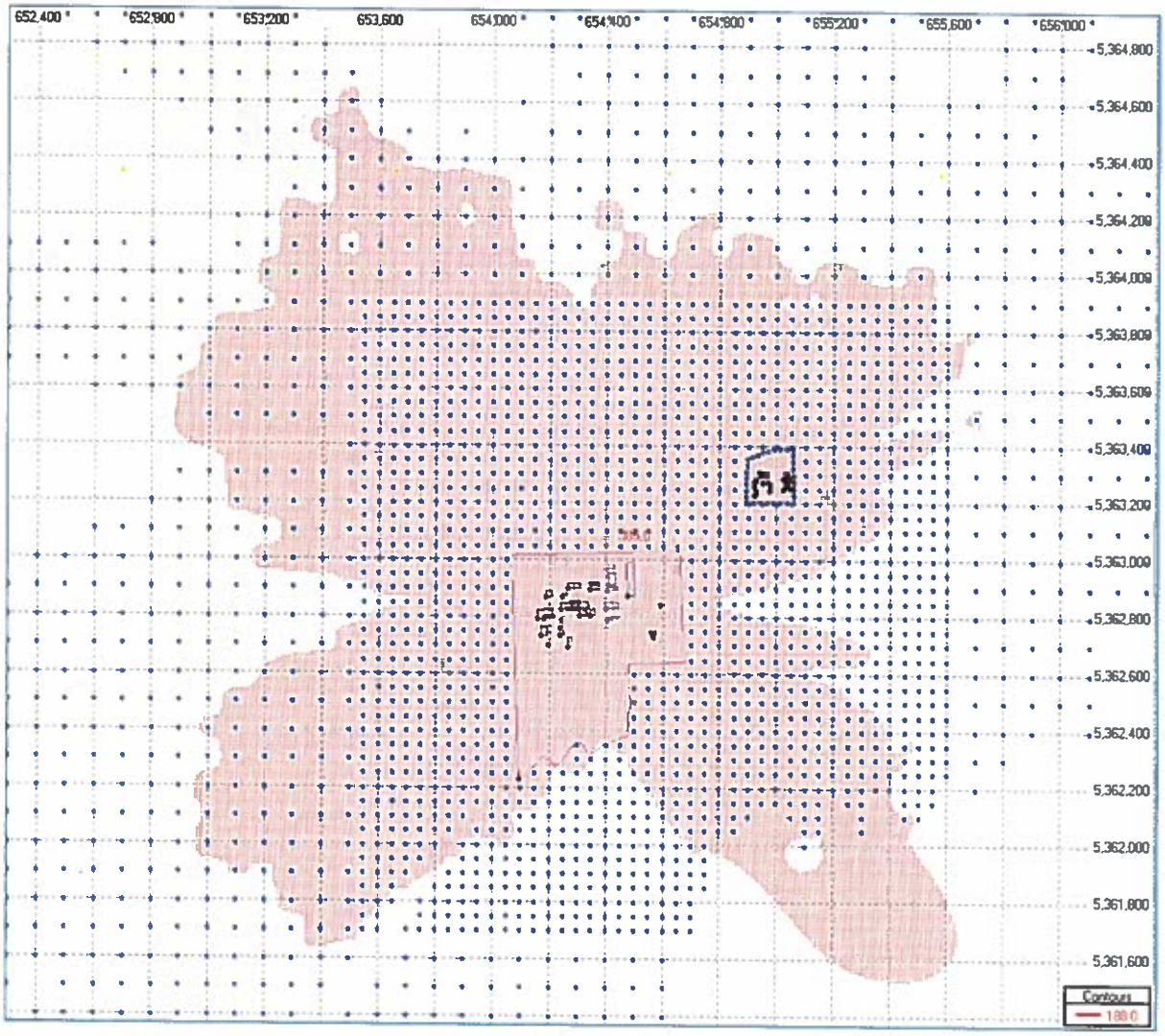


Predicted NAAQS impacts, 1-hr NO_2 (including 35 µg/m^3 background)
Receptors inside Hess Gas Plant Boundary [impacts from WBI Tioga Compressor Station only]

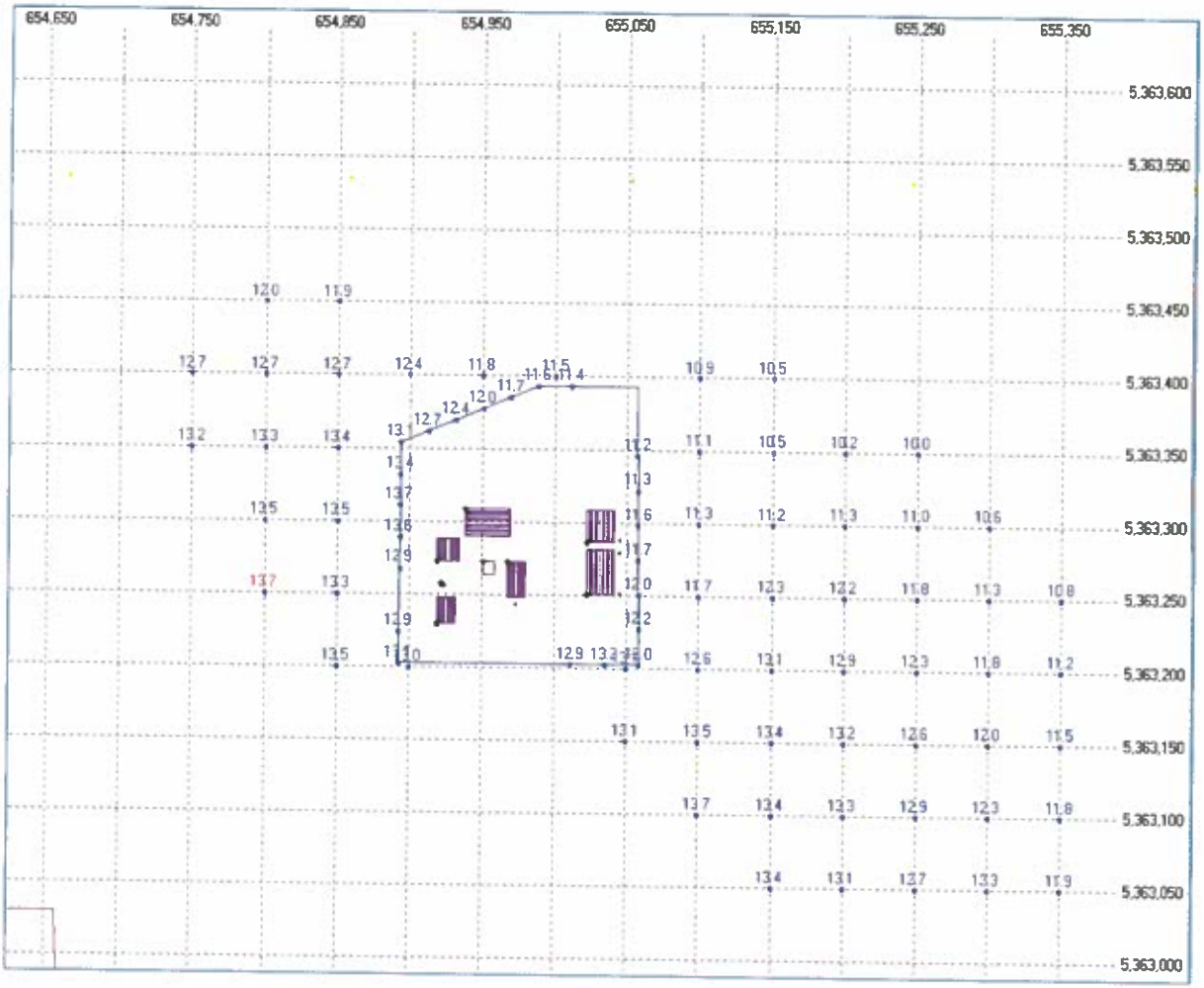


Predicted NAAQS impacts, 1-hr NO_2 (including 35 µg/m^3 background)
Receptors [above SIL] outside Hess Gas Plant Boundary [impacts from WBI & HGP combined]

Shaded contour – impacts above 1-hr NO_2 AAQS (188 µg/m^3)



Predicted NAAQS impacts, Annual NO_2 (including 5 µg/m³ background)
Receptors [above SIL] outside Hess Gas Plant Boundary [impacts from WBI & HGP combined]



Lisa DiNicolantonio

From: Kautzman, Rheanna M. <rKautzman@nd.gov>
Sent: Tuesday, July 14, 2020 6:27 AM
To: Daniel Guido
Cc: Ann Curnow; Andrea Thornton
Subject: RE: WBI Tioga Modeling files

Good Morning Dan,

I was able to download the files. I will let you know if I have any questions on the modeling or the files.

Rheanna Kautzman
Environmental Scientist
Division of Air Quality

By Executive Order, I am working from home and may not be as reachable by phone. I will be checking voice mail twice a day, so please leave a message and I will get back to you as soon as possible.

701.328.5188 (main AQ) • 701.328.5186 (direct) • 701.328.5185 (fax) • www.deq.nd.gov/aq/

NORTH Dakota Be Legendary. | Environmental Quality

From: Daniel Guido <Daniel.Guido@erm.com>
Sent: Monday, July 13, 2020 1:35 PM
To: Kautzman, Rheanna M. <rKautzman@nd.gov>
Cc: Ann Curnow <Ann.Curnow@erm.com>; Andrea Thornton <Andrea.Thornton@erm.com>
Subject: RE: WBI Tioga Modeling files

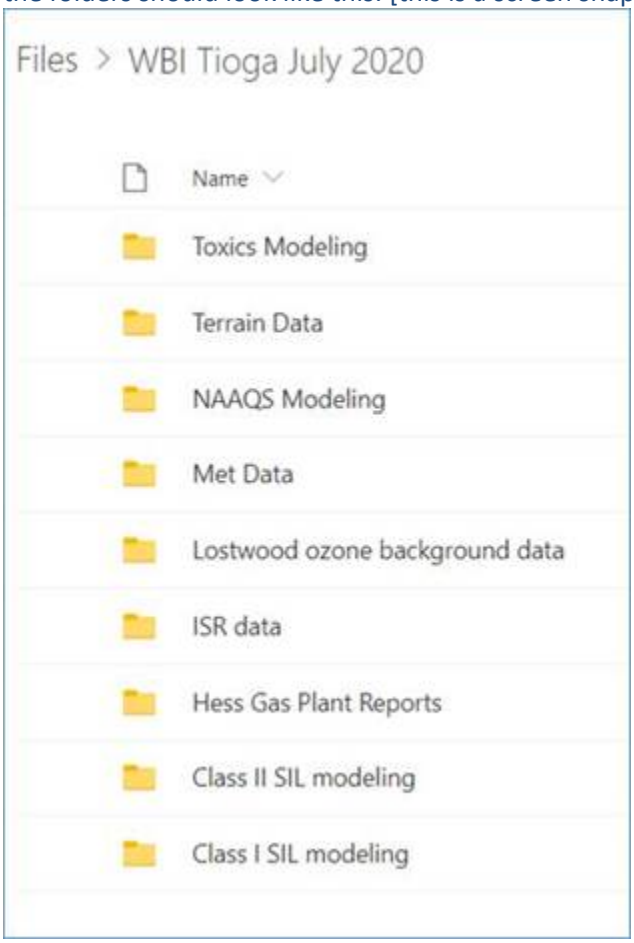
Rheanna –

I have created a folder with subfolders that contain all the electronic files from the updated modeling for the WBI Tioga air permitting.

You will find everything at this web link – this connection should be good for 7 days, let me know if you are not able to acquire all data files before this link expires, and I can refreshe it.

https://theermgroup-my.sharepoint.com/:f:/g/personal/daniel_guido_erm_com/EvoBT3to0gBEnA2ENF_RjlwB3RgY4QgeITuRVmT7pH30wA?e=kIKIxg

the folders should look like this: [this is a screen snap of the primary folder]



When you are able, please send me back a note that confirms that you have all data copied to your local fileserver site.

Daniel Guido
Principal Consultant, Scientist

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E daniel.guido@erm.com | **W** www.erm.com

From: Kautzman, Rheanna M. <rKautzman@nd.gov>
Sent: Thursday, July 9, 2020 4:06 PM

To: Daniel Guido <Daniel.Guido@erm.com>
Subject: RE: WBI Tioga Modeling files

Afternoon Dan,

The max file size upload on our FTP is 2gb—it should be able to accept ZIP files. I can also send you more than one invite (not sure if you can use the same invite more than once). But if you have an alternative means of transmitting the files that works for me.

Rheanna Kautzman
Environmental Scientist
Division of Air Quality

By Executive Order, I am working from home and may not be as reachable by phone. I will be checking voice mail twice a day, so please leave a message and I will get back to you as soon as possible.

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NORTH Dakota Be Legendary. | Environmental Quality

From: Daniel Guido <Daniel.Guido@erm.com>
Sent: Thursday, July 9, 2020 2:54 PM
To: Kautzman, Rheanna M. <rKautzman@nd.gov>
Subject: RE: WBI Tioga Modeling files

Rheanna –

I have compiled all the files from the updated/revised WBI Tioga air permit modeling.
I connected to the ND DEQ file transfer link you sent to me – and notice that this appears to allow ONE FILE TRANSFER AT A TIME.

This may not be practical for what I need to do – I have 267 files (totaling 8.23 GB). I do not have any single file that exceeds the 2000MB file size limitation, but to repeat this transfer step 267 times?

Instead, I will send you a link to download these from a file transfer site where I can place my data – organized in subfolders, etc.
I hope that will work for you as an alternative to the ND DEQ file transfer option you had provided.

I will be sending a subsequent email with the WEB LINK to the folder I can place these files.

Daniel Guido
Principal Consultant, Scientist

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From: Daniel Guido
Sent: Wednesday, July 8, 2020 5:07 PM
To: Kautzman, Rheanna M. <rKautzman@nd.gov>
Subject: WBI Tioga Modeling files

Rheanna –

I wanted to send this simple email to let you know I got the email requesting the modeling files.
I will be able to get this started in the morning. . . .

Regards,

Daniel Guido
Principal Consultant, Scientist

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NORTH BAKKEN EXPANSION PROJECT

Agency Correspondence – State Historical Society of North Dakota (SHSND)

ERM

1000 IDS Center
80 South Eighth Street
Minneapolis, MN 55402

Telephone: +1 612 347 6789
Fax: +1 612 347 6780

www.erm.com

Call Log

Log of Telephone Conversation

Call To/From Whom	Fern Swenson
Phone number	701-328-2666
Company	State Historical Society of North Dakota (SHSND)
ERM Contact	Pat Robblee
Phone number	612-840-8976
Date	June 26, 2020
Time of Conversation	2:25 p.m. cst (approx.)
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

I telephoned Fern Swenson, the State Historic Preservation Officer for North Dakota, to report the possible discovery of human remains during site testing at 32MZ3313. Ms. Swenson said she had already been in touch with the McKenzie County Sheriff's Office regarding the find and that she would have the state archaeologist examine the site in the next week. I provided Ms. Swenson with the site number and a brief description of the site and find.

ERM

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Minneapolis, MN 55402

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Fax: +1 612 347 6780

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Call Log

Log of Telephone Conversation

Call To/From Whom	Andrew Clark
Phone number	701-328-3574
Company	State Historical Society of North Dakota (SHSND)
ERM Contact	Pat Robblee
Phone number	612-840-8976
Date	June 26, 2020
Time of Conversation	3:455 p.m. cst (approx.)
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Dr. Clark called to let me know he received the notification regarding the potential discovery of human remains during site testing at 32MZ3313 and planned to visit the site later in the afternoon. I confirmed the site number/location for Dr. Clark, provided a brief description of the discovery of the potential human remains, and provided him the cell phone number for ERM's field director, Jayson Zoino, who was at the site.

ERM

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80 South Eighth Street
Minneapolis, MN 55402

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www.erm.com

Call Log

Log of Telephone Conversation

Call To/From Whom	Andrew Clark
Phone number	701-328-3574
Company	State Historical Society of North Dakota (SHSND)
ERM Contact	Pat Robblee
Phone number	612-840-8976
Date	July 2, 2020
Time of Conversation	2:00 p.m.
Reference	North Bakken Expansion Project (Project)
Signature	

LOG OF CONVERSATION

Dr. Clark returned a voice mail message I had left for him earlier in the day regarding permit requirements for the subcontractor ERM has retained to conduct a pre-testing gradiometer survey (Enviroprobe Services, Inc.) at 32WI976. I reiterated to Dr. Clark a call I had earlier in the day with Rick Rogers of the U.S. Army Corps of Engineers regarding the permit requirement for the survey (note: 32WI976 is located on USACE lands). Dr. Clark said that the SHSND typically requires that the individual conducting the gradiometer survey have their own state-issued archaeological survey permit. I explained to Dr. Clark that the individual who will be conducting the survey is a professional geophysical scientist, not an archaeologist, and asked if he could complete the survey under ERM's permit since ERM will be directing the work. Dr. Clark said he will check with other staff at the SHSND on the permit requirement for the gradiometer survey. Dr. Clark said we can likely have the permit issue resolved – i.e., either approval for Enviroprobe Services to work under ERM's permit or a permit issued to Enviroprobe – prior to the planned start of the gradiometer survey on July 8. Dr. Clark said he will get back with me, hopefully later in the day.

From: Pat Robblee
Sent: Monday, July 6, 2020 6:38 AM
To: Raina Hanley <RHanley@bcarch.org>; Clark, Andrew <andrewclark@nd.gov>; Kevin Malloy <Kevin.Malloy@erm.com>; Dyan Youpee <d.youpee@fortpecktribes.net>
Cc: Wade Burns <WBurns@bcarch.org>; Irene Altieri <ialtieri@bcarch.org>
Subject: RE: WBI Bakken Expansion

All,

An ERM survey team initially found, but did not completely delineate, 32WI2352 in June 2019. While pipeline construction was occurring in the vicinity, there was no indication at the time that the construction would impact the site. The ERM survey team returned to delineate the site in July 2019. At that time, the pipeline construction was very close to the site (on the opposite side of 60th Street NW); it was apparent the pipeline construction would cross the site; and some ground disturbing activities had already occurred within the site. ERM notified the SHSND of the situation. We understand that the SHSND contacted the project proponent, Cenex Pipeline, and that the site was then treated as a post-review discovery. ERM was not involved with Cenex Pipeline or their contractor, KLJ, in the post-review discovery process.

Pat

Patrick Robblee
Program Director

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E pat.robblee@erm.com I W www.erm.com

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Pat Robblee

From: Pat Robblee
Sent: Monday, July 6, 2020 6:17 AM
To: Clark, Andrew
Subject: gradiometer survey

Hi Andy.

Just following up to see if Enviroprobe, our geophysical contractor, will be able to work under ERM's permit for the gradiometer survey at 32WI976, which is planned to occur this week.

Thank you.

Pat

Patrick Robblee
Program Director

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Pat Robblee

From: Clark, Andrew <andrewclark@nd.gov>
Sent: Monday, July 6, 2020 10:03 AM
To: Pat Robblee
Cc: Kevin Malloy
Subject: RE: gradiometer survey

Hi Pat and Kevin,

Enviroprobe will be able to work under ERM's permit, provided that permitted ERM staff are onsite.

Best,

Andy

From: Pat Robblee <Pat.Robblee@erm.com>
Sent: Monday, July 6, 2020 5:17 AM
To: Clark, Andrew <andrewclark@nd.gov>
Subject: gradiometer survey

Hi Andy.

Just following up to see if Enviroprobe, our geophysical contractor, will be able to work under ERM's permit for the gradiometer survey at 32WI976, which is planned to occur this week.

Thank you.

Pat

Patrick Robblee
Program Director

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