Universal Application 4

Air Dispersion Modeling Report

Refer to and complete Section 16 of the Universal Application form (UA3) to assist your determination as to whether modeling is required. If, after filling out Section 16, you are still unsure if modeling is required, e-mail the completed Section 16 to the AQB Modeling Manager for assistance in making this determination. If modeling is required, a modeling protocol would be submitted and approved prior to an application submittal. The protocol should be emailed to the modeling manager. A protocol is recommended but optional for minor sources and is required for new PSD sources or PSD major modifications. Fill out and submit this portion of the Universal Application form (UA4), the "Air Dispersion Modeling Report", only if air dispersion modeling is required for this application submittal. This serves as your modeling report submittal and should contain all the information needed to describe the modeling. No other modeling report or modeling protocol should be submitted with this permit application.

16-A: Identification	
1	Name of facility: Indian Basin Gas Plant
2	Name of company: OXY USA WTP LP
3	Current Permit number: PSD0295-M8-R4; P103-R2
4	Name of applicant's modeler: Victoria Collis
5	Phone number of modeler: (302) 507-2134
6	E-mail of modeler: vcollis@trinityconsultants.com

16-B: Brief			
1	Why is the modeling being done? Other (describe below) The purpose of the permit application is to fulfill the Specific Condition added to Permit number PSD0295-M8-R1: *The permittee shall submit a significant permit revision per 20.2.72.219.D NMAC to include an ambient impact analysis for H_2S, within 12 months from the issuance date of NSR PSD0295-M8R3.*		
2	Describe the permit changes relevant to the modeling. There are no proposed changes to the permit.		
3	What geodetic datum was used in the modeling? WGS84		
4	How long will the facility be at this location? The facility will be at this location more than one year.		
5	Is the facility a major source with respect to Prevention of Significant Deterioration (PSD)?	Yes	

6	Identify the Air Quality Control Region (AQCR) in which the facility is located. This facility is located in AQCR 155.
7	List the PSD baseline dates for this region (minor or major, as appropriate). Pollutant / Major Source Baseline Date / Trigger Date PM / January 6, 1975 / August 7, 1977 SO2 / January 6, 1975 / August 7, 1977 NO2 / February 8, 1988 / February 8, 1988 PM2.5 / October 20, 2010 / October 20, 2011
8	Provide the name and distance to Class I areas within 50 km of the facility (300 km for PSD permits). Carlsbad Caverns National Park is 30.8 km from the facility.
9	Is the facility located in a non-attainment area? If so, describe. The facility is not located in a non-attainment area.
10	Describe any special modeling requirements, such as streamline permit requirements. The purpose of the permit application is to fulfill the Specific Condition added to Permit number PSD0295-M8-R1: *The permittee shall submit a significant permit revision per 20.2.72.219.D NMAC to include an ambient impact analysis for H_2S, within 12 months from the issuance date of NSR PSD0295-M8R3.*

16-C: Modeling History of Facility

1	Describe the modeling history of the facility, including the air permit numbers, the pollutants modeled, the National Ambient Air Quality Standards (NAAQS), New Mexico AAQS (NMAAQS), and PSD increments modeled. (Do not include modeling waivers).

Pollutant	Latest permit and modification number that modeled the pollutant facility-wide.	Date of Permit	Comments
CO	0295-M6	2003	1-hr and 8-hr NMAAQS
NO_2	0295-M6	2003	24-hr and annual NMAAQS; PSD Class I & II
SO_2	0295-M6	2003	3-hr NAAQS and 24-hr NMAAQS
H_2S			
PM2.5			
PM10			
TSP			
Lead			
Ozone (PSD only)			
NM Toxic Air Pollutants (20.2.72.402 NMAC)			

16-D: Modeling performed for this application

1	For each pollutant, indicate the modeling performed and submitted with this application. Choose the most complicated modeling applicable for that pollutant, i.e., culpability analysis assumes ROI and cumulative analysis were also performed.

Pollutant	ROI	Cumulative analysis	Culpability analysis	Waiver approved	Pollutant not emitted or not changed.
CO					X
NO_2					X
SO_2					X
H_2S		X			
PM2.5					X

	PM10					X
	TSP					X
	Lead					X
	Ozone					X
	State air toxic(s) (20.2.72.402 NMAC)					X

16-E: New Mexico toxic air pollutants modeling – N/A

1	List any New Mexico toxic air pollutants (NMTAPs) from Tables A and B in 20.2.72.502 NMAC that are modeled for this application. **N/A – There are no New Mexico TAPs that are modeled for this facility.**
	List any NMTAPs that are emitted but not modeled because stack height correction factor. Add additional rows to the table below, if required.

	Pollutant	Emission Rate (pounds/hour)	Emission Rate Screening Level (pounds/hour)	Stack Height (meters)	Correction Factor	Emission Rate/ Correction Factor

16-F: Modeling options

1	What model(s) were used for the modeling? Why? BREEZE AERMOD with US EPA executable 15181 which provides more detailed background concentration tools and added flexibility.
2	What model options were used and why were they considered appropriate to the application? The model was run in regulatory default mode.

16-G: Surrounding source modeling

1	If the surrounding source inventory provided by the Air Quality Bureau was believed to be inaccurate, describe how the sources modeled differ from the inventory provided. If changes to the surrounding source inventory were made, use the unmerged list of sources to describe the changes. No changes were made to the surrounding source inventory.
2	Date of surrounding source retrieval. Surrounding source data was provided by NMED on April 29, 2016.

	AQB Source ID	Description of Corrections

16-H: Building and structure downwash

1	How many buildings are present at the facility?	There are 20 buildings at the facility.

2	How many above ground storage tanks are present at the facility?	There were no above ground storage tanks included as downwash structures in the dispersion model.	
3	Was building downwash modeled for all buildings?	Yes	
4	If not, explain why. N/A		

5

Building comments

Below is a screenshot of the buildings included in the model and their parameters.

Index	ID	Description	X coordinate	Y coordinate	Elevation	Height	X length	Y length	Angle
			m	m	meters	feet	feet	feet	degree
1	OFFICE		540407.58	3592248.62	1166.1	13	28	70	0
2	WH_E	Warehouse East	540409.68	3592212.78	1165.64	9.33	45	35	0
3	SAFETY		540412.59	3592209.08	1165.56	10.66	25	10	0
4	SHOP		540409.87	3592197.53	1165.47	13.33	40	30	0
5	SHED		540408.82	3592181.34	1165.31	9.5	23	12	0
6	NEW_CTR	New main control	540402.5	3592300	1167.29	13.66	60	25	0
7	WH_N	Warehouse north	540356.15	3592290.78	1168	13.5	30	30	-26
8	ELEC	Electrical shop	540307.58	3592264.79	1168.8	11	28	35	-26
9	INST	Instrument shop	540318.46	3592269.44	1168.57	11	16	35	-26
10	OLDCTRL	old control room b	540344.84	3592219.75	1167.14	13	15	60	0
11	AIRCOMP	Instrument air com	540321.94	3592221.22	1167.71	20.6	28	52	0
12	GENBLDG	generator building	540254.47	3592158.83	1168.09	17.5	25	55	0
13	SWD	SWD control build	540234	3592098.31	1167.07	13	25	10	0
14	OUTLETGC	outlet gas compres	540344.97	3592117.93	1165.44	10.33	23	11	0
15	740		540341.38	3592145.37	1165.79	10.75	20	10	0
16	4RECOMP	4th recompressor	540407.17	3592148.28	1164.97	14.5	12	30	0
17	CHEVRON	chevron pipeline b	540405.55	3592127.11	1164.77	9.2	8	8	0
18	SRU	SRU control	540214.87	3592201.33	1169.29	11	20	10	0
19	WATER	water softener buil	540227.62	3592182.98	1168.88	10	15	22	0
20	WORKSHOP		540408.99	3592233.89	1165.87	14	24	37	0

16-I: Receptors and modeled property boundary

1

"Restricted Area" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with a steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area. A Restricted Area is required in order to exclude receptors from the facility property. If the facility does not have a Restricted Area, then receptors shall be placed within the property boundaries of the facility.

Describe the fence or other physical barrier at the facility that defines the restricted area.

The facility fence defines the restricted area and has 50 meter receptor spacing.

2	Receptors must be placed along publicly accessible roads in the restricted area. Are there public roads passing through the restricted area?		No
3	Are restricted area boundary coordinates included in the modeling files?	Yes	

4

Describe the receptor grids and their spacing.

The receptor grid is defined as follows:

Start (m)	End (m)	Spacing (m)	Grid Description

0	500	50	Very Fine
500	1,500	100	Fine
1,500	5,000	500	Medium
1,500	50,000	1,000	Coarse

5 Describe receptor spacing along the fence line.

Main Facility				
X	Y	Elevation (m)	Hill Ht. (m)	Flagpole ht (m)
540437.6	3592342	1167.67	1167.67	0
540438.2	3592292	1166.62	1166.62	0
540438.9	3592242	1165.58	1165.58	0
540439.6	3592192	1165.03	1165.03	0
540440.2	3592142	1164.48	1164.48	0
540440.3	3592134	1164.4	1164.4	0
540470.8	3592135	1164.01	1164.01	0
540471.4	3592122	1163.87	1163.87	0
540473	3592094	1163.54	1163.54	0
540451.9	3592093	1163.81	1163.81	0
540401.9	3592093	1164.44	1164.44	0
540351.9	3592092	1165.07	1165.07	0
540327.1	3592091	1165.41	1165.41	0
540327.4	3592066	1165.12	1165.12	0
540327.7	3592043	1164.86	1164.86	0
540301	3592042	1165.19	1165.19	0
540251.1	3592040	1165.81	1165.81	0
540207.7	3592039	1166.35	1166.35	0
540207.7	3592046	1166.42	1166.42	0
540207.1	3592096	1167.35	1167.35	0
540206.8	3592121	1167.9	1167.9	0
540181.9	3592120	1168.21	1168.21	0
540173.9	3592120	1168.3	1168.3	0
540172.5	3592134	1168.64	1168.64	0
540199.6	3592136	1168.32	1168.32	0
540206.1	3592136	1168.25	1168.25	0
540204.3	3592140	1168.36	1168.36	0
540204.3	3592144	1168.44	1168.44	0
540207	3592149	1168.51	1168.51	0
540206.8	3592179	1168.99	1168.99	0
540206.7	3592194	1169.22	1169.22	0
540200.3	3592194	1169.26	1169.26	0
540199.3	3592222	1169.68	1169.68	0
540198.6	3592243	1169.98	1169.98	0
540224.9	3592256	1170.16	1170.16	0
540270.1	3592277	1169.89	1169.89	0
540315.2	3592299	1168.97	1168.97	0
540360.4	3592320	1168.35	1168.35	0
540402.2	3592340	1168.1	1168.1	0
540405.8	3592340	1168.06	1168.06	0

Residue Flare Fence				
X	Y	Elevation (m)	Hill Ht. (m)	Flagpole ht (m)
540091.5	3591997	1166.71	1166.71	0
540091.3	3591947	1165.85	1165.85	0
540091.3	3591940	1165.77	1165.77	0
540048.7	3591940	1166.32	1166.32	0
540032.9	3591940	1166.52	1166.52	0
540032.8	3591974	1166.97	1166.97	0
540032.7	3591997	1167.48	1167.48	0
540059.3	3591997	1167.13	1167.13	0
Utility Flare Fence				
X	Y	Elevation (m)	Hill Ht. (m)	Flagpole ht (m)
540195.3	3592027	1166.38	1166.38	0
540194.4	3591977	1165.86	1165.86	0
540194.1	3591963	1165.65	1165.65	0
540158.5	3591963	1165.92	1165.92	0
540137.2	3591964	1165.94	1165.94	0
540136.9	3591992	1166.4	1166.4	0
540136.6	3592028	1166.97	1166.97	0
540151.1	3592028	1166.85	1166.85	0
SSM Flare Fence				
X	Y	Elevation (m)	Hill Ht. (m)	Flagpole ht (m)
540195.3	3592027	1166.38	1166.38	0
540194.4	3591977	1165.86	1165.86	0
540194.1	3591963	1165.65	1165.65	0
540158.5	3591963	1165.92	1165.92	0
540137.2	3591964	1165.94	1165.94	0
540136.9	3591992	1166.4	1166.4	0
540136.6	3592028	1166.97	1166.97	0
540151.1	3592028	1166.85	1166.85	0

6	Describe the PSD Class I area receptors. N/A – There are no PSD Class I standards for H_2S.		

16-J: Sensitive areas

1	Are there schools or hospitals or other sensitive areas near the facility? This information is optional (and purposely undefined), but may help determine issues related to public notice.		No
2	If so, describe. N/A		
3	The modeling review process may need to be accelerated if there is a public hearing. Are there likely to be public comments opposing the permit application?		No

16-K: Modeling Scenarios – N/A – There is only one modeling scenario.

1	Identify, define, and describe all modeling scenarios. Examples of modeling scenarios include using different production rates, times of day, times of year, simultaneous or alternate operation of old and new equipment during transition periods,

	etc. Alternative operating scenarios should correspond to all parts of the Universal Application and should be fully described in Section 15 of the Universal Application (UA3). As a conservative measure, we are modeling all flares as operating at full capacity simultaneously.		
2	Which scenario produces the highest concentrations? Why? The “All” scenario produces the highest concentrations.		
3	Were emission factor sets used to limit emission rates or hours of operation? (This question pertains to the "SEASON", "MONTH", "HROFDY" and related factor sets, not to the factors used for calculating the maximum emission rate.)		No
4	If so, describe factors for each group of sources. List the sources in each group before the factor table for that group. (Modify or duplicate table as necessary. It’s ok to put the table below section 16-K if it makes formatting easier.) Sources: N/A		

5

Hour of Day	Factor	Hour of Day	Factor								
1		13									
2		14									
3		15									
4		16									
5		17									
6		18									
7		19									
8		20									
9		21									
10		22									
11		23									
12		24									

If hourly, variable emission rates were used that were not described above, describe them here: N/A

6	Were different emission rates used for short-term and annual modeling?		No
7	If yes, describe. N/A		

16-L: NO_2 Modeling – N/A – NO_2 was not modeled.

1	Which types of NO_2 modeling were used? Check all that apply.	
		100% NO_X to NO_2 conversion
		ARM
		PVMRM
		OLM
		ARM2
		Other:
2	Describe the NO_2 modeling.	

3	In-stack NO_2/NO_X ratio(s) used in modeling.
4	Equilibrium NO_2/NO_X ratio(s) used in modeling.
5	Describe/justify the use of the ratios chosen.
6	Describe the design value used for each averaging period modeled. 1-hour: Choose an item.

16-M: Particulate Matter Modeling – N/A – PM was not modeled.

1	Select the pollutants for which plume depletion modeling was used.			
		PM2.5		
		PM10		
		TSP		
		None		
2	Describe the particle size distributions used. Include the source of information.			
3	Was secondary PM modeled for PM2.5? Only required for PSD major modifications that are significant for NOx and/or SOx. Optional for minor sources, but allows use of high eighth high.		Yes	No

16-N: Setback Distances and Source Classification

1	Portable sources or sources that need flexibility in their site configuration requires that setback distances be determined between the emission sources and the restricted area boundary (e.g. fence line) for both the initial location and future locations. Describe the setback distances for the initial location. N/A – Setback distances are not relevant to this modeling.		
2	Describe the requested, modeled, setback distances for future locations, if this permit is for a portable stationary source. Include a haul road in the relocation modeling. N/A – Setback distances are not relevant to this modeling.		
3	The unit numbers in the Tables 2-A, 2-B, 2-C, 2-E, 2-F, and 2-I should match the ones in the modeling files. Do these match?	Yes	
4	Provide a cross-reference table between unit numbers if they do not match. It's ok to place the table below section 16-N for easier formatting.		
5	The emission rates in the Tables 2-E and 2-F should match the ones in the modeling files. Do these match?	Yes	
6	If not, explain why. N/A		
7	Have the minor NSR exempt sources or Title V Insignificant Activities" (Table 2-B) sources been modeled?		No
8	Which units consume increment for which pollutants? N/A – H_2S does not have PSD increment standards.		
9	PSD increment description for sources. (for unusual cases, i.e., baseline unit expanded emissions after baseline date).		
10	Are all the actual installation dates included in Table 2A of the application form, as required? This is necessary to verify the accuracy of PSD increment modeling.	Yes	No

11	If not please explain how increment consumption status is determined for the missing installation dates. N/A

16-O: Flare Modeling

1	For each flare or flaring scenario, complete the following			
	Flare ID (and scenario)	Average Molecular Weight	Gross Heat Release (cal/s)	Effective Flare Diameter (m)
	ES-14 SSM	16.04	197850360.7	12.642
	ES-42 SSM	16.04	177100590.3	11.961
	ES-50 SSM	34.08	49124890.04	5.946

16-P: Volume and Related Sources – N/A – Only SSM from flares was modeled.

1	Were the dimensions of volume sources different from standard dimensions in the Air Quality Bureau (AQB) Modeling Guidelines?	Yes	No
2	If the dimensions of volume sources are different from standard dimensions in the AQB Modeling Guidelines, describe how the dimensions were determined.		
3	Describe the determination of sigma-Y and sigma-Z for fugitive sources.		
4	Describe how the volume sources are related to unit numbers. Or say they are the same.		
5	Describe any open pits.		
6	Describe emission units included in each open pit.		

16-Q: Background Concentrations – N/A – No background for H_2S

1	Identify and justify the background concentrations used. **N/A – No background concentrations for H_2S.**		
2	Were background concentrations refined to monthly or hourly values?	Yes	No

16-R: Meteorological Data

1	Identify and justify the meteorological data set(s) used. This modeling used a recently developed representative meteorological data set for 2015 using Automated Weather Observation System (AWOS) data collected at the Artesia Municipal Airport (KATS). Artesia Municipal Airport is the location for which the NMED approved Empire Abo (1993 – 1994) meteorological data set is derived. We feel that this meteorological data set is the best representation available for conditions at the facility.

2	Discuss how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data. The data was processed in accordance with EPA guidelines and used AERSURFACE and AERMET in the generation of this data.

16-S: Terrain

1	Was complex terrain used in the modeling? If no, describe why. There is no complex terrain in the area of the facility.
2	What was the source of the terrain data? N/A

16-T: Modeling Files

1	Describe the modeling files: The modeling files are described below.		
	File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
	H_2S_SIL_v1	H_2S	SIA
	H_2S_CIA_v1	H_2S	Cumulative

16-U: PSD New or Major Modification Applications – N/A – Application is not for new PSD or major modification.

1	A new PSD major source or a major modification to an existing PSD major source requires additional analysis. Was preconstruction monitoring done (see 20.2.74.306 NMAC and PSD Preapplication Guidance on the AQB website)?	Yes	No
2	If not, did AQB approve an exemption from preconstruction monitoring?	Yes	No
3	Describe how preconstruction monitoring has been addressed or attach the approved preconstruction monitoring or monitoring exemption.		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC.		
5	If required, have ozone and secondary PM2.5 ambient impacts analyses been completed?		

16-V: Modeling Results

1	If ambient standards are exceeded because of surrounding sources, a culpability analysis is required for the source to show that the contribution from this source is less than the significance levels for the specific pollutant.

2	Identify the maximum concentrations from the modeling analysis.									
Pollutant	Period	Facility Concentration (µg/m3)	Total Modeled Concentration (µg/m3)	Total Modeled Concentration (PPM)	Background Concentration	Cumulative Concentration	Standard	Value of Standard	Units of Standard, Background, and Total	Percent of Standard
H_2S	1-hr	12.948	12.948			12.948	NMAAQS	139.3	µg/m^3	9.3%

16-W: Location of maximum concentrations

1	Identify the locations of the maximum concentrations.					
Pollutant	Period	UTM East (m)	UTM North (m)	Elevation (ft)	Distance (m)	Radius of Impact (ROI) (m)
H_2S	1-hr	543,250	3,583,090	1,345.63	9,360	32,561.5

16-X: Summary/conclusions

1	A statement that modeling requirements have been satisfied and that the permit can be issued. OXY USA WTP LP has demonstrated that H_2S emissions from Indian Basin gas Plant neither cause nor contribute to an exceedance of the standard.