Engineering Evaluation Report
Northrop Grumman, Plant: 10861
401 East Hendy Ave, Sunnyvale, CA 94088
NSR Application #32164 and SMOP Application # 691904

Background
Northrop Grumman System Corporation of Sunnyvale, CA is applying for an Authority of Construct/Permit to Operate, and Modification to the Synthetic Minor Operating Permit for the following source:

S-1001 Wickes Boiler, Commercial/Institutional Boiler, 151 MMBtu/hr maximum capacity, equipped with Ultra Low NOx Burners and Flue Gas Recirculation, Natural Gas fired only
Abated by
A-160 Selective Catalytic Reduction System (SCR) with Oxidation Catalyst for S-1001

And to decommission

S-5 Wickes Boiler, Commercial/Institutional Boiler, 124 MMBtu/hr maximum capacity
Abated by
A-55 Selective Catalytic Reduction System (SCR) for S-5

In September 2012, S-5 was retrofitted to reduce the NOx emission level to meet the January 1, 2012 emission limit of 5 ppm NOx, dry at 3% in Regulation 9-7. S-5 has been operating continuously since September 2012.

Northrop Grumman (NG) recently noticed the efficiency of S-5 boiler is not as efficient as eleven years ago, and the boiler requires frequent upgrades to further improve the boiler efficiency, reduce fuel consumption, and improve NOx and CO emissions. Northrop Grumman will decommission S-5, 124 MMbtu/hr boiler and replace S-5 with a larger ultra low NOx burner boiler with a much improved Selective Catalytic Reduction System (SCR) with an oxidation catalyst, frequency driven air blower motor to control combustion air and dilution air, and mechanized modulating flue gas recycling system. The new S-1001 boiler will be required to achieve 2.5 ppmv NO_x and 50 ppmv CO at 3% oxygen at the exhaust atmospheric outlet, which will reduce the air pollution significantly and improve energy efficiency.

S-1001 is subject to Regulation 9-7-307.6, which requires NOx to be less than or equal to 5 ppmvd at 3% Oxygen and 400 ppmvd CO at 3% oxygen. The new S-1001 boiler will comply with Regulation 9-7-307.6.

S-1001 boiler generates steam used to perform acceptance testing of turbines at high speeds for the US Navy, which is a different process than most boilers in use at industrial facilities to generate electricity. The nature of the prototype development and the use of untested equipment required safety trips (shutdown and startup) to ensure the safety of personnel and equipment, including turbine overspeed protection and overvoltage. NG proposed 10 hours of startup and shutdown (1 shutdown and 1 startups per day) per day and 175 hours per year total. Each startup and shutdown period lasts 5 hours maximum.

The SMOP Application 691904 is being combined and evaluated along with this NSR Application 32164**.**

Emission Calculations:

Basis:
BAAQMD Standard Condition
Temperature = 70 ^{0}F or 530 ^{0}R
Pressure = 14.7 psia, or 29.92 inches of Hg, or 760 mmHg, or 1 atm
Relative humidity = 18%
Heating value of Natural Gas =1050 MMBtu/1MM cu.ft
Molar Specific Volume (V) of gas at T=70 ^{0}F and P = 14.7 psia
V_M= Molar Volume= 386.9 dscf/lb mole
MW= Molecular Weight of pollutant (i.e. 46.01 lbs of NO_2/mole or 28.0 lbs of CO/mole)
Exhaust flow rate of the Boiler = 43210 acfm or 34,535 dscfm

- Controlled NOx: Emission limit is assumed to be 2.5 ppmvd[1] @ 3 % O_2, Manufacturer's Guarantee = 0.003lb/MMBtu
- Controlled CO: Emission limit is assumed to be 50 ppmvd[2] @ 3% O_2, Manufacturer's Guarantee = 0.037 lb/MMBtu
- Below NOx and CO calculations for maximum daily emissions (10 hours of Startup and shutdown per Regulation 9-7-115.1 allowance and 14 hours of normal operation)

$$\left\{NOx = 0.003\frac{lb}{MMBtu} * 151\frac{MMBtu}{hr}\right\} = 0.453\ \frac{lb}{hr} * 14\ hr\ (normal\ operation) = 6.34\frac{lb\ NOx}{14\ hrs}$$

$$\left\{CO = 0.037\frac{lb}{MMBTU} * 151\frac{MMBTu}{hr} =\right\} = 5.586\ \frac{lb}{hr}\ * 14\ hr\ (normal\ operation) = 78.22\ \frac{lb\ CO}{14\ hrs}$$

- For Startup and shut down 10 hours/day, Uncontrolled NOx = 30 ppmvd @ 3%O2, Manufacturer's Guarantee = 0.036 lb/MMBtu; Uncontrolled CO = 50 ppmvd @3%O2 Manufacturer's Guarantee = 0.037 lb/MMBtu

$$NOx\ emission\ \left(\frac{lb}{10\ hours}\right) = \left\{0.036\frac{lb}{MMBtu} * 151\frac{MMBtu}{hr} * 10\ \frac{hr}{yr} = 54.36\ \frac{lb}{10\ hours}\ (Startup\ and\ Shutdown)\right\}$$

$$CO\ emission\ \left(\frac{lb}{10\ hours}\right) = \left\{0.037\frac{lb}{MMBtu} * 151\frac{MMBtu}{hr} * 10\ \frac{hr}{yr} = 55.87\frac{lb}{10\ hours}\ (startup\ and\ shutdow)\right\}$$

- For VOC/POC, SO_2, PM_{10} and $PM_{2.5}$, the emission factors from AP-42, Chapter 1.4 Combustion of natural gas, Table 1.4-2, Large Boiler controlled Flue Gas Regulation was used; SO_2 was based on 10,000 grains/MMscf.

  VOC/POC = 5.5 lb/MMscf during start up, shutdown period and normal operation (with SCR)
  PM10/PM2.5= 7.6 lb/MMscf during start up, shutdown period and normal operation with SCR)
  SO2 = 3 lb/MMScf during start up, shutdown period and normal operation (with SCR)

- Assume PM_{10} emissions = $PM_{2.5}$ emissions for combustion;
- Normal Operating Schedule: 24 hours a day at 8,760 hours per year
- For maximum daily emissions, per Regulation 9-7-115 allows 10 hours of Startup and Shutdown (SS) plus 14 hours of normal operation, and assuming this SS event (10 hours SS) happens 2 times per one day (1 start up and 1 shutdown period), each period is 5 hours. The 5 hours for startup are necessary (cold start from 40°F to 505°F) because the operator cannot increase more than 100°F per hour to maintain equal thermal growth of the boiler's drum, water tubes, superheater tubes, and SCR. Exceeding the manufacturer's recommended heat rates can lead to failure of components.
- Burner maximum power rating is 151 MMBtu/hour ;
- Natural gas: Heating Value of 1050 Btu/scf (BAAQMD default value);
- Natural Gas throughput = 1.32E07 therms/year;
- NH_3 concentration in the boiler exhaust is lower or equal to 5 ppmvd at 3% O_2 Manufacturer's guaranteed

1. Manufacturer's guaranteed 2.5 ppmvd NO_x - lowest emission factor for Natural Gas fired industrial boiler during normal operation with SCR control.
2. Manufacturer's guaranteed 50 ppmvd CO -lowest emission factor for Natural Gas fired industrial boiler during normal operation with SCR control..

Table 1. New Boiler S-1001Natural Gas Combustion Emissions

Criteria Pollutant	**Max. Daily Emission SS 10 hours (lbs/10 hours)**	**Max. Daily Emission Normal Operation with SCR (lbs/14 hours)**	**Max. Daily (10 hrs SS+14 hrs Normal Operation with SCR) (lbs/day)**	**Daily Emission Normal Operation with SCR, (lbs/day)**	**Annual Emission Normal Operation with SCR (lbs/yr)**	**Annual Emission Normal Operation without SS (tons/yr)**	**Annual Emission 175 hours SS (lbs/yr)**	**Annual Emission 175 hours SS (tons/yr)**
NOx	54.36	6.34	60.07	10.87	3968	1.984	4840	2.420
CO	55.87	78.22	134.09	134.09	48942	24.471	48,942	24.271
VOC/POC	7.91	11.07	18.98	18.98	6929	3.464	6929	3.464
PM_{10}	10.93	15.30	26.23	26.23	9574	4.787	9574	4.787

$PM_{2.5}$	10.93	15.30	26.23	26.23	9574	4.787	9574	4.787
SO_2	4.31	6.04	10.35	10.35	3779	1.890	3779	1.890
Ammonia			4.75 (10 hrs/day without SCR's NH_3 injection)	8.14	2969.96	1.485	2910.63 (175 hrs/yr without SCR's NH_3 injection)	1.455

Note: SS = Startup and Shutdown

Toxic Health Risk Assessment

The Health Risk Assessment (HRA) is required for new and modified sources when the emissions of toxic air contaminants (TACs) are at or exceed the trigger levels outlined in Regulation 2, Rule 5, Table 2-5-1. As shown in Table 2 below, an HRA is required S-1001.

Table 2. Air Toxic Emissions from S-1001

Toxic Air Contaminant (TAC)	Emission Factors (lb/MMBTU)	Hourly Emission lb/hr	Acute Trigger Level lb/hr	Trigger Y/N	Annual Emission lb/yr	Chronic Trigger Level lb/yr	Trigger Y/N
ACETALDEHYDE	4.22E-06	6.37E-04	2.10E-01	N	5.57E+00	2.90E+01	N
ACROLEIN	2.65E-06	4.00E-04	1.10E-03	N	3.50E+00	1.40E+01	N
ARSENIC	1.96E-07	2.96E-05	8.80E-05	N	2.59E-01	5.80E-01	N
BENZENE	7.84E-06	1.18E-03	1.20E-02	N	1.03E+01	2.90E+00	Y
BERYLLIUM	5.88E-09	8.88E-07	NA	N	7.76E-03	3.40E-02	N
CADMIUM	1.08E-06	1.63E-04	NA	N	1.42E+00	1.90E-02	Y
COPPER	8.33E-07	1.26E-04	4.40E-02	N	1.10E+00	NA	N
ETHYLBENZENE	9.31E-06	1.41E-03	NA	N	1.23E+01	3.30E+01	N
FORMALDEHYDE	2.17E-04	3.28E-02	2.40E+01	N	2.86E+02	9.00E+00	Y
n-HEXANE	6.18E-06	9.33E-04	NA	N	8.15E+00	2.70E+05	N
LEAD	4.90E-07	7.40E-05	NA	N	6.46E-01	2.90E-01	Y
MANGANESE	3.73E-07	5.63E-05	NA	N	4.92E-01	3.50E+00	N
MERCURY	2.55E-07	3.85E-05	2.70E-04	N	3.36E-01	2.10E-01	Y
NAPHTHALENE	5.98E-07	9.03E-05	NA	N	7.89E-01	3.30E-03	Y
NICKEL	2.06E-06	3.11E-04	8.80E-05	Y	2.72E+00	3.10E-01	Y
PAH (as benzo(a)pyrene-equiv.)	6.60E-09	9.97E-07	NA	N	8.71E-03	2.10E-01	N
PROPYLENE	7.17E-04	1.08E-01	NA	N	9.46E+02	1.20E+05	N
SELENIUM	1.18E-08	1.78E-06	NA	N	1.56E-02	8.00E+00	N
TOLUENE	3.59E-05	5.42E-03	2.00E+00	N	4.74E+01	1.60E+04	N

VANADIUM	2.25E-06	3.40E-04	1.30E-02	N	2.97E+00	NA	N
XYLENES	2.67E-05	4.03E-03	9.70E+00	N	3.52E+01	2.70E+04	N
Ammonia	5 ppmv @ 3%O_2	5.32E-01	7.1	N	4.66E+03	7.70E+03	N

Based on the emissions displayed above, a Health Risk Assessment is required for this application. There are no related projects within 5 years of this application.

The results from the HRA indicate that the project cancer risk is **2.3 in a million**, the maximum chronic hazard index is **0.094** and the acute hazard index is **0.019**. In accordance with District Regulation 2-5-301, the proposed source S-1001 requires TBACT because the estimated source risk exceeds the cancer risk of 1.0 in a million. Since the estimated project cancer risk does not exceed 10.0 in a million and hazard indices do not exceed 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements for projects not located within an Overburdened Community as defined in Regulation 2-1-243.

The toxic compounds that are most contributing to TBACT are metals (arsenic and cadmium). The Air District did not locate (within its jurisdiction or others) any other similar sources that are achieving a more stringent requirement than the use of PUC quality natural gas for TBACT. Source S-1001 will be using PUC quality natural gas only as imposed in permit Condition 100379, Part 1 to meet TBACT. In addition, S-1001 is also equipped with oxidation catalyst, which is expected to reduce the organic TAC emissions.

Cumulative Increase since April 5, 1991
Northrop Grumman at 401 East Hendy Ave, Sunnyvale, CA 94088 (Plant No. 10861) is an existing facility. Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 10861.

Table 3. Cumulative increases in tons/year

Criterial Pollutant	Existing Emissions (tons/year)	Application Emissions (tons/year)	Cumulative Emissions (tons/year)
NOx	2.2920	2.420	4.712
POC	3.7750	3.464	7.239
CO	2.3070	24.271	26.578
PM_{10}	1.9440	4.787	6.731
$PM_{2.5}$	0.0050	4.787	4.792
SO_2	0.0330	1.890	1.923

Statement of Compliance

Regulation 1: General Provisions and Definitions
All sources are subject to Regulation 1, Section 301, which prohibits the discharge of air contaminants resulting in a public nuisance. The proposed boilers are not expected to be a source of public nuisance.

Regulation 2, Rule 1: California Environmental Quality Act (CEQA) Requirements
This permit application is categorically exempt from CEQA because the project has no potential for causing a significant adverse environmental impact, or the application is categorically exempt from CEQA under CEQA Guidelines Sections 15301, specifically Class 1 exemption for existing facilities (also known as "No or Negligible expansion of existing use". In making the determination that this application is categorically exempt: 1) the Air District reviewed the CEQA-related Information from the applicant (Regulation 2-1-426-1) indicating that there is no potential for a significant adverse environmental impact from the project; 2) a formal health risk assessment was approved by the Air District; and 3) the Air District determined there are no unusual circumstances, or that the cumulative impacts from successive projects of the same type in the same place do not result in significant adverse environmental impacts. As required under Regulation 2-1-426.1, the applicant has included in its permit application CEQA-related information (CEQA Appendix H) that demonstrates with certainty that the project has no potential for resulting in any significant environmental impacts.

Regulation 2, Rule 1: School and Overburdened Communities Public Notice Requirements
The public notification requirements of Regulation 2-1-412 apply to new or modified sources which result in any increase in toxic air contaminant or hazardous air contaminant emissions at facilities within 1,000 feet of the boundary of a K-12 school or sources located within an Overburdened Community and require an HRA. The project is not within 1,000 feet of the boundary of a K-12 school. The facility is not located in an Overburdened Community, as defined in Regulation, Rule 1, section 243. Therefore, public notification under Reg. 2-1-412 is not required.

Regulation 2, Rule 2: Best Available Control Technology (BACT) Requirements
Based on the emission calculations above, the owner/operator of S-1001 is subject to BACT for the following pollutants: NOx, POC, CO, PM_{10}, $PM_{2.5}$, and SO_2 because these emissions exceed 10 lb/highest day.

Per Section 2-2-202, BACT is defined as an emission limitation, control device, or control technique applied at a source that is the most stringent of:

- the most effective device or technique successfully utilized,
- the most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source,
- the most effective emission control limitation for the type of equipment comprising such a source that is contained in an approved implementation plan of any state, or
- the most effective control device or technique or most stringent emission limitation that is technologically feasible, taking into consideration cost-effectiveness, any ancillary health and environmental impacts, and energy requirements.

These requirements are generally categorized as either technologically feasible and cost-effective (termed "BACT 1") or achieved-in-practice (termed "BACT 2"). BACT 2 is either equal to or less stringent than BACT 1. Because achieved-in-practice is required regardless of cost and BACT 1 is more stringent than BACT 2, an evaluation for what has been achieved-in-practice is first conducted.

__NOx and CO Control__

BACT 1 (Technologically Feasible and Cost-Effective)
The two post-combustion techniques that present the greatest likelihood of successful NOx reduction from the boiler S-1001 exhaust are selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR). Both SNCR and SCR utilize a reducing agent, such as ammonia or urea to convert NOx into molecular nitrogen (N2) and water (H2O). The chemical reactions that accomplish this conversion depend on the reducing agent and the presence of a catalyst. The best temperature at which the reactions occur for SNCR is between 1600-2000 ^{0}F. Thus, SNCR is not technologically feasible and not an effective control technology for the boiler that operates at a maximum temperature between 570-700 ^{0}F. Northrop Grumman proposed to use the more suitable SCR with oxidation catalyst, with precise negative feedback PID variable frequency control system on combustion air blower, ultra low NOx burner, and flue gas recirculation system as control equipment for the S-1001 boiler. The oxidation catalyst is also considered a BACT 1 technology for CO.

BACT *2 (Achieved in practice)*
BACT 1 for NOx has been determined in the Air District BACT Guideline, but it has not been updated since 2010. The Air District first surveyed other similar facilities to determine the BACT 2 level of control for sources similar to the S-1001 boiler. The latest BACT Clearinghouse from SMAQMD BACT determination date 02/09/2024 set to be the most stringent and can be achieved in practice with the following limits on NO_x and CO concentrations: NO_x concentration limit in boiler exhaust: 2.5 ppmv @ 3% O_2 or 0.003 lb/MMBtu and CO concentration limit in boiler exhaust: 50 ppmv @ 3% O_2 or 0.037 lb/MMBtu. The Air District did not locate (within its jurisdiction or others) any other similar sources that are achieving a more stringent limit for NOx than is included in the SMAQMD BACT. Therefore, BACT for Northrop Grumman for NOx will be the same emission limit not to exceed 2.5 ppmvd NOx @ 3% O_2.

For CO, Northrop Grumman proposed to use SCR with an oxidation catalyst, in which the manufacturer guaranteed to meet 50 ppmv @ 3% O_2 or 0.037 lb/MMBtu. The use of SCR can achieve a level lower than the proposed limits for CO. However, the lower CO emission limit would increase the NOx limit; therefore, to achieve the 2.5 ppm NOx at 3% O2, the vendor cannot guarantee the CO limit to go below 50 ppm. S-1001 cannot achieve the lower proposed CO limit due to the fact that it is a water tube boiler which typically has a larger CO emission footprint, and planned boiler operating conditions do not support temperatures required for catalyst oxidation at high and low fire. To achieve the lower than 50 ppmv @ 3% O_2 CO limit, the entire boiler system would require modifications to the burner and controls package, SCR, fan sizing, VFD, and boiler footprint in an effort to safely overcome the gas pressure drop resulting from the added catalyst needed to achieve a lower concentration (ppmv). During the tuning process RFMacDonold (manufacturer) can adjust air-fuel ratios to try and achieve better emission results, but there are no guarantees beyond the 50 ppmv and are not able to determine or guarantee a lower CO emissions rate. In addition, the Air District did not locate (within its jurisdiction or others) any other similar facilities that are achieving a more stringent limit for CO than the proposed limit of 50 ppmv @ 3% O_2 from SJVAPCD BACT guideline.

<u>POC Control</u>

BACT 1 (Technologically Feasible and Cost-Effective)
BACT 1 for POC is the use of either a carbon adsorption system or a thermal oxidizer. However, a carbon adsorption system is lower cost when compared to a thermal oxidizer. Using the EPA Carbon Adsorber Calculation Sheet- 8th edition (Nov. 2020) – the estimated cost of two fixed carbon beds in series is $706,724. The proposed total annualized cost of the carbon adsorption system is $158,435 based on 43,210 ACFM of the S-1001-151 MMBtu/hr Wickes Boiler. The annualized cost of the carbon adsorption would be more than $158,535 in 2023 because EPA's cost calculation spreadsheet is using 2021 utility and labor costs, which have increased. However, we will assume that the annualized cost of $158,535 for the carbon beds would cost the same as in 2024 for the purpose of this cost analysis.

<u>Cost Effectiveness Summary for Emissions of POC from S-1001</u>

	Carbon Adsorption System abates S-1001 Boiler
Total Annualized Costs	$165,689(EPA calculation spreadsheet-Nov. 2020)
ACFM	43,210 acfm
POC Destruction/Control Efficiency	98.5 %
Controlled POC 3.464 tpy x 0.985% = 3.41 tpy	
Cost Effectiveness $47,886/ton (see attached Appendix A- EPA spreadsheet)	

The cost of the carbon adsorption system abatement device exceeds the Air District's current $17,500/ton cost-effectiveness threshold and therefore it is not cost effective to implement an add-on POC abatement (BACT 1) for S-1001 Boiler abated by SCR.

BACT 2 (Achieved in practice)
This application is required to meet an achieved in practice BACT 2 limits for POC by using PUC quality natural gas as specified in SJVQMD BACT determination. S-1001 will be using exclusively PUC quality natural gas from PG&E.

The Air District did not locate (within its jurisdiction or others) any other similar facilities that are achieving a more stringent limit for POC than is included in the SJVQMD.

<u>SO_2, PM_{10} and $PM_{2.5}$ Control</u>

BACT 1 (Technologically Feasible and Cost-Effective)
The Air District did not locate any BACT1 requirement with add-on control through BACT's Clearing House search. The use of Pressure Swing Adsoption or scrubber may be able to reduce emissions, but it is unlikely to be cost-effective or technologically feasible. BACT 1 for SO_2, PM_{10} and $PM_{2.5}$ is the fuel selection and good combustion practices. Northrop Grumman plans to use PUC quality natural gas as specified in the latest SJVAQMD BACT Clearinghouse determination.

BACT 2 (Achieved in practice)
This application is required to meet an achieved in practice BACT 2 limits for SO_2, PM_{10} and $PM_{2.5}$ by using PUC quality natural gas as specified in SJVAQMD BACT determination. S-1001 will be using exclusively PUC quality natural gas from PG&E. The Air District did not locate (within its jurisdiction or others) any other similar sources

that are achieving a more stringent BACT level of control other than fuel selection for SO_2, PM_{10} and $PM_{2.5}$ that is included in the SJVAQMD BACT determination.

SJVAPCD Best Available Control Technology (BACT) Guideline 1.1.2*
Last Update: November 30, 2022

Natural gas or propane fired boilers/steam generators** with heat input rate greater than 20 MMBtu/hr

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NOx	2.5 ppmvd @ 3% O2 (0.003 lb/MMBtu)		
SOx	PUC quality natural gas or propane with LPG backup		
PM_{10}	PUC quality natural gas or propane with LPG backup		
CO	50 ppmvd @ 3% O2 (0.037 lb/MMBtu)		
VOC	PUC quality natural gas or propane with LPG backup		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

* This is a Summary Page for this Class of Source.
** This guideline is applicable to units fired solely on natural gas from a PUC or FERC regulated source or propane/LPG. This guideline is not applicable to Oilfield Steam Generators or Electric Utility Steam Generating Units.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Best Available Control Technology (BACT) Guideline

Source Category

Source:	**Boiler**	**Revision:**	**5**
		Document #:	**17.3.1**
Class:	**≥ 50 MMBtu/hr Heat Input**	**Date:**	**08/04/10**

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice	TYPICAL TECHNOLOGY
POC	1. n/d 2. n/s	1. n/d[f] 2. Good Combustion Practice[a]
NOx	1. n/d[b, c, d] 2. n.d[a, c, d]	1. Selective Catalytic Reduction (SCR) + Low NO_x Burners (LNB) + Flue Gas Recirculation (FGR) [b, c, d] 2. Ultra Low NO_x Burners (ULNB) + FGR [a, c, d]
SO_2	1. Natural Gas or Treated Refinery Gas Fuel w/ <.50 ppmv Hydrogen Sulfide and <100 ppmv Total Reduced Sulfur [a,c] 2. Natural Gas or Treated Refinery Gas Fuel w/ <100 ppmv Total Reduced Sulfur [a,c]	1. Fuel Selection[a,c] 2. Fuel Selection[a,c]
CO	1. 10 ppmv @ 3% O_2 Dry [f] 2. 50 ppmv @ 3% O_2 Dry [a, c, e]	1. Oxidation Catalyst [f] 2. Good Combustion Practice in Conjunction with SCR System or Ultra Low NO_x Burners and FGR [a, c, e]
PM_{10}	1. n/d 2. Natural Gas or Treated Refinery Gas Fuel [a,c]	1. n/d 2. Fuel Selection[a,c]
NPOC	1. n/a 2. n/a	1. n/a 2. n/a

References

a.	BAAQMD
b.	SCAQMD. Cost effectiveness evaluations shall be based on emissions from firing primary fuels but not emergency backup fuels.
c.	BACT limits apply to all fuels except for emergency backup fuel oil used during natural gas curtailment. For emergency backup fuel oil: BACT(1) for NOx and CO (achieved using LNB+FGR+SCR and GCP) is 25 ppmvd NOx @3%O2, 100 ppmvd CO @3%O2, and 5 ppmvd NH3 @ 3%O2 BACT(2) for NOx and CO (achieved using ULNB+FGR and GCP) is 40 ppmvd NO_x @3%O2 and 100 ppmvd CO @#%O2 BACT(2) for SO2 and PM10 is the use of low sulfur fuel with < 0.05 wt% S BACT(2) for POC is GCP
d.	NOx determination by Continuous Emission Monitor (3-hr average), or BAAQMD approved equivalent.
e.	CO determination by Continuous Emission Monitor (3-hr average), or BAAQMD approved equivalent.
f.	The BACT(1) CO limit does not apply to boilers smaller than 250 MMBTU/hr unless an oxidation catalyst is found to be cost effective for TBACT or POC Control.

Regulation 2, Rule 2: Offsets
The emissions increase from this application are 3.464 tons POC, maximum 3.203 tons of NOx, 4.787 tons PM_{10}, 1.890 tons SO_2 per year. Northrop Grumman is a Synthetic Minor Facility with the operating permit condition limit of 34.5 tons per year of POC, 34.5 tons per year of NOx, 95 tons per year of each PM_{10}, CO and SO_2 (Condition 14049, Part 1). The facility has a potential to emit more than 10 tons per year but less than 35 tons per year of POC and NOx and less than 100 tons per year of PM_{10}, $PM_{2.5}$ and SO_2.

Offsets shall be provided at a 1:1 ratio from Air District's Small Facility Banking account for any un-offset cumulative increase in emissions at the facility and any related sources since the baseline date determined in accordance with section 2-2-608 since the facility does not own any offsets. The Air District will provide the required offsets of 3.464 tons POC and 2.420 tons of NOx per year from the Small Facility Banking account for this application because the Potential to Emit is greater than 10 tons per year per Regulation 2-2-302 and the facility does not own any POC or NOx offsets.

Regulation 2, Rule 5: Health Risk Assessment Requirements
See Toxic Health Risk Assessment section above, which discusses Regulation 2-5 compliance.

<u>Regulation 2, Rule 6: Major Facility Review</u>
<u>The facility is subject to and in compliance with the Synthetic Minor Operating Permit (SMOP) as required in Regulation 2-6-310, in which the facility elected to accept enforceable permit conditions such that the facility satisfies the synthetic minor facility requirements.</u>

Regulation 6, Rule 1, "Particulate Matter – General Requirements"
The boiler is subject to and will comply with Regulation 6, Rule 1-301 and 302. Because S-1001 is fueled with natural gas, for any period aggregating more than three minutes in any hour, there shall be no visible emission as dark or darker than No. 1 on the Ringelmann Chart (Regulation 6-1-301) and no visible emission equal to or greater than 20% opacity (Regulation 6-1-302). The source is expected to comply with Regulation 6-1-305 since the particles from the source are not expected to be emitted in the amount causing annoyance to the public where the particles are large

enough to be visible as individual particles at the emission point, or of such size and nature as to be visible individually as incandescent particles.

The boiler is subject to and will comply with Regulation 6, Rule 1, Section 310 since it will be burning natural gas. From AP 42, Section 1.4, Table 1.4-2, default TSP emissions for natural gas are estimated at 7.6 E-6 lb/dscf of natural gas burned, which equates to an outlet grain loading of 0.053 gr/dscf. This rate is well below the Regulation 6-1-310 limit of 0.15 gr/dscf.

Regulation 9, Rule 1, "Inorganic Gaseous Pollutants – Sulfur Dioxide"
The boiler is subject to and will comply with Regulation 9, Rule 1, "Inorganic Gaseous Pollutants, Sulfur Dioxide," by combustion of natural gas. Combustion of natural gas is expected to produce an SO_2 concentration of no more than 1 ppmv of SO_2, thereby meeting the requirement of a maximum ground level concentration of 300 ppmv of SO_2, prescribed in Regulation 9-1-110.

Regulation 9, Rule 7, "Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters"
During natural gas firing, the boilers S-1001 will meet the following emission limits: 2.5 ppmv of NOx and 50 ppmv of CO in exhaust gases corrected to 3% O_2, dry basis per the manufacturer guarantee. This boiler's emissions are expected to comply with the NOx and CO emission limitations of Regulation 9, Rule 7, Section 307.6, which limits 5 ppmv of NOx and 400 ppmv of CO corrected to 3% O_2, dry basis.

Sections 9-7-403 – Initial Demonstration of Compliance and 9-7-506 – Periodic Testing
Source S-1001 is expected to comply with Sections 9-7-403 and 506, since the facility will be required to perform initial and annual source tests to verify that the source can meet the emission guarantee provided by the equipment manufacturer. The facility will also be installing NOx and CO CEMs in order to demonstrate compliance with both Regulation 9-7 and Regulation 2-2.

40 CFR Part 60, Subpart Db, Standard of Performance for Industrial Commercial Institutional Steam Generating Units construction after June 19, 1984
S-1001 is subject to Subpart Db for a steam generating unit with a heat input capacity greater than 100 MMBtu/hr.
S-1001 met the SO2 requirement of less than 0.02 lb/MMBtu of SO2 using natural gas (60.42b(k1)(1).
S-1001 met the SO2 requirement of less than 0.01 lb/MMBtu of NOx using natural gas (60.44b(a)(1)(i) with low heat release rate.

40 CFR Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, Institutional Boilers and Process Heaters
40 CFR Part 63, Subpart JJJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources
The NESHAP for Industrial-Commercial-Institutional Boilers and Process Heaters, 40 CFR, Part 63, Subpart DDDDD applies to boilers located at a facility that is a major source of HAPs. Since this facility is not major for HAPs, this regulation does not apply to the proposed boilers at this site.

On February 23, 2011, EPA issued a final rule to limit HAP emissions from new and existing industrial, commercial, and institutional boilers and process heaters located at area source facilities (sites that are not major sources of HAPs), 40 CFR, Part 63, Subpart JJJJJJ. This rule explicitly excludes "gas-fired" boilers and process heaters (§63.11195(e) and §63.11237). Therefore, the natural gas-fired boilers at this facility are not subject to this rule.

Synthetic Minor Condition #14049, Plant #10861
Amended by NSR Application #32164 and SMOP Application 691904 (April 2025) – Remove S-5 from existing Condition 14049 and add new Condition 100379 for S-1001 into SMOP. **Permit Condition #14049 will be updated to #100707.**

PERMITTED SOURCES

S8, Dry Filter Paint Spray Booth, Binks PFA
S9, Paint Spray Booth and Cure Booth

S10, Paint Spray Booth, Binks
S11, Paint Spray Booth, Binks NPB 10-10
S12, Paint Spray Booth, DeVilbiss
S13, Paint Spray Booth, DeVilbiss
S19-S21, Parts Washers, Graymills Model 300 S25, Dry Filter
Paint Spray Booth, Newcomb-McDonald S29, Paint Bake Oven,
Ross Air System, 1.25 MM BTU/hr max S31, Shot Blast Booth
(21-1)
S33, Dry Filter Down Draft Spray Booth, Binks
S34, Sand Blast Operation, Binks #1984
S37, Air Stripping Column
S41, Paint Booth, DeVilbiss Model #DR-X-1610-150
S56, Steam Generator, 410 MM BTU/hr, max
S57, Shot Blast Room
S59, Plastic Media Blast Facility, Aerolyte Model SC-2462
S61, Abrasive Blast Booth
S62, Composite Sanding Booth
S63, Rust Preventative Spray Booth
S106, Wipe Cleaning Operation, Building 11
S107, Wipe Cleaning Operation, Building 16
S108, Wipe Cleaning Operation, Building 21
S109, Wipe Cleaning Operation, Building 31
S111, Wipe Cleaning Operation, Building 33
S112, Wipe Cleaning Operation, Building 41
S113, Wipe Cleaning Operation, Building 44
S114, Wipe Cleaning Operation, Building 55
S115, Wipe Cleaning Operation, Building 61
S116, Wipe Cleaning Operation, Building 81
S118, Wipe Cleaning Operation, Building 134
S131, Heat Treat Oven, 14.4 MM BTU/hr, Bldg 61
S134, Automatic Blast Booth, Bldg 162
S135, Wipe Cleaning Operation, BTU/hr, Bldgs 123, 124, 162,
163 and 165
S136, Adhesive Coating Operations subject to Condition
No. 14692 Facility Wide, Equipped with
1.5 MMBTU/Hr, Adhesive Dryer, Natural Gas Powered
S138, Feedwater Heater, 12.3 MM BTU/hr
S139, Feedwater Heater, 12.3 MM BTU/hr
S152, Emergency Standby Generator
S153, Fire Pump Driver Engine
S155, Urethane Casting Machine
S156, Urethane Casting Machine
S157, Fire Pump Driver Engine
S158, Vapor Degreaser
S159, Emergency Generator
S160, Dry Filter Spray Booth
S161, Paint Spray Booth with Dry Filter
S162, Paint Spray Booth with Dry Filter
S163, Urethane Casting Machine
S166, Ultrasonic Bench Top Solvent Cleaner
S-1001, Wickes Boiler, Commercial/Institutional Boiler, 151 MMBtu/hr maximum capacity, equipped with Ultra Low NOx Burners and Flue Gas Recirculation, Natural Gas fired only abated by A-160

EXEMPT SOURCES
S122, Groundwater Treatment System (Reg 1-110.6)

S123, Fixed Roof Storage Tank (Reg 2-1-123.2)
S124, Ammonia Storage Tank (Reg 2-1-123.3.1) S128,
Superheater, 9.8 MM BTU/hr max, Twyman Model 2113-1 (Reg 2-1
-
114.2)
S129, Superheater, 7 MM BTU/hr max, Twyman Model 21182 (Reg
2-1-114.2)
S141, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S142, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S143, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S144, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S145, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S146, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S147, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S148, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S149, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S150, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S151, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S154, Steam Boiler (Pickling Process), 5.25 MM BTU/hr (Reg 2
-
1-114.2)

ABATEMENT DEVICES
A1, Diesel Particulate Filter
A32, Baghouse for S31
A34, Baghouse for S34
A55, Selective Catalytic Reduction System for S5
A56, SCR System for S56
A61, Dust Collector for S61
A124, Baghouse for S57
A125, Dust Collector for S59
A126, Ammonia Gas Scrubber for S124
A134, Dust Collector for S134
A135, Carbon Adsorption System for S9 A158, Carbon
Adsorption System for S158.
A-160, Selective Catalytic Reduction System (SCR) with Oxidation Catalyst for S-1001

This facility, Site #B0861, has a synthetic minor operating permit. This operating permit covers all equipment existing at this facility as of permit issuance. The sources and abatement devices are listed above.
The following conditions establish the federally enforceable permit terms that ensure this plant is classified as a Synthetic Minor Facility under District Regulation 2, Rule 6, Major Facility Review, and ensure it is not subject to the permitting requirements of Title V of the Federal Clean the Act as amended in 1990 and 40 CFR Part 70. All applications submitted by the applicant and all modifications to the plant's equipment after issuance of the synthetic minor permit must be evaluated to ensure that the facility will not exceed the synthetic minor general limits below, and that sufficient monitoring, recordkeeping, and reporting requirements are imposed to ensure enforceability of the limits.
Any revision to a condition establishing this plant's status

as a Synthetic Minor Facility or any new permit term that would limit emissions of a new or modified source for the purpose of maintaining the facility as a synthetic minor must undergo the procedures specified by Rule 2-6, section 423. The basis for the synthetic minor conditions is an emission limit of 95 tons per year for regulated air pollutants, an emission limit for a single hazardous air pollutant of 9 tons per year, and an emission limit for a combination of hazardous air pollutants of 23 tons per year. Any District conditions that do not establish this facility as a synthetic minor are marked with an asterisk. The facility must comply with all conditions, regardless of asterisks, and must comply with all District requirements for new and modified sources regardless of its status as a synthetic minor.

1. In no event shall the emissions from this site exceed any of the emission limits listed below. The owner/operator shall demonstrate compliance with these emission limits by complying with all emission limits, monitoring procedures, and record keeping requirements identified in Parts 4-16 below. (Basis: Regulation 2-6-423)

NOx	34.5 tons/year
CO	95 tons/year
POC	34.5 tons/year
PM10	95 tons/year
SO2	95 tons/year

Any Single HAP 9 tons/year
Combination of HAPs 23 tons/year

2. The owner/operator shall maintain the following records in a District approved log: a. Records of the date, type, and quantity of each VOC or HAP containing material distributed from the storerooms on an event basis, summarized monthly; b. Purchase records of the date, type, and quantity of materials containing VOCs or HAPs, which are not distributed from the storerooms (such as materials used for special projects), on an event basis, summarized monthly; and c. The date, quantity, and type of waste solvent (multiple or single component) collected for offsite recycle or disposal on an event basis, summarized monthly.

Summaries shall be completed within twenty business days after the end of each month. The log shall be retained for at least five years from the last date of entry and be available for review by the District upon request. (Basis: Cumulative Increase; Regulation 2, Rule 5, and Regulation 2-6-423.2.3)

3. The owner/operator shall calculate the monthly rolling 12 month sums of VOC, each HAP, and total HAP emissions from all coating and solvent usage operations each month. a. The calculations shall be based upon the quantities reported in Part 2 above, and the chemical composition information from Material Safety Data Sheets or other manufacturer content certifications. b. If the

records regarding the VOC (and/or HAP) content of waste
records regarding the VOC (and/or HAP) content of waste
solvent shipments are maintained as in Part 3(a), the VOC (and/or HAP) emissions calculated in Part 3(a) may be reduced by the quantity of material collected for recycle or disposal the previous month multiplied by the corresponding VOC (and/or HAP) content of the material. c. To adjust VOC emissions as described in Part 3(b), the VOC content of all offsite waste solvent shipments must be determined through a District approved lab analysis; likewise, to adjust HAP emissions, the specific HAP content must be determined through a District approved lab analysis. Analysis is not required for offsite disposal of single component waste or virgin material. d. Where analysis of the VOC (and/or HAP) content of waste solvent indicates a range of weight percents, rather than an exact percentage, the lowest figure of the range shall be used in the adjustment of VOC (and/or HAP) emissions in Part 3(b). e. The emission factor for VOCs and HAPs shall be one pound of VOC content and one pound of HAP per pound of HAP content, respectively. f. If a compound is both a HAP and a VOC, then it shall be included in the emission totals for both. The calculations shall be complete within twenty business days after the end of each month, shall be kept onsite for a period of five years, and shall be made available to District staff upon request. (Basis: Cumulative Increase; Regulation 2, Rule 5; and Regulation 2-6-423.2.3)

COMBUSTION EQUATIONS:

4. The owner/operator of S29, S56, S129, S131, S138, S139, S152, S154, and S1001 shall fire exclusively on natural gas, except that Sources S153 and S157, Fire Pump Driver Engines, and Source S159, Emergency Standby Diesel Generator may be fired on diesel fuel. (Basis:
Regulations 9-7-113, 9-8-331.3) (Basis: Cumulative Increase; BACT, 9-7-307.6)

5. The owner/operator of Sources S138 and S139 shall not exceed the following emissions limits:
NOx: 15 ppmv, dry, at 3% O_2
CO: 50 ppmv, dry, at 3% O_2
Upon the effective date for Regulation 9-7-307.3 as specified in Regulation 9-7-308, NOx emissions from Sources S138 or S139 shall not exceed 15 ppmv, dry at 3% O_2, except during startup and shutdown periods as defined in Regulations 9-7-219 through 220 and complying with Regulation 9-7-115. (Basis: Cumulative Increase; BACT, and Regulations 9-7-115, 9-7-307.3, and 9-7-308)

6. The owner/operator of the following sources shall not exceed the designated amounts of natural gas usage in any consecutive 12 month period
Source(s) Maximum Natural Gas Usage
Per Consecutive 12 month Period

S56 910 million standard cubic feet
S138/S139 90 million standard cubic feet combined (Basis: Regulation 2-6-423.2.3)

7. The owner/operator shall equip Sources S56 and S138/139 (combined) with a separate dedicated, standard natural gas meter to monitor the gas flow to each source. (Basis: Regulation 2-6-423.2.3)

8. Deleted (Skipped out)

9. Deleted. Duplicate with Part 7.
10. The facility wide natural gas usage shall not exceed 1,450 million standard cubic feet in any consecutive 12 month period. (Basis: Regulation 2-6-423.2.3)

11. * The owner/operator of Sources S153 and S157, Fire Pump Driver Engines, and S159, Emergency Standby Diesel Generator shall fire exclusively on diesel fuel having a sulfur content less than 0.0015% by weight. The sulfur content of the fuel oil shall be certified by the fuel oil vendor. (Basis:Title 17, CCR, 93115: CARB ATCM for Stationary Compression-Ignition Engines)

12. * Sources S153 and S157 shall only be operated to operate fire pump engines during fires or for reliability related activities. Operation for reliability related activities shall not exceed 34 hours for S153 and 34 hours for S157 in any calendar year. Operation while mitigating emergency conditions is subject to facility wide limits on diesel fuel usage set out in Part 18 below. (Basis: Title 17, CCR, 93115: CARB ATCM for Stationary Compression-Ignition Engines)

13. * Source S159, Emergency Standby Diesel Generator, shall only be operated to mitigate emergency conditions or for reliability related operations. Operation for reliability related activities shall not exceed 50 hours per year. Operation while mitigating emergency conditions is subject to facility wide limits on diesel fuel usage set out in Part 18 below. (Basis: Title 17, CCR, 93115: CARB ATCM for Stationary Compression-Ignition Engines)

14. *Emergency conditions are as defined in the CARB ATCM for Stationary Compression-Ignition Engines. (Basis: Title 17, CCR, 93115: CARB ATCM for Stationary Compression-Ignition Engines)

15. Reliability related activities are as defined in the CARB ATCM for Stationary Compression Ignition Engines. (Basis: Title 17, CCR, 93115: CARB ATCM for Stationary Compression-Ignition Engines)

16. The owner/operator of S153 and S157, Fire Pump Engines, and S159, Emergency Standby Diesel Generator, shall not exceed 40,000 gallons (combined) of diesel usage in any consecutive 12 month period for non-emergency use. (Basis: Regulation 2, Rule 5; Cumulative Increase; and Regulation 2-

6-423.2.3)

17. Facility wide diesel fuel usage for all activities
including any emergency use of S153, S157, or S159 shall not
exceed 220,000 gallons in any consecutive 12 month period.
(Basis: Regulation 2-6-423.2.3)

18. The owner/operator shall maintain the following records in a District approved log:
a. Monthly natural gas throughput to S-1001, S56, and S138/S139
on a source specific basis;
b. Monthly records of the natural gas usage for the remainder of the facility;
c. Monthly records of diesel deliveries for S153, S157, and
S159;
d. Total natural gas usage at S-1001,S56, and S138/S139
on a rolling 12 month basis;
e. Total diesel fuel usage at S153, S157, and S159 on a rolling 12 month basis for non-
emergency use;
f. Total diesel fuel usage at S153, S157, and
S159 on a rolling 12 month basis for all activities
including any emergency use;
g. For S159, hours of operation for the previous month. Records shall be retained for at
least five years from the last date of entry and shall be made available for review by the District upon request.
h. For S-1001, records of the total hours for each startup and/or shutdown per day. The hours shall be totaled over any consecutive 12 month period. Records of all requirements as referenced in Condition 100379.(Basis: Regulations 1-402; 1-
420; 1-441; 1-544; 2-6-423.2.3, 9-7-503; 9-8-530; Title 17, CCR, 93115: CARB
ATCM for Stationary Compression-Ignition Engines)

Permit condition No. 100379

1. The owner/operator of S-1001 shall operate this source on California Public Utility quality natural gas fuel exclusively. (basis: Cumulative Increase, BACT, TBACT)

2. The owner/operator of S-1001 shall exceed 36,240 therms per calendar day and/or 13,227,600 therms of natural gas fuel in any consecutive twelve-month period. The owner/operator shall equip Source S-1001 and A-160 with a properly installed, properly operated, and properly maintained per manufacturer's specifications a separate dedicated, standard natural gas meter to monitor the natural gas flow rate. (basis: Cumulative Increase, Regulation 2-6-423.2.3)

3. The owner/operator shall abate emissions from S-1001 with the properly maintained and properly operated per manufacturer's specifications abatement device A-160 during all periods of operation except for startup and shutdown of S-1001. A startup/shutdown ends/starts when the exit exhaust temperature of S-1001 reaches 380 degrees F. Each startup and shutdown period shall not exceed 5 hours. The owner/operator of S-1001 shall not exceed 10 hours for any startup and shutdown combined per calendar day. The owner/operator of S-1001 shall not exceed 175 hours of startups and shutdowns combined during any consecutive 12-month period. (basis: Regulation 9-7-115, Cumulative Increase)

4. The owner/operator of A-160 shall maintain the operating temperature of the A-160 catalyst between 380 degrees F and 800 F. (basis: Regulation 2-1-403, Cumulative Increase)

5. The owner/operator of A-160 shall properly install, properly operate, and properly maintain per manufacturer's specifications a continuous digital temperature gauge at A-160 to demonstrate compliance with part 4. The owner/operator shall install, and maintain in accordance with manufacturer's recommendations, a temperature measuring device that meets the following criteria: the minimum and maximum measurable temperatures with the device are 0 degrees F and 1,000 degrees F, respectively, and the minimum accuracy of the device over this temperature range shall be 1.0 percent of full-scale. (basis: Regulation 2-1-403, Cumulative Increase)

6. The owner/operator shall equip Source S-1001 and A-160with a properly installed, properly operated, and properly maintained per manufacturer's specifications continuous emissions monitors for NOx, CO, O_2 and continuous flow meter at the exhaust of A-160. The owner/operator of S-1001 and A-160 shall perform daily calibrations, quarterly audit and annual RATA tests for the NOx, CO and O2 CEMs in accordance with the Air District's Manual of Procedure. The owner/operator of S-1001 and A-160 shall perform annual RATA tests for the continuous flow monitor in accordance with the Air District's Manual of Procedure.. (Basis: Regulation 2-1-403, Regulation 1-522 CEM, Regulation 2-6-423.2.3)

7A. The owner/operator of S-1001 shall ensure that all of the following mass emission limits are not exceeded during normal operation with SCR in operation and without any startups and/or shutdowns:

Pollutant	pounds/calendar day	tons per year
NO_x	10.87	1.984
CO	134.09	4.471
SO_2	10.35	1.890
POC	18.98	3.464
$PM_{10}/PM_{2.5}$	26.23	4.787
NH3	8.14	1.485

[Basis: BACT, Cumulative Increase]

7B. The owner/operator of S-1001 shall ensure that all of the following mass emission limits are not exceeded during periods that include the maximum permitted allowance for startups and shutdowns per part 3:

Pollutant	pounds/calendar day	tons per year
NO_x	60.70	3.203
CO	134.09	25.039
SO_2	10.35	1.890
POC	18.98	3.464
$PM_{10}/PM_{2.5}$	26.23	4.787
NH3	4.75	1.455

[Basis: BACT, Cumulative Increase]

7C. In the event that the owner/operator of S-1001 operates on days with a startup or shutdown but is less than maximum 10 hours allowed, the daily emissions limits shall be determined by using the emissions factors in part 8A multiplied by the hours of normal operation (i.e., no startup/shutdown) plus the actual hours of operation during startup and/or shutdown multiplied by the emissions factors in part 8B. The owner/operator shall not exceed these limits on these days. Similarly, for the consecutive 12 month period emissions limits for consecutive 12 month periods that have less than the maximum 175 hours of startups and/or shutdowns, the maximum consecutive 12 month period emissions limits shall be determined by multiplying the hours of operation of normal operation during the consecutive 12 month period by the normal emissions factors in part 8A plus the hours of startup and shutdown for the consecutive 12 month period multiplied by the emissions factors in part 8B. The owner/operator of S-1001 shall not exceed these emissions limits during that consecutive 12 month period.

The owner/operator of S-1001 shall demonstrate compliance with these limits using the Air District approved methodologies specified in part 9f.
[Basis: BACT, Cumulative Increase]

8A. The owner/operator of Sources S-1001 shall not exceed any of the following emissions limits during normal operation with SCR in operation and without any startups and shutdowns:

NOx: 2.5 ppmv, dry, at 3% O2 and/or 0.003 lb/MMBtu

CO: 50 ppmv, dry, at 3% O2 and/or 0.037 lb/MMBtu
VOC/POC: 5.24 E-3 lb/MMBtu
$PM_{10}/PM_{2.5}$: 7.24E-3 lb/MMBtu
SO_2: 2.86E-3 lb/MMBtu NH_3: 5 ppmv, dry, at 3% O2 and/or 0.00225 lb/MMBtu
(basis: BACT, Cumulative Increase)

8B. The owner/operator of Sources S-1001 shall not exceed any of the following emissions limits during startup and shutdown periods:
NOx: 0.036 lb/MMBtu
CO: 0.037 lb/MMBtu
VOC/POC: 5.24 E-3 lb/MMBtu
$PM_{10}/PM_{2.5}$: 7.24E-3 lb/MMBtu
SO_2: 2.86E-3 lb/MMBtu
NH_3: 0.00131 lb/MMBtu
(basis: BACT, Cumulative Increase)

9. To determine compliance with the above parts, the owner/operator of S-1001 and A-160 shall maintain the following in an Air District approved log:

a. Daily and monthly records of natural gas consumption at S-1001
b. Date and time and number of hours for all individual startups and shutdowns
c. Date of each catalyst replacement
d. All source test results
e. Daily readings (at least once per day during operation of S-1001 and A-160) of stack O2 level, NH3 injection flow rate, steam flow, pressure, time and firing rate (MMBtu/hr)
f. Emission calculations and Air District-approved monitoring that demonstrates compliance with Parts 7A, 7B, 7C, and Parts 8A and 8B of this permit condition using properly installed, properly maintained, properly calibrated and properly operated per manufacturer's specification an Air District-approved or certified continuous emission monitor (CEM) for NOx, CO, exhaust flow rate and O_2, and use Air-District approved initial and/or latest annual source test results (activity-based emissions factors) for POC, $PM_{10}/PM_{2.5,}$ and SO_2.

To estimate the daily and annual mass emissions for NOx, CO, the owner/operator shall convert the average hourly CEM concentrations (ppmv) of NOx and CO into hourly mass emissions using the hourly exhaust flow rate (MMdscf/hr). The hourly mass emissions shall be totaled on a daily, monthly, and annual basis. To estimate the daily and annual mass emissions for POC, $PM_{10}/PM_{2.5,}$ and SO_2, the owner/operator shall multiply the latest source test's activity-based emissions factors by the daily (MMBtu/day) natural gas and annual (MMBtu/yr) natural gas usages, respectively.
g. All CEM data for NOx, CO, O2, and exhaust flow rate.

These logs shall be kept for at least 5 years from the date of entry and shall be made available to the Air District upon request. (basis: recordkeeping, Regulation 2-1-403, Regulation 2-6)

10. To demonstrate compliance with Parts 8A and 8B, the owner/operator of S-1001 and A-160 shall use the NOx and CO CEM data with the exhaust flow rate data. If the NOx and/or CO CEM data are unavailable, the owner/operator shall use the source test results for NOx and/or CO. The source test results for NOx, CO, POC, NH_3, $PM_{10}/PM_{2.5,}$ and SO_2 shall be converted to an activity based emission factor from the measured emissions and the activity usage during the source test (e.g. pounds per million Btu or pounds pollutant per standard cubic feet of natural gas fired at S-1001). (Basis: Regulation 2-1-403, Cumulative Increase)

11. Not later than 60 days from the startup of S-1001 and annually thereafter, the owner/operator shall conduct Air District approved source tests during startup/shutdown and normal operations for NOx, CO, POC, $PM_{10}/PM_{2.5,}$ SO_2 and NH_3 to determine initial, daily, and

annual compliance with the limits in Parts 7A, 7B, 8A and 8B during startup/shutdown and normal operating modes. Testing frequency shall be no less than 10 months and no more than 13 months from the last test date.

.

The owner/operator shall comply with all applicable testing requirements as specified in the District's Manual of Procedures. The owner/operator shall notify the Air District's Source Test Section, in writing, of the source test protocols and projected test dates at least 30 days prior to testing. The owner/operator shall submit the source test results of S-1001 to the Air District's Source Test Section no later than 60 days after the source test. The results shall be maintained onsite for five years from the date of the test and shall be made available for review by the Air District upon request. (Basis: BACT, Regulation 2-1-403, 40 CFR 60 Subpart Db, and Regulations 2-6-423.2.3 and 9-7-506, Cumulative Increase)

12. The owner/operator of source S-5 Boiler shall completely shutdown the equipment no later than 90 days after start-up of source S-1001 Boiler. The owner/operator shall submit the shutdown form for S-5 to the Air District and enter into the record log the date when the unit was shutdown and submit startup form for S-1001when started up.
(Basis: Regulation 2-2-206)

13. The owner/operator of S-1001 and A-160 shall not exceed 34,535 dscfm air flow rate at the exhaust of A-160. The owner/operator of S-1001 and A-160 shall not exceed 18,152 MMdscf of air flow rate at the exhaust of A-160 in any consecutive 12-month period. (basis: Cumulative Increase)

RECOMMENDATIONS

The purposed project is expected to comply with all applicable Air District requirements. I recommend issuing the Authority to Construct and a change of condition to the Synthetic Minor Operating Permit for the following sources:

S-1001 Wickes Boiler, Commercial/Institutional Boiler, 151 MMBtu/hr maximum capacity, equipped with Ultra Low NOx Burners and Flue Gas Recirculation, Natural Gas fired only,
abated by A-160 Selective Catalytic Reduction System (SCR) with oxidation catalyst

And to decommission S-5 and A-55 after the replacement boiler S-1001 and SCR A-160 startup

S-5 Wickes Boiler, Commercial/Institutional Boiler, 124 MMBtu/hr maximum capacity, abated by A-55 Selective Catalytic Reduction System (SCR)

Prepared by: Thuya Maw, Air Quality Engineer
Date: Wednesday, July 2, 2025

Appendix A. Cost Analysis for POC/VOC

Cost Estimate

Capital Costs

Estimated capital costs for a Carbon Canister Adsorber with Canister Replacement with the following characteristics:

VOC Controlled/Recovered = Isopropyl Alcohol
Adsorber Vessel Orientation = Not Applicable
Operating Schedule = Not Applicable

Total Capital Investment (TCI) (in 2021 dollars)			
Parameter	**Equation**	**Cost**	
Total Cost for All Carbon Adsorber Canisters (EC_{Adsorb}) =	Canister Cost x Number of Canisters Required =	$95,000	
Auxiliary Equipment (EC_{aux}) =	(Based on design costs or estimated using methods provided in Section 2)	$30,000	
Total Purchased Equipment Costs for Carbon Adsorber (A) =	= EC_{Adsorb} + EC_{aux} =	$125,000	
Instrumentation =	0.10 × A =	$12,500	
Sales taxes =	0.03 × A =	$3,750	
Freight =	0.05 × A =	$6,250	
	Total Purchased Equipment Costs (B) =	$135,000	

Installation Costs (in 2021 dollars)			
Parameter	**Equation**	**Cost**	
Installation =	0.20 × B =	$27,000	
Site Preparation (SP) =		$50,000	
Buildings (Bldg) =		$30,000	
	Total Direct and Indirect Installation Costs =	$107,000	
Contingency Cost (C) =	CF(Purchase Equipment Cost + Installation costs)=	$12,100	
Total Capital Investment (TCI) =	**Purchace Equipment Costs + Installation Costs + Contingency Costs =**	**$254,100**	**in 2021 dollars**

Annual Costs

Direct Annual Costs			
Parameter	**Equation**	**Cost**	
Maintenance Costs:	0.06 x TCI	$15,246	
Carbon Canister Replacement Costs:	Installation Cost = 0.2 x Number of Canisters x Cost per canister x Number of times replaced/year =	$19,000	
	Canisters = number of canisters x Cost per canister x 1.08 x Number of times replacemed/year =	$102,600	
Direct Annual Costs (DAC) =		**$136,846**	**in 2021 dollars**

Indirect Annual Costs			
Parameter	**Equation**	**Cost**	
Administrative Charges	= 2% of TCI	$5,082	
Property Taxes	= 1% of TCI	$2,541	
Insurance	= 1% of TCI	$2,541	
Capital Recovery	= CRFAuxiliary Equipment × (TCI - 1.08(Canister Costs)) =	$18,679	
Indirect Annual Costs (IAC) =		**$28,843**	**in 2021 dollars**
Total Annual Cost (TAC) =	**DAC + IAC =**	**$165,689**	**in 2021 dollars**

Cost Effectiveness

Cost Effectiveness			
Parameter	**Equation**	**Cost**	
Total Annual Cost =	TAC =	$165,689	per year in 2021 dollars
Annual Quantity of VOC Removed =	$W_{voc} = m_{voc} \times \Theta_s \times E$ =	3.46	tons per year
Cost Effectiveness =	Total Annual Cost (TAC) / Annual Quantity of VOC Removed/Recovered =	$47,886	per ton of pollutants removed in dollars

Appendix B
Revision of Synthetic Minor Operating Permit (SMOP) Application

The following changes were made to Northrop Grumman's SMOP:

- Preamble of permitted sources of Condition 14049.
- Deleted any mentioning of S-5 and A-55 in Condition, Parts 4a, 5a through 5f, 6, 7, 9, and 18h, i, j, as marked above in the evaluation.
- Adding new Condition 100379 for S-1001 Boiler and A-160 SCR.

SMOP Condition 14049 – Northrop Grumman
PERMITTED SOURCES

S8, Dry Filter Paint Spray Booth, Binks PFA
S9, Paint Spray Booth and Cure Booth
S10, Paint Spray Booth, Binks
S11, Paint Spray Booth, Binks NPB 10-10
S12, Paint Spray Booth, DeVilbiss
S13, Paint Spray Booth, DeVilbiss
S19-S21, Parts Washers, Graymills Model 300 S25, Dry Filter
Paint Spray Booth, Newcomb-McDonald S29, Paint Bake Oven,
Ross Air System, 1.25 MM BTU/hr max S31, Shot Blast Booth
(21-1)
S33, Dry Filter Down Draft Spray Booth, Binks
S34, Sand Blast Operation, Binks #1984
S37, Air Stripping Column
S41, Paint Booth, DeVilbiss Model #DR-X-1610-150
S56, Steam Generator, 410 MM BTU/hr, max
S57, Shot Blast Room
S59, Plastic Media Blast Facility, Aerolyte Model SC-2462
S61, Abrasive Blast Booth
S62, Composite Sanding Booth
S63, Rust Preventative Spray Booth
S106, Wipe Cleaning Operation, Building 11
S107, Wipe Cleaning Operation, Building 16
S108, Wipe Cleaning Operation, Building 21
S109, Wipe Cleaning Operation, Building 31
S111, Wipe Cleaning Operation, Building 33
S112, Wipe Cleaning Operation, Building 41
S113, Wipe Cleaning Operation, Building 44
S114, Wipe Cleaning Operation, Building 55
S115, Wipe Cleaning Operation, Building 61
S116, Wipe Cleaning Operation, Building 81
S118, Wipe Cleaning Operation, Building 134
S131, Heat Treat Oven, 14.4 MM BTU/hr, Bldg 61
S134, Automatic Blast Booth, Bldg 162
S135, Wipe Cleaning Operation, BTU/hr, Bldgs 123, 124, 162,
163 and 165
S136, Adhesive Coating Operations subject to Condition
No. 14692 Facility Wide, Equipped with
1.5 MMBTU/Hr, Adhesive Dryer, Natural Gas Powered
S138, Feedwater Heater, 12.3 MM BTU/hr
S139, Feedwater Heater, 12.3 MM BTU/hr
S152, Emergency Standby Generator

S153, Fire Pump Driver Engine
S155, Urethane Casting Machine
S156, Urethane Casting Machine
S157, Fire Pump Driver Engine
S158, Vapor Degreaser
S159, Emergency Generator
S160, Dry Filter Spray Booth
S161, Paint Spray Booth with Dry Filter
S162, Paint Spray Booth with Dry Filter
S163, Urethane Casting Machine
S166, Ultrasonic Bench Top Solvent Cleaner
S1001, Boiler Wickes Boiler, Commercial/Institutional Boiler, 151 MMBtu/hr maximum capacity, equipped with Ultra Low NOx Burners and FGR, Natural Gas fired only, abated by A-160 SCR and Oxidation Catalyst

EXEMPT SOURCES
S122, Groundwater Treatment System (Reg 1-110.6)
S123, Fixed Roof Storage Tank (Reg 2-1-123.2)
S124, Ammonia Storage Tank (Reg 2-1-123.3.1) S128,
Superheater, 9.8 MM BTU/hr max, Twyman Model 2113-1 (Reg 2-1
-
114.2)
S129, Superheater, 7 MM BTU/hr max, Twyman Model 21182 (Reg
2-1-114.2)
S141, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S142, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S143, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S144, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S145, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S146, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S147, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S148, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S149, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S150, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S151, Paint Gun Washer, <50 g/l VOC solvent (Reg 2-1-118.4)
S154, Steam Boiler (Pickling Process), 5.25 MM BTU/hr (Reg 2
-
1-114.2)

ABATEMENT DEVICES
A1, Diesel Particulate Filter
A32, Baghouse for S31
A34, Baghouse for S34
A55, Selective Catalytic Reduction System for S5
A56, SCR System for S56
A61, Dust Collector for S61
A124, Baghouse for S57
A125, Dust Collector for S59
A126, Ammonia Gas Scrubber for S124
A134, Dust Collector for S134
A135, Carbon Adsorption System for S9 A158, Carbon
Adsorption System for S158.
A160 Selective Catalytic Reduction System (SCR) with oxidation catalyst abating S-1001 Boiler

This facility, Site #B0861, has a synthetic minor operating permit. This operating permit covers all equipment existing at this facility as of permit issuance. The sources and abatement devices are listed above.

The following conditions establish the federally enforceable permit terms that ensure this plant is classified as a Synthetic Minor Facility under District Regulation 2, Rule 6, Major Facility Review, and ensure it is not subject to the permitting requirements of Title V of the Federal Clean the Act as amended in 1990 and 40 CFR Part 70. All applications submitted by the applicant and all modifications to the plant's equipment after issuance of the synthetic minor permit must be evaluated to ensure that the facility will not exceed the synthetic minor general limits below, and that sufficient monitoring, recordkeeping, and reporting requirements are imposed to ensure enforceability of the limits.
Any revision to a condition establishing this plant's status as a Synthetic Minor Facility or any new permit term that would limit emissions of a new or modified source for the purpose of maintaining the facility as a synthetic minor must undergo the procedures specified by Rule 2-6, section 423. The basis for the synthetic minor conditions is an emission limit of 95 tons per year for regulated air pollutants, an emission limit for a single hazardous air pollutant of 9 tons per year, and an emission limit for a combination of hazardous air pollutants of 23 tons per year. Any District conditions that do not establish this facility as a synthetic minor are marked with an asterisk. The facility must comply with all conditions, regardless of asterisks, and must comply with all District requirements for new and modified sources regardless of its status as a synthetic minor.

1. In no event shall the emissions from this site exceed any of the emission limits listed below. The owner/operator shall demonstrate compliance with these emission limits by complying with all emission limits, monitoring procedures, and record keeping requirements identified in Parts 4-16 below. (Basis: Regulation 2-6-423)

NOx	34.5 tons/year
CO	95 tons/year
POC	34.5 tons/year
PM10	95 tons/year
SO2	95 tons/year

Any Single HAP 9 tons/year
Combination of HAPs 23 tons/year

2. The owner/operator shall maintain the following records in a District approved log: a. Records of the date, type, and quantity of each VOC or HAP containing material distributed from the storerooms on an event basis, summarized monthly; b. Purchase records of the date, type, and quantity of materials containing VOCs or HAPs, which are not distributed from the storerooms (such as materials used for special projects), on an event basis, summarized monthly; and c. The date, quantity, and type of waste solvent (multiple or single component) collected for offsite recycle or disposal on an event basis, summarized monthly.

Summaries shall be completed within twenty business days after the end of each month. The log shall be retained for at least five years from the last date of entry and be available for review by the District upon request. (Basis: Cumulative Increase; Regulation 2, Rule 5, and Regulation 2-6-423.2.3)

3. The owner/operator shall calculate the monthly rolling 12 month sums of VOC, each HAP, and total HAP emissions from all coating and solvent usage operations each month. a. The calculations shall be based upon the quantities reported in Part 2 above, and the chemical composition information from Material Safety Data Sheets or other manufacturer content certifications. b. If the records regarding the VOC (and/or HAP) content of waste records regarding the VOC (and/or HAP) content of waste solvent shipments are maintained as in Part 3(a), the VOC (and/or HAP) emissions calculated in Part 3(a) may be reduced by the quantity of material collected for recycle or disposal the previous month multiplied by the corresponding VOC (and/or HAP) content of the material. c. To adjust VOC emissions as described in Part 3(b), the VOC content of all offsite waste solvent shipments must be determined through a District approved lab analysis; likewise, to adjust HAP emissions, the specific HAP content must be determined through a District approved lab analysis. Analysis is not required for offsite disposal of single component waste or virgin material. d. Where analysis of the VOC (and/or HAP) content of waste solvent indicates a range of weight percents, rather than an exact percentage, the lowest figure of the range shall be used in the adjustment of VOC (and/or HAP) emissions in Part 3(b). e. The emission factor for VOCs and HAPs shall be one pound of VOC content and one pound of HAP per pound of HAP content, respectively. f. If a compound is both a HAP and a VOC, then it shall be included in the emission totals for both. The calculations shall be complete within twenty business days after the end of each month, shall be kept onsite for a period of five years, and shall be made available to District staff upon request. (Basis: Cumulative Increase; Regulation 2, Rule 5; and Regulation 2-6-423.2.3)