Memorandum

To: Tertia Speiser, NEPA Compliance Officer,
Response and Restoration Division
Cybersecurity, Energy Security, and Emergency Response (CESER)
U.S. Department of Energy

From: ICF

Date: April 19, 2024

Re: Special Environmental Analysis of Balancing Authority of Northern California (BANC) Operations during 202(c) Emergency Order Operations between September 4, 2022, and September 8, 2022

1 Introduction

On September 4, 2022, U.S. Department of Energy (DOE) issued Order No. 202-22-2 that permitted the Balancing Authority of Northern California (BANC) to operate under Federal Power Act Section 202(c) conditions for a limited period. BANC is a registered Balancing Authority with the North American Electric Reliability Corporation and operates as a neighboring Balancing Authority Area (BAA) to the California Independent System Operator (CAISO) BAA. DOE found that an emergency existed: "California has experienced several periods of extreme heat, drought conditions, and threat of wildfires. Such conditions are expected to occur over the next several days [from September 2, 2022] and threaten the reliable operation of the bulk electric power system in California. The loads from the forecasted heat wave over the next week are expected to push demand for electric energy by BANC members to at or over historical peaks and higher than normally expected planning targets for this time of year." DOE determined that issuance of an Emergency Order would "meet the emergency and serve the public interest." Under the Order NTT Global Data Centers was authorized to operate specific electric generating resources (Covered Resources) located within California outside of the limits of their Title V Operating Permit (Permit No. TV2016-20-01 issued by the Sacramento Metropolitan Air Quality Management District) when directed to do so by BANC, notwithstanding air quality or other permit limitations.

One covered resource was included in the order: NTT Global Data Centers, Americas, located at 1312 Striker Ave, Sacramento, CA 95834. Its generation capacity consists of 48 MW across 24 generators. Each generator is driven by a diesel-fueled internal combustion (IC) engine. As backup capacity the resource is designed to support 26.1 MW of critical data center load with built in redundancy. The 24 generators are collectively known as "CA2".

The Order stated that BANC anticipated that the emergency order it requested "may result in exceedance of National Ambient Air Quality Standards (NAAQS) under the Clean Air Act." The Order also required BANC to inform all affected communities where the Covered Resource operates and clearly explain what the Order allowed BANC to do, including potential impacts to the surrounding community. The Order was limited to a 5-day period and expired on

September 8, 2022. BANC was required to submit a report documenting operations of the covered resources under the emergency order. BANC filed its Final Report on November 14, 2022.

This document summarizes ICF's review of documents BANC provided to DOE regarding its operations under Section 202(c) emergency orders pursuant to the Federal Power Act between September 4, 2022, and September 8, 2022[1] (the "order period"). Specifically, ICF reviewed:

- Operations data from covered generating units to determine the number of engines operating and their hours of operation.
- Emissions data from covered generating units to determine whether any emissions would have caused ambient pollutant concentrations in the region to exceed any NAAQS.
- Location coordinates of the generating units to determine the potential for Environmental Justice impacts on the affected population in the area around the CA2 data center.
- The robustness of community engagement plans.

2 Emissions Evaluation

2.1 Approach

ICF has reviewed the information supplied by BANC for the NTT generating facilities and presents our findings below.

The reporting period for Section 202(c) emergency order was September 4, 2022, through September 8, 2022, though no generating units exceeded their permit limits on September 4 the Order applied to the 24 generating units listed in Table 1.

Table 1. Generating Units at CA2 Covered by DOE 202(c) Emergency Order 202-22-2

Permit No.	Generator ID	Total Operating Hours per Engine During Order Period
21352	41M	17.1
21366	42M	17.0
21367	41U	21.7
21368	42U	21.1
22348	43M	17.1
22349	44M	17.0
21369	43U	21.8

[1] The documents reviewed are posted on the Department of Energy's (DOE) web site at the following link: https://www.energy.gov/ceser/federal-power-act-section-202c-banc-september-2022

Permit No.	Generator ID	Total Operating Hours per Engine During Order Period
21370	44U	16.8
21371	45U	21.9
21372	46U	21.8
22350	47U	9.0
22351	48U	22.1
22352	51M	16.8
22353	52M	16.8
22354	51U	21.4
22355	52U	21.2
22356	53U	21.2
22357	54U	21.2
22358	55U	21.1
22359	53M	16.8
22360	56U	21.0
22361	57U	21.0
22362	58U	18.4
22363	59U	20.9
Total Operating Hours		**462.2**

Source: BANC

The hours of operation per engine on any single day during the Order Period ranged from zero (for several engines) to 7.7 hours (by engine 43U on September 7). The maximum total time of operation for any single engine during the Order period was 22.1 hours (by engine 48U as shown in Table 1). Table A-1 in the BANC Final Report provides further detail on the hours of operation for each engine.

ICF reviewed operating and emissions data provided by BANC for each unit, for each of the 32 hours in which the Order was in effect and operations occurred outside of permit limits (2:00 PM – 10:00 PM PDT on September 5-8, 2022).[2] Meteorological data measured at Sacramento International Airport (SMF), located about 6.1 miles northwest of CA2, provided the average wind direction and speed that occurred for each hour. Based on the wind data the likely locations of potential air quality impacts in the area surrounding CA2 were identified. The likelihood that any impacts would have caused pollutant concentrations to exceed the NAAQS or California Ambient Air Quality Standards (CAAQS) was assessed for each location based on the operational, emissions, and wind data.

The NAAQS and CAAQS are based on specific averaging time periods which range from one hour to one year. For diesel engines the standards that are the most likely to be exceeded are

[2] Several emergency generators also operated between 10:00 and 10:30 PM on September 6 and 7, 2022, due to the generators ramping down from the heat emergency operation.

the NAAQS and CAAQS for the 1-hour nitrogen dioxide (NO_2) standard as a result of operating the diesel generators in excess of the operating permit. Because of the short duration of the Order period, it was not possible to assess impacts for the 24-hour and longer averaging periods. Therefore, direct impacts were assessed primarily in terms of potential 1-hour NO_2 concentrations. Other short-term standards considered but not assessed were the 1-hour carbon monoxide (CO) and sulfur dioxide (SO_2) standards as well as the 8-hour CO standard as the CO emissions from the diesel generators are about half the nitrogen oxide (NO_x) emission rate and the ambient air quality concentration standard is about 30 times higher for CO compared to NO_2. Similarly, SO_2 emission rates are about 1,000 times lower than NO_x emission rates.

Because volatile organic compound (VOC) and NO_x emissions chemically interact in the atmosphere over minutes to hours in the presence of sunlight to produce ozone (secondary formation), the 8-hour ozone NAAQS and CAAQS were also assessed in terms of the potential to cause or contribute to an exceedance of the standards.

2.2 Permit Exceedances

The CA2 engines drive generators that serve as an emergency or backup power supply, meaning that they do not run continuously as in a conventional power plant, but only run for maintenance, repair, or emergency purposes. The engines are permitted by the Sacramento Metropolitan Air Quality Management District (SMAQMD) to operate for a maximum of 50 hours per year for maintenance, and less than 200 hours per year for both emergency and maintenance, per engine.

As noted in the BANC Final Report, NTT exceeded two permit conditions during the Order period. Briefly, these conditions require that a maximum of one engine may operate at a time except under conditions of emergency or for maintenance and repair. These two conditions and the circumstances of exceedance are described in more detail below, per the BANC Final Report.

1. Exceeded Permit Condition: Condition III. 53 of Permit No. TV2016-20-01 states that unless authorized by SMAQMD, for purposes other than emergency operation, only one IC engine may operate at any single time at 1312 Striker Ave. The following exclusions apply to this condition:

a) Facility wide operational test where all or some of the engines operate at the same time occurring no more often than once every calendar year and for less than 30 minutes.

b) Electrical infrastructure upgrades or repairs requiring multiple IC engines to operate.

Manner of Exceedance: Multiple generators ran concurrently on September 5-8, 2022 consistent with the Order: no engines ran on September 4, 17 engines ran concurrently on September 5, 24 on September 6 and 8, and 23 on September 7. Additionally, on September 6-7, 2022, multiple engines operated shortly after the 2 PM - 10 PM period covered by the Order.

2. Exceeded Permit Condition: Per Condition V. B-7.2 and Condition V. B-8.2 of Permit No. TV2016-20-01, the emergency generators at CA2 may only operate for maintenance purposes and/or in an emergency. "Maintenance purposes" is defined as "the operation of an NTT IC engine in order to preserve the integrity of the IC engine and its associated generator, the facility's electrical distribution system or when required by SMAQMD to verify compliance with applicable rules and regulations." "Emergency" is defined as "when electrical service from the serving utility is interrupted by an unforeseeable event."

Manner of Exceedance: The CA2 emergency generators ran during the heat emergency event for purposes other than maintenance or emergency as defined in the permit on September 5-8, 2022. Specifically, the operation from 2 PM to 10 PM on those days did not meet the definition above of emergency; the units were operated in response to the heat emergency. Additionally, several emergency generators operated after 10 PM on September 6 and 7, 2022.

2.3 Analysis of Operations and Emissions

This section summarizes emissions information provided by BANC for those hours during which emissions exceeded the limits in the units' respective air quality permits as described above. The permitted limits on emissions are set on a unit-by-unit basis by SMAQMD at levels that are intended to ensure that ambient concentrations will not violate the NAAQS or CAAQS. NTT reported emissions for CO, NO_x, particulate matter of 10 microns diameter and smaller (PM_{10}), sulfur oxides (SO_x), and VOC. Permit limits were exceeded only for hours of operation (Table 1). NTT did not report any exceedances of permit conditions that limit actual emissions. Table 2 summarizes the reported emissions from the engines for the Order Period.

The emissions in Table 2 represent the total mass (in pounds) of emissions that could have contributed to ambient pollutant concentrations during the Order period. The permits for the CA2 engines do not include limits on the number of pounds emitted per day as shown in Table 2. Rather, the permits limit the mass emissions per unit of work (grams per horsepower-hour), the number of pounds emitted per quarter, and the number of pounds emitted per year. NTT did not report any exceedances of the permit limits for emissions per unit of work, emissions per quarter, or emissions per year. As noted above, permit limits were exceeded only for the number of engines operating at a time (condition 1 in Section 2.2) and for operation for purposes other than maintenance or emergency as defined in the permit (condition 2 in Section 2.2).

Table 2. Emissions (pounds) from CA2 Engines During Order Period

Description	CO	NO_X	PM_{10}	SO_X	VOC
September 4, 2022	0	0	0	0	0
September 5, 2022	649.33	1,198.77	37.46	1.25	249.74
September 6, 2022	2,326.85	4,295.71	134.24	4.47	894.94
September 7, 2022[1]	2,870.88	5,300.09	165.63	5.52	1,104.18
September 8, 2022[1]	1,873.62	3,458.99	108.09	3.60	720.62
Total emissions during Order period	7,720.68	14,253.56	445.42	14.85	2,969.49
Maximum emissions to stay within permit limits (hypothetical scenario of normal operations consisting of 1 engine operating at a time for maintenance/repair/emergency purposes during each hour)	83.20	153.60	4.80	0.16	32.00
Excess emissions due to permit exceedances (emissions during Order period minus hypothetical scenario of normal operations)	7,637.48	14,099.96	440.62	14.68	2,937.48

Source: BANC
[1] Includes operations after 10:00 PM.

2.4 Assessment of Potential Air Quality Impacts

2.4.1 Measured Air District Concentrations in the Region

The SMAQMD operates several air quality monitoring sites in the region that measure concentrations of various pollutants continuously. There are three SMAQMD monitors located within 10 miles of CA2. Table 3 shows the maximum pollutant concentrations measured at each monitor during the Order period. Not every pollutant is measured at each site.

Table 3. Measured Concentrations at SMAQMD Monitors During Order Period

Monitoring Site Name	USEPA Site ID	Approx. Distance from CA2 (miles)	Maximum Measured Short-Term Concentrations						
			CO (1-hr, ppm)	CO (8-hr, ppm)	NO_2 (1-hr, ppm)	PM_{10} (24-hr, $\mu g/m^3$)	$PM_{2.5}$ (24-hr, $\mu g/m^3$)	SO_2 (1-hr, ppm)	O_3 (8-hr, ppm)
Bercut Drive	06-067-0015	3.9	1.7	1.6	0.035	NM	11.1	NM	NM
1309 T Street	06-067-0010	5.7	NM	NM	0.030	37.8	10.9	NM	0.079
Del Paso Manor	06-067-0006	7.2	NM	NM	0.019	40	9.4	0.001	0.068
Air Quality Standards									
NAAQS			35.0	9.0	0.10	150	35	0.075	0.070
CAAQS			20.0	9.0	0.18	50	NS	0.25	0.070
Exceedance of standard during Order period?			No	No	No	No	No	No	0.079

Sources: SMAQMD, CARB
hr = hour
$\mu g/m^3$ = micrograms of pollutant per cubic meter of air
ppm = parts per million
CO = carbon monoxide
NO_2 = nitrogen dioxide
O_3 = ozone
PM10 = particulate matter of 10 microns diameter and smaller
$PM_{2.5}$ = particulate matter of 2.5 microns diameter and smaller
SO_2 = sulfur dioxide
CAAQS = California Ambient Air Quality Standards
NAAQS = National Ambient Air Quality Standards
NM = pollutant not measured at site

NS = no standard established

As shown in Table 3, the nearest air quality monitors to CA2 did not record any exceedances of the NAAQS or CAAQS during the Order period with the exception of O_3. However, because of the distances between CA2 and the monitoring sites, any direct impacts due to CA2 may not be discernible at these monitors and are discussed further below.

2.4.2 Other Measured Concentrations Near CA2

Citizen scientists operate a network of real-time air quality particulate matter sensors focused on $PM_{2.5}$ and the data are reported through the PurpleAir monitoring website. These sensors are not as accurate as the Federal Reference Method (FRM) instrumentation used by SMAQMD monitors but are of sufficient quality to identify areas of high concentrations. PurpleAir measurements have been shown to correlate well with FRM measurements, providing both good accuracy and high precision even under hot and dry conditions.[3]

Four PurpleAir sensors are located within 7,900 feet (1.5 miles) of CA2 with the closest station at 2,500 feet (0.5 miles). Unfortunately, the two closest stations had limited archived data available. However, the most complete dataset collected at 10-minute frequency was the Natomas Clay Way station (# 7278) which, at 4,000 feet (0.8 miles) from CA2, reported data for nearly all of the Order period. The fourth station Natomas Park – Heron is farther from CA2 at 7,900 feet (1.5 miles) but had a nearly complete observation record during the Order period.

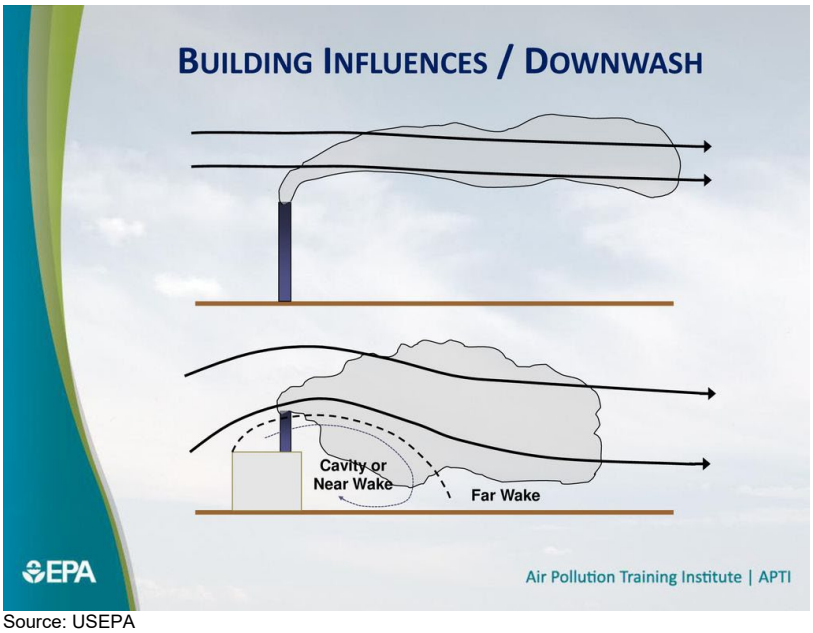
None of these stations shows an exceedance of the $PM_{2.5}$ air quality standard but the Natomas Clay Way and Natomas Park Heron both show elevated $PM_{2.5}$ concentrations on Sept 5th starting at around 8 PM and lasting until 11 PM for the Clay Way station, while the Natomas Park Heron measured a longer period of elevated readings from about noon on Sept 5th until 3:00 AM on Sept 6th. No other time periods showed elevated $PM_{2.5}$ concentrations. However, it is unlikely, based on the wind measurement discussed in Section 2.4.4, that these increased concentrations were associated with emissions from CA2.

2.4.3 Likely Pollutant Dispersion at CA2

Buildings and similar structures in the path of air flow create a turbulent wake region on the building roof and the leeward (downwind) side of the building as shown in Figure 1. An exhaust plume caught in the path of this flow is drawn into the wake and is temporarily trapped in a recirculating region or “cavity”. This effect, known as “downwash“, leads to higher ground-level pollutant concentrations near the building than if the building were not present. The CA2 engine stack exits are only a few feet above the roof level. Therefore, it is highly likely the emission plumes are drawn into the wake. Under these conditions the maximum pollutant concentrations will occur within the recirculation cavity and close to CA2, likely within about 120 feet of the building.[4] Beyond the recirculation cavity, concentrations will decrease with increasing distance from CA2.

[3] South Coast Air Quality Management District, AQ –SPEC Air Quality Sensor Performance Evaluation Center, 2017. Sensor PurpleAir PA-II.
[4] The USEPA SCREEN3 dispersion model was used to estimate the distance to the maximum pollutant concentration.

Figure 1. Building Downwash Effect



Source: USEPA

2.4.4 Assessment of Direct Air Quality Impacts

Depending on the wind speed and direction, downwash could cause high pollutant concentrations to occur outside the CA2 site but still within a few hundred feet of the building, in areas where the public has access. Although these nearby areas appear to be in industrial/commercial use they include public sidewalks and a vacant lot immediately northwest of CA2 that could be used informally for recreation. Under USEPA policy, these publicly accessible areas are considered “ambient air” and are subject to the NAAQS/CAAQS. Because of the downwash effect and the fact that multiple engines were running simultaneously, it appears that 1-hour NO_2 concentrations likely exceeded the NAAQS or CAAQS in these nearby areas during the Order period.

The exhaust from the engines contains a mixture of nitrogen oxides, primarily nitric oxide (NO) with only a small proportion of NO_2.[5] Once emitted the NO reacts with oxygen in the atmosphere and is converted to NO_2 over time. The conversion time can be seconds to minutes depending on local conditions. As a result, NO_2 concentrations in areas very close to the emission source can be low because the NO has not had time to convert to NO_2. However, because the conversion can occur within seconds, and to avoid underestimating potential impacts, this analysis assumes that most of the NO has converted to NO_2 by the time the emissions reach any locations where impacts are assessed.

Potential concentrations beyond the immediate area of the CA2 site were assessed at the nearest sensitive locations (known as receptors). Sensitive receptors include residences, schools and daycare facilities, health care facilities, and recreational sites. The assessment considered the number of hours that the wind (measured at SMF) blew from CA2 toward each receptor, the wind speeds, the orientation of the units with respect to the wind direction, and the distance from CA2 to the receptor. Based on these factors, the likelihood of a violation of

[5] Air quality studies typically assume conservatively that no more than 10% of the NO_X is emitted as NO_2 in the stack exhaust from diesel generators.

the NAAQS or CAAQS was characterized as three potential options: “unlikely,” “possible,” or “likely”. Table 4 presents the assessment of air quality impacts for each receptor and wind direction combination that occurred during the Order period.

In addition to the SMF meteorological data a personal weather station, at Natomas Park, has hourly meteorological data available through the Weather Underground, a weather station network. This station is located 4,300 feet (0.8 miles) northwest of CA2. Meteorological data from this station was reviewed for possible use in assessing impacts given its proximity to CA2. The data was initially reviewed but had more than half the hours during the Order period with zero wind speed and direction. Further analysis showed the data was likely measuring the wind speed and direction only 10-15 feet above ground level, considerably lower than SMF’s 33-foot height. This is important as the wind speed and direction values measured at the lower height are well below the release height of the stacks plus plume rise. In addition, the low measurement height is within the nocturnal boundary layer following sunset while the emissions from CA2 stacks remain well above the surface-based inversion. Data from Natomas Park measured at the lower height, if used in the assessment, would underestimate the wind speeds at the plume height. For these reasons ICF does not include this meteorological data in the air quality analysis.

Table 4. Assessment of Potential Air Quality Impacts at Receptors

Wind Vector Range[1] (degrees)	Wind Speed Range (mph)	Number of Hours[2]	Nearest Downwind Sensitive Receptor from CA2	Minimum Distance to Receptor (ft)	Meets Criteria for 1-hr NO_2 NAAQS Violation?[3]	Meets Criteria for 1-hr NO_2 CAAQS Violation?[4]	Rationale
0-10	6.9-10.4	5	Vacant (possible informal recreation area)	2,300+	Unlikely	Unlikely	Distance from sources; winds moderate during period[5]
20-50	3.5-10.4	7	Residences at Del Paso Rd./Sorento Rd.	3,300	Unlikely	Unlikely, but possible for hour of lowest wind speed	Distance from sources; winds largely moderate during period except 1 hour with low (3.5 mph) wind speed
70-90	3.5-4.6	3	Residences on and east of Bollenbacher Ave.	6,400	Unlikely	Unlikely	Distance from sources; winds low-moderate during period
160-190	0-12.7	8	Residences immediately south of I-80	4,200	Unlikely	Unlikely	Distance from sources; winds largely moderate during period; 3 of the hours have calm wind which will lead to relatively high concentrations.
200-210	6.9-9.2	3	Staybridge Suites Hotel on Promenade Circle	4,900	Unlikely	Unlikely	Distance from sources; winds moderate during period leading to lower concentrations
240	5.8	1	Residences on Golden Cypress Way across stormwater retention pond from CA2	500	Unlikely	Likely	Short distance from sources; moderate wind speed; all of the units are lined up along the south wall of the building which puts them in alignment for producing a high concentration at receptor. Likely to have exceedance of the 1-hour NO_2 CAAQS which would meet criteria for violation. Likely to have exceedance but not a violation of the 1-hour NO_2 NAAQS.[2]
330	6.9	1	Residences on English Elm St.	1,770	Unlikely	Possible	Fairly short distance from sources; winds moderate
340-350	4.6-10.4	6	Natomas Charter School at Del Paso Rd./ Blackrock Dr.	2,400	Unlikely	Unlikely	Distance from sources; winds moderate-high during period

[1] Direction the wind is blowing toward. For example, a wind vector of 0 degrees indicates that the wind is blowing towards due north (i.e., a south wind).
[2] Number of hours wind blew at vectors given in left column.
[3] The 1-hour NO_2 NAAQS is defined statistically: to attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations must not exceed 0.10 ppm. Thus, multiple exceedances of the numerical value of the standard can occur before the criteria for a NAAQS violation are met. Source: 40 CFR 50.
[4] The 1-hour NO_2 CAAQS is defined as the value not to be exceeded. Thus, a single exceedance of the numerical value of the standard meets the criteria for a violation. Source: 17 CCR 70200.
[5] If all else is equal, concentrations increase as wind speed decreases, and vice versa.

2.4.5 Assessment of Indirect Air Quality Impacts (Ozone)

An exceedance of both the 8-hour ozone NAAQS and CAAQS occurred during the Order period. The highest measured ozone exceedance was 0.079 ppm occurring between 10 am to 6 pm on September 6th at the T Street monitor. It is likely that CA2 emissions released during the Order period contributed to an exceedance of both the CAAQS and NAAQS within the region, but not in immediate vicinity to CA2 due to the time needed for the photochemistry to take place typically resulting in peak impacts found 2 to 10-km downwind.

2.4.6 Conclusions

Based on the reported emissions, the orientation of the generator stacks, the distances from CA2 to receptors, and the wind speeds and directions during the Order period, it appears likely that the operations that exceeded permit limits at CA2 would have increased ambient concentrations enough to cause or worsen a violation of the 1-hour NO_2 CAAQS, but not the NAAQS, at publicly accessible locations very near CA2 as well as in the area of residences on Golden Cypress Way. It also appears possible that violations of the 1-hour NO_2 CAAQS, but not the NAAQS, could have occurred at residences at Del Paso Road/Sorento Road and at residences along English Elm Street. In addition, it appears likely that the CA2 emissions released during the Order period contributed to an exceedance of both the ozone CAAQS and NAAQS.

Further evaluation could likely refine the extent of this preliminary conclusion. Such evaluation could include further review of meteorological conditions during the reporting period, and air dispersion modeling to quantify the potential ambient air concentrations in the area for NO_2, $PM_{2.5}$, CO and SO_2 and their spatial extent in the region during the Order period.

3 Review of Environmental Justice Implications for Affected Populations

This section highlights the potential environmental justice (EJ) implications for the affected population in the region of interest. ICF's evaluation was based on data from U.S. EPA's EJScreen tool, available at ejscreen.epa.gov/mapper.[6] EPA's EJScreen is a GIS-based mapping tool for evaluating potential EJ impacts across the United States. The tool allows users to combine demographic and environmental information on a user-selected area. The data used for these purposes in EJScreen are based on publicly available data sources, such as the American Community Survey from the Census Bureau for demographic data and various EPA data sources for environmental indicators. ICF used this screening tool for this analysis because it provides a method consistent with EPA's approach for defining EJ vulnerabilities for affected populations.

[6] Another potential source that ICF considered to conduct this analysis is CalEnviroScreen (https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40. Accessed April 2, 2024). However, due to the familiarity and ease of use of EPA EJScreen's interface and to maintain consistency with a similar analysis conducted for the PJM region, ICF decided to use EPA's EJScreen for both analyses.

3.1 Analyzing Demographic Characteristics of Nearby Populations

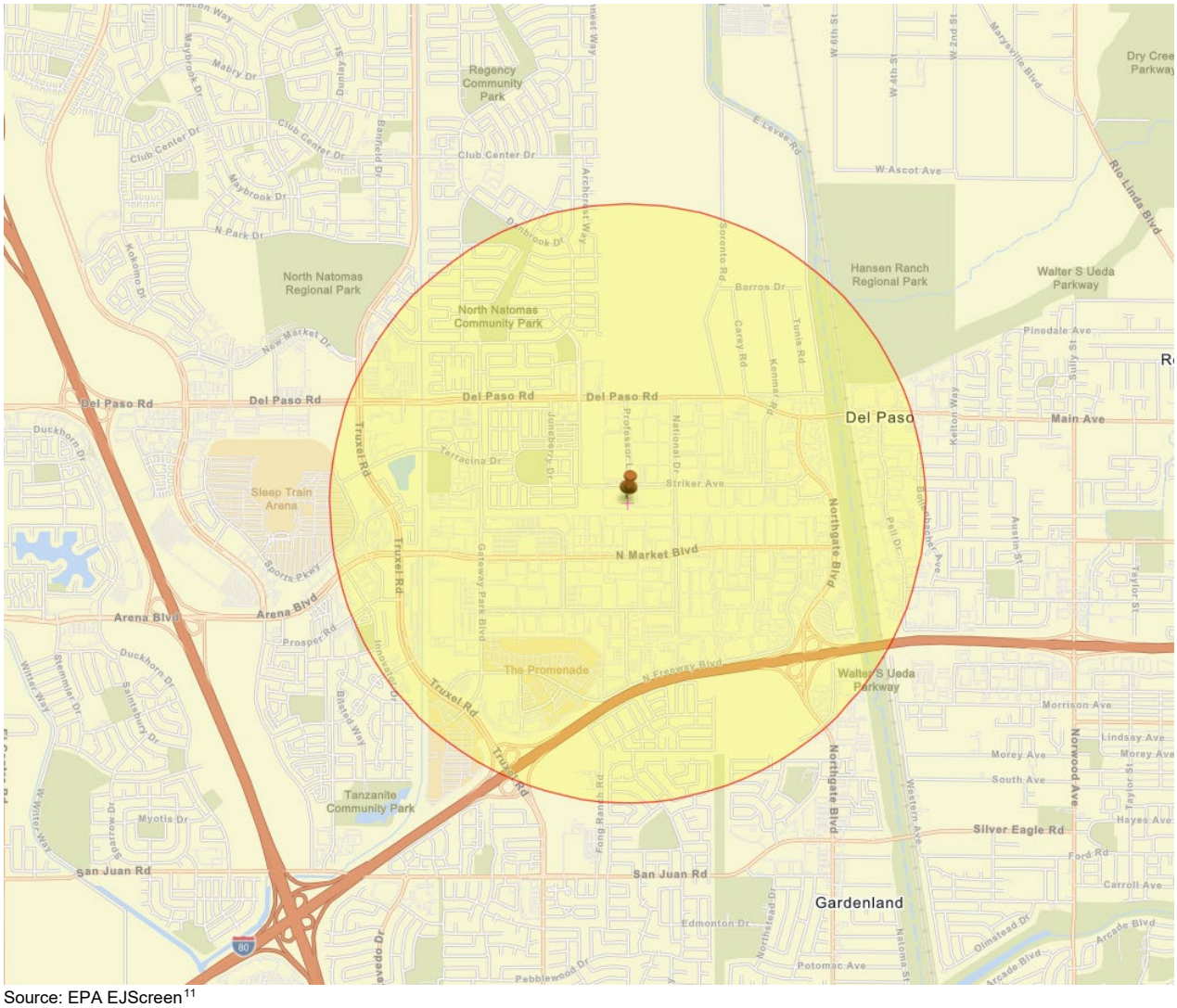
To identify the vulnerable population around the CA2 data center that is likely to be impacted by any potential exceedances during the 5-day period in September 2022, ICF extracted the demographic and environmental characteristics of those living within a pre-specified 2-km and 10-km radius around the data center. Since the data center is near a residential part of the city with neighborhoods around, ICF chose the 2-km radius to better isolate the demographic and environmental characteristics of the nearby population. The 10-km radius was chosen to analyze the EJ characteristics in a wider region around the data center.

The EJScreen also identifies if a census tract is designated as a Disadvantaged Community (DAC) in the pre-specified 2-km and 10-km radii.[7] The EPA defines DAC as any census tract that is identified as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST); and/or census block group that is at or above the 90th percentile for any of EJScreen's Supplemental Indexes when compared to the state or nation; and any that are within Tribal lands.[8,9] To calculate a single supplemental index for one block group, EJScreen multiplies the environmental indicator by socioeconomic information. The socio-economic indicators include people of color, low-income, unemployment, limited English speakers, less than high school education, and percent of people under the age of five and percent of people over 64.[10]

Figure 2 below overlays the 2-km circle around CA2 data center. A 2-km radius ensures the neighborhoods around the data center are captured in detail.

[7] Figure 4 shows DACs located within a 10-km radius around CA2 data center.
[8] U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-05/LIDAC%20Technical%20Guidance%20-%20Final_2.pdf. pg. 4. Accessed April 2, 2024.
[9] CEJST considers communities disadvantaged if they are in census tracts that meet the thresholds for at least one of tool's categories of burden, or if they are on land within the boundaries of a federally recognized tribe. Source: https://screeningtool.geoplatform.gov/en/methodology#3/33.47/-97.5. Accessed April 2, 2024.
[10] U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation, https://www.epa.gov/ejscreen/ejscreen-map-descriptions. Accessed April 2, 2024.

Figure 2. 2-km Radius Around CA2 Data Center

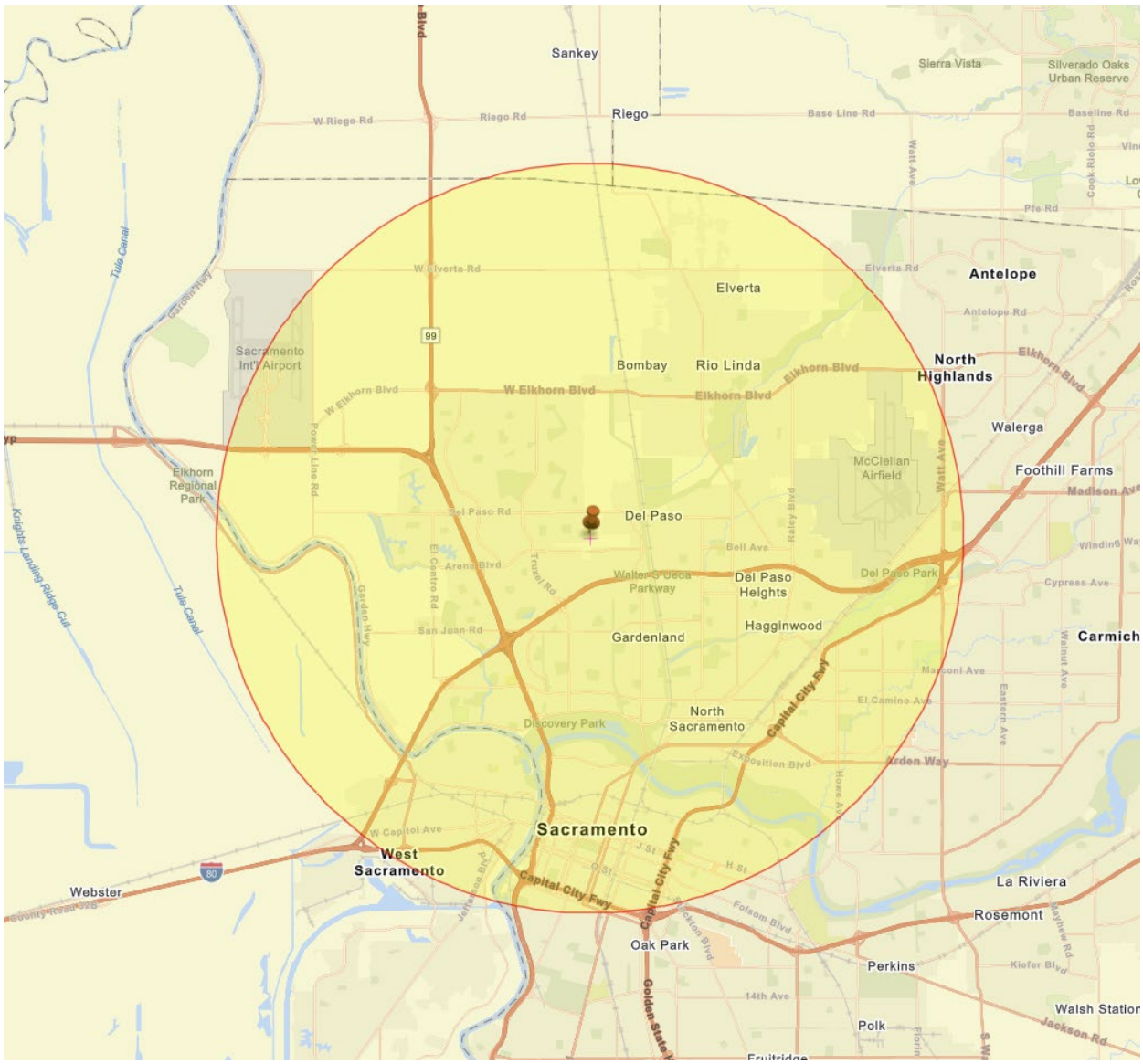


Source: EPA EJScreen[11]

Figure 3 below overlays a 10-km circle around the data center. Using a 10-km radius around the data center captures a greater share of the potentially affected population and is consistent with the air quality analysis discussed above.

[11] United States Environmental Protection Agency. 2023 version. EJScreen. www.epa.gov/ejscreen. Retrieved December 5, 2023.

Figure 3. 10-km Radius Around CA2 Data Center



Source: EPA EJScreen[12]

Using these custom boundaries, ICF extracted the demographic and environmental data from EJScreen to identify the potential EJ vulnerabilities for the population living around the data center. Table 5 indicates the age ranges of population in the 2-km and 10-km radii from the data center.

[12] EJScreen. www.epa.gov/ejscreen. Retrieved December 5, 2023.

Table 5. Distribution of the Affected Population by Age

Age	2-km Radius	10-km Radius
Total Population	**11,223**	**327,136**
1 to 4	7%	6%
5 to 17	21%	17%
18 to 64	63%	65%
65 and up	9%	12%

Source: EPA EJScreen[13]

As shown in Table 5, the largest proportion of population exposed to any potential EJ concerns falls within the 18-64 age group, followed by the 5-17 age group. Note that 28 percent of the total population exposed to any potential EJ concerns in the 2-km radius fall within the 1-17 age group. This age group consists of young children who are likely to be more vulnerable to air toxins.

Table 6. Distribution of the Affected Population by Race

Race	2-km Radius	10-km Radius
Total Population	**11,223**	**327,136**
White	24%	37%
Black	14%	11%
American Indian	0%	0%
Asian	30%	15%
Hawaiian/Pacific Islander	2%	1%
Other race	0%	1%
Two or more races	6%	6%
Hispanic	24%	30%

Source: EPA EJScreen[14]

Table 6 shows the breakdown of the population by race in the 2-km and 10-km radius. Race information is broken down to show population that identify themselves as White, people of color (Black, American Indian, Asian, Hawaiian/ Pacific Islander or other race), or belong to the Hispanic ethnicity.[15] In the area around 2-km radius of the data center, the population that identifies as Asian makes up the majority of the population followed by Hispanic and White. The outlook is slightly different in the area around 10-km of the data center, where the population that identifies as White consists of 37 percent of the total population followed by Hispanic at 30 percent.

[13] EJScreen. www.epa.gov/ejscreen. Retrieved November 11, 2023.
[14] EJScreen. www.epa.gov/ejscreen. Retrieved November 11, 2023.
[15] EJScreen defines people of color as individuals who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. Source: U.S. Environmental Protection Agency (EPA), 2023. EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf. Accessed December 5, 2023.

Table 7. Demographics of the Affected Population

Demographic Indicators	2-km Radius	10-km Radius	State Average
Total Population	**11,223**	**327,136**	
People of Color[16]	76%	63%	**61%**
Low Income	22%	35%	**28%**
Unemployed[17]	6%	7%	**7%**
Limited English Speaking Households[18]	8%	6%	**9%**
Population with Less Than High School Education[19]	10%	14%	**16%**

Source: EPA EJScreen[20]

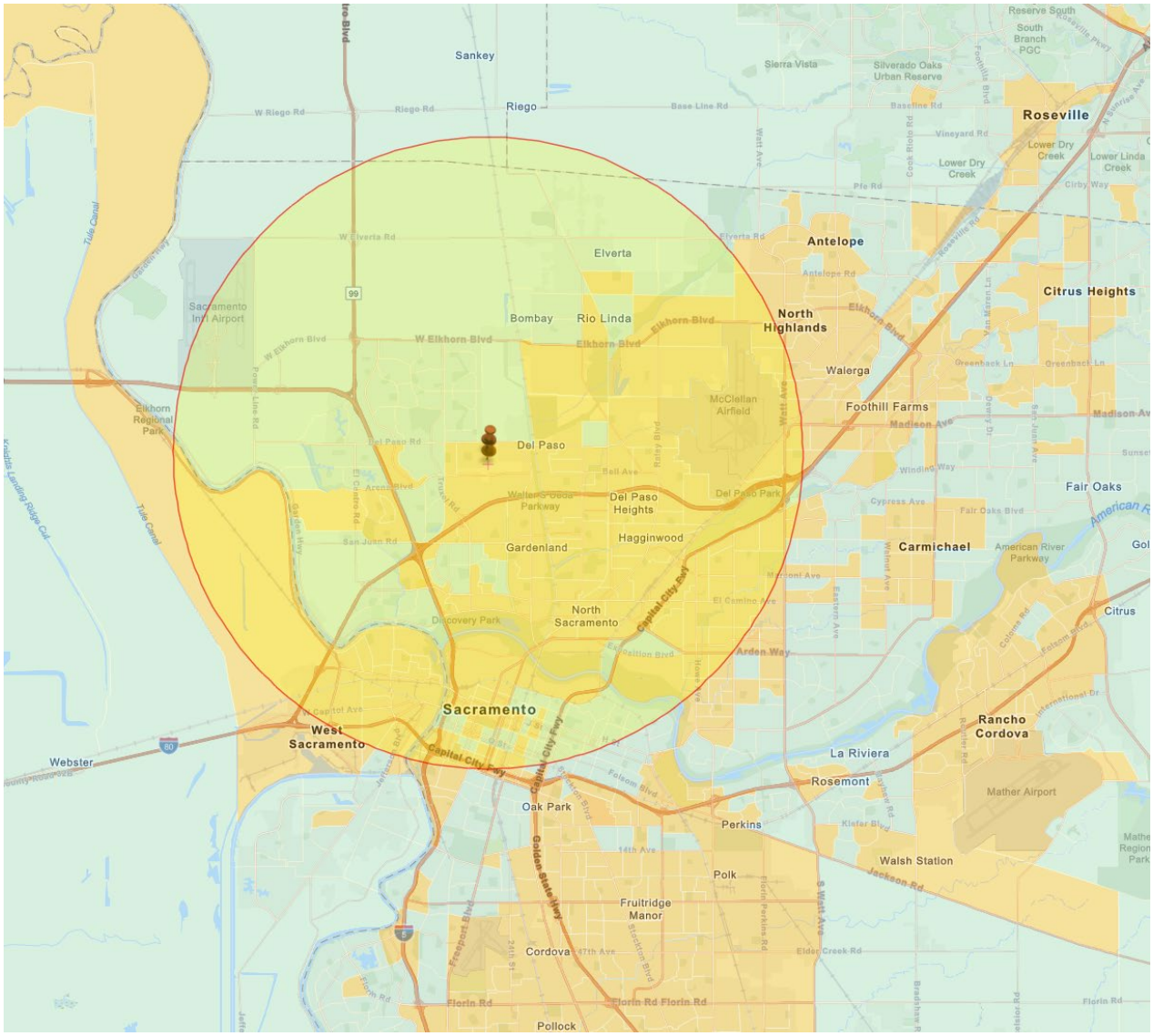
As shown in Table 7, 22 percent of the population in the 2-km radius is low-income. Low-income population is defined as those whose household income is less than twice the federal poverty level in the past 12 months. At the 10-km radius, the low-income population increases to 35 percent, higher than the state average of 28 percent. In the 2-km radius around the data center, 76 percent of the population is of color, higher than the state average of 61 percent. However, in the 10-km radius, the percentage of people of color decreases to 63 percent, implying that the population closest to the data center is likely to have a higher proportion of people of color than in the wider radius.

In terms of employment, 6 percent of the population in the 2-km radius is unemployed, which is close to the state average of 7 percent. And according to the education metric, the population in the 2-km and 10-km radius have a lower share of people with less than a high school education compared to the state average. This shows that the area around the data center is ahead in terms of high school educated population as compared to the state average. Thus, while the population likely to be mostly affected by any potential exceedances at the data center may not have any distinguishable difference with the wider state population in terms of their educational attainment and employment status, they are more likely to have been people of color.

Figure 4 below shows DACs located within a 10-km radius around the data center. Census tracts designated as DACs are highlighted in orange. These census tracts are designated as DACs based on the DAC criteria set by EPA as mentioned above. Based on the figure, there are several DACs within the 10-km radius around the data center. This indicates a large share of the population in the area is vulnerable and could be disproportionately affected by any potential EJ concerns that might have been exacerbated by any exceedances at the data center.

[16] People of color are individuals who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. Source: EPA, EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf. Accessed April 2, 2024.
[17] Unemployed is defined as individuals who did not have a job during the reporting period, made at least one specific active effort to find a job, and were available to work. Source: EPA, EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf. Accessed April 2, 2024.
[18] EJScreen defines limited English-speaking households as a household in which no one over the age of 14 years old speaks only English or speaks a non-English language and speaks English "'very well'" as reported in the American Community Survey. Source: EPA, EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf. Accessed April 2, 2024.
[19] EJScreen defines less than high school education as people 25 years or older who did not receive a high school diploma. Source: EPA, EJScreen Technical Documentation, https://www.epa.gov/system/files/documents/2023-06/ejscreen-tech-doc-version-2-2.pdf. Accessed April 2, 2024.
[20] EJScreen. www.epa.gov/ejscreen. Retrieved November 9, 2023.

Figure 4. DACs Within 10-km Radius Around CA2 Data Center



Source: EPA EJScreen[21]

3.2 Combining Demographic Information with Environmental Indicators

To understand the EJ vulnerabilities of the population living around the data center, ICF analyzed the various environmental pollutant indicators from EJScreen and compared their values with the state averages. Table 8 below shows the values of the various environmental indicators of interest (see Table 8 notes for definitions of these pollutant indicators) around the 2-km and 10-km radii of the data center.

[21] EJScreen. www.epa.gov/ejscreen. Retrieved December 5, 2023.

Table 8. Environmental Indicators Data

Environmental Indicators	2-km Radius	10-km Radius	State Average
Particulate Matter (PM 2.5 in ug/m3)	8.52	8.46	**8.65**
Ozone (ppb)	63.3	63.8	**65.9**
Diesel PM (ug/m3)	0.217	0.243	**0.26**
Air Toxics Cancer Risk (risk per MM)	33	38	**27**
Air Toxics Respiratory Hazard Index	0.5	0.56	**0.34**
Toxic Releases to Air	45	57	**780**
Traffic Proximity and Volume	100	540	**510**
Lead Paint	0.026	0.32	**0.31**
Superfund Proximity	0.11	0.14	**0.17**
RMP Proximity	0.92	0.51	**0.57**
Hazardous Waste Proximity	2.9	4.4	**5.9**
Underground Storage Tanks	0.04	1.5	**1.5**
Wastewater Discharge	2.9	1.2	**4**

Source: EPA EJScreen[22]

- Particulate Matter (PM2.5 in ug/m3) —PM2.5 levels in the air, measured in µg/m3 annual average
- Ozone—Ozone annual mean top 10 of daily maximum 8-hour concentration in air
- Diesel PM (ug/m3) —Diesel particulate matter level in the air, measured in µg/m3
- Air Toxics Cancer Risk (risk per MM)—Lifetime cancer risk from inhalation of air toxics
- Air Toxics Respiratory HI—Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration)
- Toxic Releases to Air Indicator (TRI)—Risk Screening Environmental indicators (RSEI) modeled toxicity-weighted concentrations in air of TRI listed chemicals
- Traffic Proximity and Volume—Count of vehicles at major roads within 500 meters, divided by the distance in meters (daily traffic count/distance to road)
- Lead Paint—Percent of housing units built pre-1960, as indicator of potential lead paint exposure
- Superfund Proximity—Count of proposed and listed NPL sites within 5-km, divided by distance in km (site count/km distance)
- RMP Facility Proximity—Count of RMP (potential chemical accident management plan) facilities within 5-km, divided by distance in km (facility count/km distance)
- Hazardous Waste Proximity—Count of hazardous waste management facilities within 5-km, divided by distance in km (facility count/km distance)
- Underground Storage Tanks—Weighted count of USTs per sq. km
- Wastewater Discharge—Toxicity-weighted stream concentrations at stream segments within 500 meters, divided by distance in km (toxicity-weighted concentration/m distance)

As shown in Table 8, the area within the 2-km and 10-km radii of the data center has higher values for Air Toxics Cancer Risk and Air Toxics Respiratory Hazard Index compared to the state averages. This implies the population near the data center is more vulnerable with respect to these two environmental indicators compared to the rest of the state. According to the data from EPA's EJScreen, 11 percent of the population ages 18 and older in the 10-km radius of the data center have asthma, while the state's average is 9.5 percent. Since ozone can reduce lung function and aggravate conditions like asthma, the likely exceedance of ozone emissions during the 5-day period, as mentioned in the air quality analysis above, has the potential to increase the risk of asthma-related health effects during this period.

3.3 Conclusion – Environmental Justice Analysis

Using the data from EPA's EJScreen, it appears the population in the 18-64 age group in the region around the CA2 data center are more vulnerable to EJ concerns compared to the rest of

[22] EJScreen. www.epa.gov/ejscreen. Retrieved December 5, 2023.

California. As discussed in the air quality analysis above, DOE's emergency authorization under Section 202(c) of the Federal Power Act, allowed increased operations of the data center that appears to have exceeded the permit levels and may have caused a violation of the 1-hour NO_2 CAAQS. Analyzing the *baseline*, *business-as-usual* EJ concerns for the population around these data centers indicate that a significant portion of the population surrounding the CA2 data center could be considered to be vulnerable to EJ concerns since there is a large presence of minority population groups, belonging to DAC, with limited socioeconomic opportunities, who could be more susceptible to higher levels of pollution under those baseline conditions. As discussed in Section 2.4.5, further review of meteorological conditions and potentially air dispersion modeling for the relevant time period likely would be required to refine the air quality analysis which would help to determine whether the EJ concerns were exacerbated during those 5 days covered by the 202(c) authorization. BANC is not aware of any action taken by SMAQMD regarding NTT's permit exceedances.

4 Review of BANC Outreach and Emergency Communications

Review of BANC's Community Notice

Order No. 202-22-2 required BANC to "*inform all affected communities where the Covered Resource operates that BANC has been issued this Order, in a manner that ensures that as many members of the community as possible are aware of the Order, and explain clearly what the Order allows BANC to do, including potential impacts to the community where the Covered Resource is located and communities adjacent to the Covered Resource".*[23] BANC enlisted the support of the Sacramento Municipal Utility District (SMUD) to inform affected communities where the Covered Resource operates.

Emergency communications consist of four main components: 1) pre-emergency activities and preparations, 2) creating holding statement(s) during the emergency, 3) monitoring media and stakeholders during the emergency, and 4) post-emergency evaluations. ICF reviewed BANC's summary community outreach efforts related to the order period against this four-part framework. Our review, per the Statement of Work, was limited to documents provided by DOE and available on at the following link: Federal Power Act Section 202(c): BANC September 2022 | Department of Energy. The only additional document identified relative to community outreach is a 17-page document with the name "Final Report of the Balancing Authority of Northern California". Our comments are based on this document, specifically the section titled - Community Notice by Sacramento Municipal Utility District (SMUD) (see Appendix A).

4.1 Review of BANC's Community Engagement

In the summary of its community notice, BANC indicates that "SMUD posted a news release[24] on its website explaining that DOE had issued an order that allowed BANC to call on the Covered Resource through September 8, 2022, under certain conditions." Additionally, "after the issuance of the September 4 order, SMUD contacted customers in near proximity to the Covered Resource via automated phone calls."

[23] https://www.energy.gov/sites/default/files/2022-09/Order%20202-22-2%20Final%20for%20BANC%20.pdf
[24] https://www.smud.org/en/Corporate/About-us/News-and-Media/2022/2022/US-Department-of-Energy-power-generation-order

Based upon a review of BANC's community notice in support of DOE's Emergency Order No. 202-22-2, we found the approach — shown in the Appendix — to be compliant but lacking in efficacy.

In reviewing the communications and outreach channels that BANC employed to inform the impacted citizens of the Emergency Order, it is our assessment that the news release, posted only on the SMUD website, and subsequent automated phone calls were insufficient to reach a large portion of the impacted customers. Based upon an analysis from Critical Mention, it appears that the news release was not picked up by any media outlets, thus further limiting distribution to impacted customers.

Because of the limited information reported, it is unclear if there was additional targeted outreach, such as in-language communications, community event outreach, or communications specifically targeted at hard-to-reach or disadvantaged communities. As such, we offer the following information on best-practices to build a robust and effective emergency response communications strategy.

4.1.1 Strengthening Community Engagement

BANC's outreach effort appears to be only "one-way" communications. The Community Notice did not detail any methods or channels for questions or discussion among the communities or communicating partners. Our typical recommendation would be to include some follow-up with stakeholders to ensure they received and were able to, and did, disseminate the Emergency Order information. These partner organizations may also have events and other opportunities in which BANC could participate to best reach affected communities.

Further, none of the proposed communication tactics identified modes or timing for stakeholder feedback or dialogue, for example, contacting environmental justice organizations every two weeks after initial outreach, or contacting local government weekly after initial outreach. BANC may have planned to solicit such feedback in a separate effort, but nothing in BANC's community notice noted that any feedback or dialogue with stakeholders would happen. This kind of two-way dialogue is helpful in ensuring the impacted communities 1) understand the details of the Emergency Order, and 2) are given an opportunity to ask questions and provide feedback. BANC may have also considered holding community meetings in the impacted areas to allow for stakeholder input; such meetings would also likely garner media coverage.

Additional channels that may add important coverage would be to leverage more of the commercial media market – using public access television channels, as well submitting press releases and information to radio and television networks, to gain earned media coverage that would reach a broader segment of the impacted communities.

There may be language or cultural considerations for reaching the impacted communities that BANC needs to consider in its outreach plans. This was unclear in the current outreach effort information.

4.2 Additional Best Practices for Community Engagement during Emergencies

As previously referenced, successful emergency communications contain four main activities: 1) pre-emergency preparations, 2) creating a holding statement, 3) monitoring media and

stakeholders during the emergency, and 4) post-emergency evaluations. We offer the following observations based on these standard practices in emergency communications.

4.2.1 Pre-emergency Preparatory Activities

Primarily, we recommend having several systems and approaches developed prior to crisis events, so that when emergencies occur there are previously approved procedures and communications at the ready, saving time and expediting responses.

For the sake of speed, an organization should proactively draw up a template with potential emergency scenarios, designate the appropriate channels for communication, and then plug in the necessary information if the actual incident occurs. Emergency response communications generally need to be sent to various people in multiple departments. Potential audiences include government agencies and offices (state and local), specific companies or industries impacted by the incident, media, the community, elected officials, and other authorities. The need for cultural considerations e.g., language or manner of contact should also be identified. Modes and processes for follow-up with the various stakeholders during the emergency should also be determined, acknowledging the need for flexibility during the event.

There are unique features of each emergency that may require some communications to be tailored to that event. It is certainly possible that BANC had pre-prepared lists of entities that it tailored when it informed the community in which the covered resources are located about the emergency order. Based on best practice, BANC may consider an annual review of their emergency communications protocol in addition to annual automated messaging tests. BANC may also consider regularly reviewing and updating stakeholder contact information.

4.2.2 Create a Holding Statement

None of the BANC materials indicated that it had pre-prepared holding statements for this emergency order. In an emergency, when minutes count, saying “no comment” in the first wave of press coverage is not an option. To avoid a panic situation when crafting and securing internal approval for an initial response to media or community inquiries, the best practice is to have a holding statement at-the-ready.

The holding statement does not need to be lengthy, nor does it need to address all aspects of what the media is seeking. A few brief sentences grounded in accuracy, BANC’s values, and empathy should be the framework for the statement—and it should be issued quickly. Being timely is critical to controlling the narrative.

BANC may not have had all the information it needed but could let the media and public know that more information will be shared as it becomes available. This approach buys valuable time and credibility with key reporters and important stakeholders. The key is to communicate that the entity is on top of the situation and not making the situation worse.

To implement this strategy, a set of holding statements that address the most likely issues or emergencies should be drafted and pre-cleared through leadership. This will compress the amount of time needed to modify and secure final approval for the statement when the emergency occurs.

Increasingly, organizations communicate directly with affected communities through social media. Similar holding statements created for social media channels and directed at these communities could be developed and pre-cleared through leadership.

4.2.3 Media and Stakeholder Monitoring

It is not apparent that BANC established in advance of the emergency guidance on how media and community stakeholder monitoring would be executed. Once BANC executed its media plan, it would have had to start monitoring the media and communities' responses.

It is vital to establish a protocol in advance of any significant issue or emergency that guides how media and stakeholder monitoring/listening will be executed. The ability to evaluate and review the statements and information being articulated by stakeholders and presented through media channels will inform sound decision making as to whether to issue a holding statement, conduct a press interview, post an update on social media—or not comment publicly.

Each monitoring report should capture and summarize the sources, key articles and stories, amplification, tone/sentiment, reach of the journalists and stakeholders, and patterns of coverage from one report to the next. As social media becomes increasingly important and by-passes traditional media, it is also important to monitor the social media channels of communities affected by the emergency order. It is very possible that BANC had such established monitoring plans, however, they were not included in the materials available for us to review.

4.2.4 Analyzing Effectiveness of Communication

It is not apparent that BANC had a plan to analyze the effectiveness of its communication plan post-emergency. We did not have any materials that discussed whether or how such analysis was done.

It is useful to analyze the effectiveness of communications and engagement during the emergency (as much as possible) and certainly after the event. Providing emergency media coverage and stakeholder/community feedback on social media or through other channels could give BANC information on the effectiveness of its outreach. Such information received in a timely manner could allow for changes in outreach and/or communication efforts.

After an emergency, BANC should evaluate the effectiveness of its outreach. How did the communities and stakeholders feel about the communications? Did they feel informed in a timely manner? Were all the people impacted reached with the information they needed? What was done well? What could have been better? New insights from this post-emergency analysis that lead to improvements should be incorporated into subsequent emergency outreach plans.

4.3 Conclusions

Based on our review, we found BANC's community notice for DOE Order No. 202-22-2 to be compliant, but lacking efficacy. A formal emergency communications plan that establishes protocols for managing emergency situations would benefit BANC. The plan can help establish clear protocols for quickly developing an effective and comprehensive approach to engage and properly inform the impacted communities and stakeholders for emergency events.

The listed distribution channels were inadequate and could have included more public access and earned media channels. It was also unclear if the executed channels effectively reached a majority of impacted customers.

Tailored media, stakeholder, and community engagement are key components of successful emergency operations. It is possible that BANC has a detailed outreach and/or emergency

communications plan (not included in the package of materials posted on the DOE website) that includes the best-practices that we provide above.

APPENDIX A

The following information replicates in its entirety the community notice within BANC's Final Report of the Balancing Authority of Northern California.

Community Notice by Sacramento Municipal Utility District (SMUD)

Upon issuance of DOE's Order No. 202-22-2 on September 4, 2022, BANC enlisted the support of the Sacramento Municipal Utility District (SMUD) to inform affected communities where the Covered Resource operates.

On September 4, 2022, SMUD posted a news release on its website explaining that DOE had issued an order that allowed BANC to call on the Covered Resource through September 8, 2022, under certain conditions. The news release specified that the Covered Resource may be operated only during a grid emergency between the hours of 2 PM and 10 PM. It also explained that the order authorized generation that would otherwise be constrained by federal air permit limits.

On September 8, following the issuance of DOE's Amendment Number 1 to Order No. 202-22-2, SMUD posted an update on its website explaining the changes resulting from the modified order. In addition, after the issuance of the September 4 order, SMUD contacted customers in near proximity to the Covered Resource via automated phone calls. The calls, which were also placed on September 4, explained that the Covered Resource was participating in a state program to ease stress on the power grid and, if needed, may be called on to run backup generators between the hours of 2 PM and 10 PM.