B.F. Sisk Dam Safety of Dam Modification Project Environmental Impact Statement / Environmental Impact Report

Appendix C1: Detailed Air Quality Background Information

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Appendix C1
Detailed Air Quality Background Information

This appendix provides additional information on the regulatory setting associated with air quality standards.

C1.1 Regulatory Setting

C1.1.1 Federal

C1.1.1.1 Clean Air Act

Table C1-1 presents the current national ambient air quality standards (NAAQS) for the criteria pollutants. Ozone (O_3) is a secondary pollutant, meaning that it is formed in the atmosphere from reactions of precursor compounds under certain conditions. Primary precursor compounds that lead to formation of O_3 include volatile organic compounds (VOCs) and nitrogen oxides (NOx). Fine particulate matter with an aerodynamic diameter less than or equal to 2.5 microns can be emitted directly from sources (e.g., engines) or can form in the atmosphere from precursor compounds. Its precursor compounds in the area of analysis include sulfur oxides (SOx), NOx, VOCs, and ammonia.

Table C1-1. National Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Violation Criteria
O_3	8 Hour	0.070 ppm (137 µg/m^3)[1]	Same as Primary Standard	Annual fourth-highest daily maximum 8-hour concentration, averaged over three years
PM_{10}	24 Hour	150 µg/m^3	Same as Primary Standard	Not to be exceeded more than once per year on average over three years
$PM_{2.5}$	24 Hour	35 µg/m^3	Same as Primary Standard	98th percentile, averaged over three years
$PM_{2.5}$	Annual	12.0 µg/m^3	15 µg/m^3	Annual mean, averaged over three years

Pollutant	Averaging Time	NAAQS Primary	NAAQS Secondary	Violation Criteria
CO	1 Hour	35 ppm (40 mg/m^3)	N/A	Not to be exceeded more than once per year
CO	8 Hour	9 ppm (10 mg/m^3)	N/A	Not to be exceeded more than once per year
NO_2	1 Hour	100 ppb (188 µg/m^3)	N/A	98th percentile, averaged over three years
NO_2	Annual	53 ppb (100 µg/m^3)	Same as Primary Standard	Annual mean
SO_2	1 Hour	75 ppb (196 µg/m^3)	N/A	99th percentile of 1-hour daily maximum concentrations, averaged over three years
SO_2	3 Hour	N/A	0.5 ppm (1,300 µg/m^3)	Not to be exceeded more than once per year
SO_2	24 Hour	0.14 ppm (366 µg/m^3)[2]	N/A	Not to be exceeded more than once per year
SO_2	Annual	0.030 ppm (79 µg/m^3)[2]	N/A	Annual mean
Pb	Rolling 3-Month Average	0.15 µg/m	Same as Primary Standard	Not to be exceeded

Source: California Air Resources Board (CARB) 2016a.

Notes:

[1] On October 26, 2015, the EPA published a final rule to lower the 8-hour O_3 NAAQS to 0.070 parts per million (ppm). The final rule was effective on December 28, 2015 (80 Federal Register [FR] 65292).

[2] On June 22, 2010, the 24-hour and annual primary SO_2 NAAQS were revoked (75 FR 35520). The 1971 SO_2 NAAQS (0.14 parts per million [ppm] and 0.030 ppm for 24-hour and annual averaging periods) remain in effect until one year after an area is designated for the 2010 1-hour primary standard. The California Air Resources Board (CARB) recommended that all of California be designated attainment for the 1-hour SO_2 NAAQS (CARB 2011), but the U.S. Environmental Protection Agency (USEPA) has not yet finalized area designations.

Key:

µg/m^3 = micrograms per cubic meter; CAAQS = California Ambient Air Quality Standard; CO = carbon monoxide; mg/m^3 = milligrams per cubic meter; N/A = not applicable; NAAQS = National Ambient Air Quality Standard; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppb = parts per billion; ppm = parts per million; SO_2 = sulfur dioxide

C1.2.1.2 General Conformity

Section 176 (c) of the CAA (42 United States Code [USC 7506] [c]) requires any entity of the Federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable state implementation plan (SIP) required under Section 110 (a) of the Federal CAA (42 USC 7410[a]) before the action is otherwise approved. In this context, conformity means that such Federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving

expeditious attainment of those standards. Each Federal agency must determine that any action proposed that is subject to the regulations implementing the conformity requirements will, in fact, conform to the applicable SIP before the action is taken. This project is subject to the General Conformity Rule because it involves a Federal agency (United States Department of the Interior, Bureau of Reclamation [Reclamation]).

On April 5, 2010, the U.S. Environmental Protection Agency (USEPA) revised the general conformity regulations at 40 Code of Federal Regulations (CFR) 93 Subpart B for all Federal activities except those covered under transportation conformity (75 Federal Register [FR] 17254). The revisions were intended to clarify, streamline, and improve conformity determination and review processes, and to provide transition tools for making conformity determinations for new NAAQS. The revisions also allowed Federal facilities to negotiate a facility-wide emission budget with the applicable air pollution control agencies, and to allow the emissions of one precursor pollutant to be offset by the emissions of another precursor pollutant. The revised rules became effective on July 6, 2010.

The general conformity regulations apply to a proposed Federal action in a nonattainment or maintenance area if the total of direct[1] and indirect[2] emissions of the relevant criteria pollutants and precursor pollutants caused by the proposed action equal or exceed certain *de minimis* amounts, thus requiring the Federal agency to make a determination of general conformity. A Federal agency can indirectly control emissions by placing conditions on Federal approval or Federal funding.

Table C1-2 presents the *de minimis* amounts for nonattainment areas. The *de minimis* threshold for all maintenance areas is 100 tons per year (tpy), except for Pb, which has a *de minimis* threshold of 25 tpy.

[1] Direct emissions are those that are caused or initiated by the Federal action, and occur at the same time and place as the Federal action.

[2] Indirect emissions are reasonably foreseeable emissions that are further removed from the Federal action in time and/or distance, and can be practicably controlled by the Federal agency on a continuing basis (40 CFR 93.152).

Table C1-2. General Conformity *De Minimis* Thresholds

Pollutant	Classification of Emissions Type	*De Minimis* Threshold (tpy)
O_3 (VOCs or NOx)	Serious NAA	50
O_3 (VOCs or NOx)	Severe NAA	25
O_3 (VOCs or NOx)	Extreme NAA	10
O_3 (VOCs or NOx)	Other NAA	100
CO	n/a	100
SO_2	n/a	100
NO_2	n/a	100
PM_{10}	Moderate NAA	100
PM_{10}	Serious NAA	70
$PM_{2.5}$	Direct emissions	100
$PM_{2.5}$	SO_2 precursor	100
$PM_{2.5}$	NOx precursor	100
$PM_{2.5}$	VOC or ammonia precursor[1]	100
Pb	n/a	25

Source: 40 CFR 93.153.

Notes:

[1] Pollutant not subject to *de minimis* threshold if the State does not determine it to be a significant precursor to $PM_{2.5}$ emissions.

Key:

CO = carbon monoxide; n/a = not applicable; NAA = nonattainment area; NO_2 = nitrogen dioxide; NOx = nitrogen oxides; O_3 = ozone; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compounds

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to USEPA guidance (USEPA 1994), before any approval is given for a proposed action to go forward, the regulating Federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the proposed action. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with any analysis required under National Environmental Policy Act (NEPA). If the regulating Federal agency determines that the general conformity regulations do not apply to the proposed action (meaning the project emissions do not exceed the *de minimis* thresholds in a nonattainment or maintenance area), no further analysis or documentation is required.

If the general conformity regulations apply to the proposed action, the regulating Federal agency must next conduct a conformity evaluation in accord with the criteria and procedures in the implementing regulations, publish a draft determination of general conformity for public review, and then publish the final determination of general conformity. For a required action to meet the conformity determination emissions criteria, the total of direct and indirect emissions from the action must be in compliance or consistent with all relevant requirements and milestones

contained in the applicable SIP (40 CFR 93.158[c]), and in addition must meet other specified requirements, such as:

- For any criteria pollutant or precursor, the total of direct and indirect emissions from the action is specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration (40 CFR 93.158[a][1]); or

- For precursors of O_3, NO_2, or particulate matter, the total of direct and indirect emissions from the action is fully offset within the same nonattainment (or maintenance) area through a revision to the applicable SIP or a similarly enforceable measure that effects emission reductions so that there is no net increase in emissions of that pollutant (40 CFR 93.158[a][2]); or

- For O_3 or NO_2, the total of direct and indirect emissions from the action is determined and documented by the State agency primarily responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would not exceed the emissions inventory specified in the applicable SIP (40 CFR 93.158[a][5][i][A]); or

- For O_3 or NO_2, the total of direct and indirect emissions from the action (or portion thereof) is determined by the State agency responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, would exceed the emissions inventory specified in the applicable SIP and the State Governor or the Governor's designee for SIP actions makes a written commitment to USEPA for specific SIP revision measures reducing emissions to not exceed the emissions inventory (40 CFR 93.158[a][5][i][B]).

C1.1.2 State

Table C1-3 summarizes the California ambient air quality standards (CAAQS).

Table C1-3. California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	Violation Criteria
O_3	1-Hour	0.09 ppm (180 µg/m^3)	Not to be exceeded
O_3	8-Hour	0.070 ppm (137 µg/m^3)	Not to be exceeded
PM_{10}	24-Hour	50 µg/m^3	Not to be exceeded
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	Not to be exceeded
$PM_{2.5}$	Annual Arithmetic Mean	12 µg/m^3	Not to be exceeded
CO	1-Hour	20 ppm (23 mg/m^3)	Not to be exceeded
CO	8-Hour	9.0 ppm (10 mg/m^3)	Not to be exceeded
NO_2	1-Hour	0.18 ppm (339 µg/m^3)	Not to be exceeded
NO_2	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Not to be exceeded
SO_2	1-Hour	0.25 ppm (655 µg/m^3)	Not to be exceeded
SO_2	24-Hour	0.04 ppm (105 µg/m^3)	Not to be exceeded
Pb	30-Day Average	1.5 µg/m^3	Not to be equaled or exceeded
Visibility Reducing Particles	8-Hour	See Footnote 1	Not to be exceeded
Sulfates	24-Hour	25 µg/m^3	Not to be equaled or exceeded
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Not to be equaled exceeded
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m^3)	Not to be equaled exceeded

Source: CARB 2016a

Notes:

[1] In 1989, CARB converted both the general statewide 10-mile visibility and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and “extinction of 0.07 per kilometer” for the statewide and Lake Tahoe Air Basin standards, respectively.

Key:

µg/m^3 = micrograms per cubic meter; CAAQS = California ambient air quality standard; CO = carbon monoxide; Mg/m3 = milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SO_2 = sulfur dioxide

C1.1.3 Regional/Local

The current, USEPA-approved SIPs for each Federal nonattainment or maintenance pollutant in the SJVAPCD are summarized below:

- O_3 – *2007 Ozone Plan*, approved by USEPA for the 1997 8-hour O_3 NAAQS on April 30, 2012 (77 FR 12652)
- O_3 – *2013 Plan for the Revoked 1-Hour Ozone Standard*, approved by USEPA for the 1979 1-hour O_3 NAAQS on February 25, 2016 (81 FR 19492)

- CO – *Final Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas*, approved by USEPA on June 1, 1998 (63 FR 15305)[3]

- PM_{10} – *2007 PM_{10} Maintenance Plan and Request for Redesignation*, approved by USEPA on November 12, 2008 (73 FR 66759)

- $PM_{2.5}$ – *2008 $PM_{2.5}$ Plan*, partially approved by USEPA on January 9, 2012 (76 FR 69896). In this approval, the USEPA approved in part and disapproved in part SIP revisions to provide for attainment of the 1997 $PM_{2.5}$ NAAQS.[4]

The following plans were approved by CARB, but are still pending approval by the USEPA:

- O_3 – *2016 Ozone Plan for 2008 8-Hour Ozone Standard*, approved by CARB on July 21, 2016 and transmitted to USEPA on August 24, 2016 (CARB 2016b)

- $PM_{2.5}$ – *2015 Plan for the 1997 $PM_{2.5}$ Standard*, approved by CARB on May 21, 2015 and transmitted to USEPA on June 25, 2015 (CARB 2015a)

- $PM_{2.5}$ – *2012 $PM_{2.5}$ Plan*, approved by CARB for the 2006 $PM_{2.5}$ NAAQS on January 24, 2013. The plan was transmitted to the USEPA on March 4, 2013 and is pending approval (CARB 2015b).

The following plans were approved by the SJVAPCD Governing Board, but are still pending approval by CARB and the USEPA:

- $PM_{2.5}$ – *2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard*, approval pending a series of public workshops to assess further emission reductions; the last public meeting was held on September 28, 2017 (CARB 2017a)

[3] On July 22, 2004, CARB approved an update to the SIP with the *2004 Revisions to the Carbon Monoxide Maintenance Plan*, which was subsequently submitted to the USEPA for approval on November 8, 2004. Because the USEPA has not yet approved the update, the 1998 plan is the current SIP-approved plan.

[4] On August 28, 2013, the USEPA proposed to approve the SJVAB 1997 $PM_{2.5}$ Contingency Measures and published an interim-final rule to stay and defer sanctions (78 FR 53113).

The SJVAPCD is also in the process of developing an attainment strategy to address the various $PM_{2.5}$ NAAQS developed in 1997 (24-hour 65 µg/m^3 and annual 15 µg/m^3), 2006 (24-hour 35 µg/m^3), and 2012 (annual 12 µg/m^3). The SJVAPCD is holding a series of public advisory workshops to develop the strategy, with the last one held on November 14, 2017 (SJVAPCD 2017). Furthermore, the SJVAPCD is in the process of developing the 2017 PM_{10} Maintenance Plan to demonstrate maintenance of the NAAQS from 2020 to 2029 (SJVAPCD 2017).

C2.1 Monitoring Data – Criteria Pollutants

Air quality data from monitoring stations within the SJVAB near the San Luis Reservoir are summarized in Table C1-4. Multiple monitoring stations were used to estimate the ambient background concentrations of pollutants because not all pollutants were monitored at every station. Two monitoring stations were in Merced County, but additional data was obtained from Stanislaus County (Turlock station) and from Fresno County (North Front Street station) for CO and SO_2 because these pollutants are not monitored in Merced County. The closest representative monitoring stations were used in this table.

Table C1-4. Ambient Air Quality Monitoring Data

Pollutant [1]	2012	2013	2014	2015	2016	CAAQS	NAAQS
O_3 [2]							
Maximum concentration, 1-hour period, ppm	0.100	0.100	0.100	0.102	0.097	0.09	n/a
National standard design value, 8-hour period, ppm	0.083	0.081	0.081	0.082	0.082	n/a	0.07
California designation value, 8-hour period, ppm	0.09	0.088	0.092	0.092	0.09	0.07	n/a
CO [3]							
Maximum concentration 1-hour period, ppm	2.1	1.9	1.9	1.3	*	20	35
Maximum concentration 8-hour period, ppm	1.5	1.6	1.2	1	*	9	9
NO_2 [2]							
National standard design value, 1-hour period, ppm	0.038	0.039	0.041	0.038	0.036	n/a	0.1
California designation value, 1-hour period, ppm	0.05	0.05	0.05	0.05	0.05	0.18	n/a
National standard design value, annual average, ppm	0.007	0.008	0.008	0.007	0.007	n/a	0.053
California designation value, annual average, ppm	0.007	0.007	0.007	*	*	0.03	n/a

Pollutant [1]	2012	2013	2014	2015	2016	CAAQS	NAAQS
SO_2 [4]							
Maximum concentration 1-hour period, ppm	0.0088	0.0055	0.0067	0.0108	0.008	0.25	0.075
Maximum concentration 24-hour period, ppm	0.0023	0.0025	0.0027	0.0024	0.002	0.04	0.14
Annual arithmetic mean, ppm	0.00066	0.00059	0.00049	0.00051	0.00046	n/a	0.03
PM_{10} [5,6,7]							
Maximum national concentration 24-hour period, µg/m^3	89.4	77.4	88.3	97.2	64.3	n/a	150
Maximum state concentration 24-hour period, µg/m^3	89.4	80.5	92.7	94	64.5	50	n/a
Maximum annual state concentration, 3-year average, µg/m^3	30	30	*	31	31	20	n/a
$PM_{2.5}$ [2,6,7]							
Maximum national concentration 24-hour period, µg/m^3	50.7	75.1	64.5	61.2	43	n/a	35
National 2013 annual standard design value, µg/m^3	14.3	13.3	11.7	12.3	11.8	n/a	12
State annual designation value, µg/m^3	16	16	13	13	12	12	n/a

Source: CARB 2017b; USEPA 2017

Notes:

[1] An exceedance is not necessarily a violation. Violations are defined in 40 CFR 50 for NAAQS and 17 CCR 70200 for CAAQS.

[2] Data from Merced-South Coffee Avenue monitoring station.

[3] Data from Turlock-South Minaret Street monitoring station.

[4] Data from Fresno-North First Street monitoring station.

[5] Data from Merced-2334 M Street monitoring station.

[6] Statistics may include data that are related to an exceptional event.

[7] State and national statistics may differ for the following reasons: State statistics are based on California-approved samplers, whereas national statistics are based on samplers using Federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.

Key:

* = insufficient data was available to determine the value; µg/m^3 = micrograms per cubic meter; CAAQS = California ambient air quality standard; CO = carbon monoxide; n/a = not applicable; NAAQS = national ambient air quality standard; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; ppm = parts per million; SO_2 = sulfur dioxide

C.2 References

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