APPLICANT'S NAME: Northrop Grumman Space and Mission Systems Corporation

FACILITY PERMIT ID# 800409

CONTACT PERSON: ANTONIO S. LU

MAILING ADDRESS: ONE SPACE PARK DRIVE,
BLDG CS1/1800
REDONDO BEACH, CA 90278

EQUIPMENT ADDRESS: ONE SPACE PARK DRIVE,
BLDG M3/1153
REDONDO BEACH, CA 90278

Title V Permit Revision:
Application No. 537869

PERMIT TO OPERATE
Section D

Equipment Description:

PROCESS 3: MILLING OPERATIONS **SYSTEM #1: MACHINING EQUIPMENT**					
Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
CUTTER, HEIAN CNC ROUTER, MODEL HC-131PMC Reference A/N 542010	D341	C350		PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11
CUTTER, ACCUROUTER CNC ROUTER, MODEL SERIES 30 Reference A/N 484387	D345	C350		PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11
CUTTER, FADAL CNC MILL, MODEL VMC6030 HT Reference A/N 484388	D346			PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11
CUTTER, FADAL CNC MILL, MODEL 914VMC15 Reference A/N 484389	D347	C350		PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11
CUTTER, FADAL CNC MILL, MODEL 914VMC15 Reference A/N 484390	D348	C350		PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11
CUTTER, FADAL CNC MILL, MODEL 914VMC15 Reference A/N 484391	D349	C350		PM:(9)[RULE 405, 2-7-1986]	A63.6, B59.6, C1.23, H23.11

Conditions:

A63.6 The operator shall limit the emissions from this equipment as follows:

Contaminant	Emissions limit
VOC	Less than 1.0 lb in any one day

B59.6 The operator shall not use the following materials in this device:

Toxic air contaminants identified in Rule 1401, Table 1 with an effective date of 9/10/2010 or earlier except for isopropyl alcohol

C1.23 The operator shall limit the material process to no more than 60 lb(s) in any one month.

For the purpose of this condition, material process shall be defined as total amount of volatile organic compound (VOC) used in any one calendar month.

The limit shall be based on the total combined limit for equipment D341, D345 – D349.

The operator shall limit the use of isopropyl alcohol as a cutting lubricant and not as a cleaning solvent.

H23.11 This equipment is subject to the applicable requirements of the following rules or regulations:

CONTAMINANT	RULE	RULE/SUBPART
VOC	DISTRICT RULE	109
VOC	DISTRICT RULE	442

PERMIT TO OPERATE
Section D

Equipment Description:

PROCESS 3: MILLING OPERATIONS **SYSTEM #2: AIR POLLUTION CONTROL EQUIPMENT**					
Equipment	Device ID	Connected To	Source Type/	Emissions	Equipment Specific

			Monitoring Unit		Conditions
BAGHOUSE, TORIT, MODEL TD6121, 6,124 SQUARE FEET FILTER AREA, REVERSE . Reference A/N 544054	C350	D341, D345, D346, D347, D348, D349		PM:(9)[RULE 404, 2-7-1986]	A63.7, C6.16, D322.3, H23.10, K67.4

Conditions:

A63.7 The operator shall limit emissions from this equipment as follows:

CONTAMINANT	EMISSIONS LIMIT		
Visible Emissions	Less than or Equal To	0	Percent Opacity

C6.16 The operator shall use this equipment in such a manner that the differential pressure being monitored, as indicated below, does not exceed 6 inches of water column.

To comply with this condition, the operator shall install and maintain a(n) differential pressure gauge to accurately indicate the differential pressure across the filter media.

The operator shall determine and record the parameter being monitored once every 1 day(s).

The operator shall install and maintain a(n) automated pulse cleaning system to periodically clean the filter media.

D322.3 The operator shall perform annual inspection of the equipment and filter media for leaks, broken or torn filter media, and improperly install filter media.

E102.3 The operator shall perform annual inspection of the equipment and filter media for leaks, broken or torn filter media, and improperly installed filter media.

H23.10 This equipment is subject to the applicable requirements of the following rules or regulations:

CONTAMINANT	RULE	RULE/SUBPART
PM	DISTRICT RULE	1155

K67.3 The operator shall keep records, in a manner approved by the district, for the following parameter(s) or item(s):

The date, time and description of any maintenance or repairs resulting from the inspection.

The name of the person performing the inspection and/or maintenance of the filter media.

The date, time and results of the inspection.

Background

Northrop Grumman Space and Missions Systems is engaged in the development and manufacture of advanced semiconductors including fabrication and assembly of electronic components and hard wares for integration into satellite and space vehicle. The company also performs research and development relating to chemical lasers, rocket engine thrusters and energy related programs for commercial and non-commercial applications. These operations are currently performed at two major sites within the South Coast Air Basin and they are: Redondo Beach and Manhattan Beach.

Northrop Grumman submitted application nos. 484387, 484388, 484389, 484390 and 484391 on 6/24/2008 as existing equipment that required a permit since the lubricant/coolant used could not meet the Rule 219(g)(1) exemption of material having a VOC content of 50 gram per liter or a composite partial pressure of 20mm Hg. or less. Application no. 542010 was submitted on 8/14/2012 to replace 484386. Application 537869 was submitted on 5/17/2012 for a title v revision. Northrop uses isopropyl alcohol as a lubricant/coolant when cutting/drilling aerospace hardware to prevent contamination. Particulates are vented to a dust collector that vents all the cutting and grinding operations. This includes a panel saw, a table saw, 2 band saws, a sander, and dozen grinders. A total of 22 devices are vented to the dust collector.

This is a RECLAIM Cycle 2 and title V facility. The proposed project is considered as a “de minimis significant permit revision to this facility title V permit.

As noted, the facility has been in constant operation with a Title V permit since 2000. The facility has been subject to both self-reporting

requirements and AQMD inspections. The facility has had no citizen complaints filed, Notices to Comply or Notices of Violation issued in the last two years. The facility is currently operating in compliance with all applicable rules and permit conditions.

Emissions Calculations:
VOC emissions:
Equipment limited to Less than 60 lbs VOC per month
Daily:
R1 = R2 = (60.0 lbs/month)(month/30days) = 2.0 lbs VOC/day.
Total Daily VOC emissions would be:
R1 = R2 = 2.0 lbs VOC/day (6 CNCs) = 0.33 lbsVOC/day total
Hourly:
R1 = R2 = (0.33lbs/day)(day/8hrs) = 0.041 lbs VOC/hr per router

Particulates:
Operating schedule 8 hrs/day, 5 days/week, 50 weeks/year
8 drums at 116 lbs were collected over a period of 12 months

8 drums(116 lbs/drum) = 928 lbs solids collected/year
928 lbs solids/(12 months)/(5 days/week)/(4.33weeks/month) = 3.57 lbs/day PM collected

@ 99% efficient
R1 = 3.57 lbs/day/(0.99) = 3.61 lbs/day, 0.45 lbs PM/hr
R2 = 3.61 lbs PM(1-0.99) = 0.04 lbs PM/day, 0.005 lbs PM/hr

Stack PM emissions
0.005 lbs/hr(7000gr/lb)(hr/60min)/(16,000ft3/min) = 3.6E-05gr/ft3

Uncontrolled CNC Machine:
PM = 3.57 lbs/day / 6 machines
PM = 0.59 lb/day
PM10 = 0.5PM
PM10 = 0.29 lb/day

Risk Assessment:
The emissions from this equipment will pass the tier 1 risk assessment for IPA with the following results:

	Cancer/Chronic ASI	Acute ASI

1.21E-04	8.75E-03
Passed	Passed

Evaluation & Rule Review

Rule 212 (c)(1):This section requires a public notice for all new or modified permit units that emit air contaminants located within 1,000 feet from the outer boundary of a school.

No public notice is required since no school is located within 1,000 ft from the above site.

Rule 212 (c)(2):This section requires a public notice for all new or modified facilities that have on-site emission increases exceeding any of the daily maximums as specified by Rule 212(g).

The proposed project will result in a small emission increase for the entire facility. A Rule 212(c) (2) notice will not be triggered since the changes will not result in an emission increase that exceeds the daily maximum under Rule 212(g).

Rule 212(c)(3):This section requires a public notice for all new or modified permit unit with increases in emissions of toxic air contaminants listed in Table I of Rule 1401 resulting in MICR greater than 1E-6 per permit unit or greater than 10E-6 per facility.

The proposed project will result in an emission increase of toxic emissions. However, as discussed in additional detail in the evaluation, the toxic emissions from this equipment will not result in an increase in MICR of more than 1×10^{-6} nor a hazard index greater than 1.0. Public notice is not required under this section of the rule.

Rule 212(g): This section requires a public notice for all new or modified sources that result in emission increases exceeding any of the daily maximums as specified by Rule 212(g).

The addition of the CNC machines will cause an increase in ROG emissions. The following summarizes the emissions:

Maximum Daily Emissions

	ROG	NO_x	PM_{10}	SO_2	CO	Pb
Emission increase	2.0	0	0	0	0	0
MAX Limit (lb/day)	**30**	**40**	**30**	**60**	**220**	**3**
Compliance Status	Yes	Yes	Yes	Yes	Yes	Yes

No public notice is required since the emission increase is below the thresholds.

Rule 401: With proper operation and maintenance compliance with this rule is expected.

Rule 402: With proper operation and maintenance compliance with this rule is expected.

Rule 404: The grain loading from the combined milling and grinding operations are estimated at 3.6E-05 gr/ft3 which is less than 0.06 grain per cubic foot required by this rule. Compliance is expected.

Rule 442: The solvent used in this operation is used as a lubricant/coolant during cutting operations. The solvent usage is not subject to a Reg. X1 Rule and will be accounted for under this rule.

Rule 1122: The solvent used in this operation is used as a lubricant/coolant and is not subject to the requirements of this rule since no emersion cleaning is being performed.

Rule 1171: The solvent used in this operation is not subject to the requirements of this rule. The solvent is used as a lubricant/coolant during the milling process and is not used for cleaning.

REGULATION XIII: Though Northrop Grumman is a NOx RECLAIM facility, compliance with Reg. XIII is still required. The proposed project will result in an increase in VOC emissions. The overall increase from this project is 2.0 lbs/day.

RULE 1303(a)(1): The daily VOC emissions from this equipment will not exceed one pound per day and will not trigger the BACT requirements.

RULE 1303(b)(1): The PM emissions from the milling and grinding operations are estimated at 0.005 lbs/hr which is less than the allowable emissions under Table A-1 at 0.41 lbs/hr. Modeling is not required for ROG.

RULE 1303(b)(2): The total emission increase from this project is 2.0 lbs/day of VOC emissions. Northrop Grumman is a major source of VOC emissions. Therefore, offsets are required. Northrop holds a total of 20 lbs VOC ERCs.

RULE 1303(b)(4): The facility is expected to be in full compliance with all applicable rules and regulations of the District.

RULE 1303(b)(5)(B): This facility and all others operated and owned by Northrop are in compliance with all applicable emission limitations and standards under the clean air act.

RULE 1303(b)(5)(C): A modeling analysis for plume visibility is not required since the net emission increase from the proposed project does not exceed 15 ton/yr of PM10 or 40 ton/yr of NOx.

Rule 1401: Toxics: Rule 1401 contains the following requirements:

1) *(d)(1) MICR and Cancer Burden* - The cumulative increase in MICR which is the sum of the calculated MICR values for all toxic air contaminants emitted from the new, relocated or modified permit unit will not result in any of the following:
   (A) an increased MICR greater than one in one million (1.0×10^{-6}) at any receptor location, if the permit unit is constructed without T-BACT;
   (B) an increased MICR greater than ten in one million (1.0×10^{-5}) at any receptor location, if the permit unit is constructed with T-BACT;
   (C) a cancer burden greater than 0.5.

2) *(d)(2) Chronic Hazard Index* - The cumulative increase in total chronic HI for any target organ system due to total emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.
3) *(d)(3) Acute Hazard Index* - The cumulative increase in total acute HI for any target organ system due to total

emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.

The increased toxic emissions from these CNC machines under application nos. 542010, 484387-391 subject to Reg 14 passed Tier 1 screening. The Risk assessment was performed using the Risk Assessment Module and is attached in the appendix:

The emissions from this equipment will pass the tier 1 risk assessment with the following results:

Cancer/Chronic ASI	Acute ASI
1.21E-04	8.75E-03
Passed	Passed

REG. XX: This proposed project has no impact on NOx emissions. Therefore, the requirement of Reg XX is not applicable to the CNC machines.

REGULATION XXX:

This facility is in the RECLAIM program. The proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or hazardous air pollutants (HAPs), and a "minor permit revision" for RECLAIM pollutants to the RECLAIM/Title V permit for this facility.

Non-RECLAIM Pollutants or HAPs

Rule 3000(b)(6) defines a "de minimis significant permit revision" as any Title V permit revision where the cumulative emission increases of non-RECLAIM pollutants or HAPs from these permit revisions during the term of the permit are not greater than any of the following emission threshold levels:

Air Contaminant	Daily Maximum (lbs/day)
HAP	30
VOC	30
NOx*	40
PM10	30
SOx*	60
CO	220

* Not applicable if this is a RECLAIM pollutant

To determine if a project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or HAPs, emission increases for non-RECLAIM pollutants or HAPs resulting from all permit revisions that are made after the issuance of the Title V renewal permit shall be accumulated and compared to the above threshold levels. This proposed project is the 4th permit revision to the Title V renewal permit issued to this facility on June 8, 2010. The following table summarizes the cumulative emission increases resulting from all permit revisions since the Title V renewal permit was issued:

Revision	HAP	VOC	NOx*	PM10	Sox	CO
Previous Permit Revision Total Cummulative to date. Title V permit renewed June 8, 2010	0	0	0	1	0	12
4th permit revision; A/N 542010, 484387 – 391 the addition of six CNC routers, D341-D346	0	2	0	0	0	0
Cumulative Total	0	2	0*	1	0	12
Maximum Daily	30	30	40*	30	60	220

* RECLAIM pollutant, not subject to emission accumulation requirements

Since the cumulative emission increases resulting from all permit revisions are not greater than any of the emission threshold levels, this proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants or HAPs.

RECLAIM Pollutants

Rule 3000(b)(12)(A)(v) defines a "minor permit revision" as any Title V permit revision that does not result in an emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or higher Allocation amount which has previously undergone a significant permit revision process.

Since NOx is a RECLAIM pollutant for this facility, a separate analysis shall be made to determine if the proposed permit revision is considered a "minor permit revision" for RECLAIM pollutants. The addition of the six CNC machines will not result in any NOx emissions. As a result, this

proposed project is considered as a "minor permit revision" for RECLAIM pollutants.

RECOMMENDATION

The proposed project is expected to comply with all applicable District Rules and Regulations. Since the proposed project is considered as a "de minimis significant permit revision" for non-RECLAIM pollutants and a "minor permit revision", for RECLAIM pollutant, it is exempt from the public participation requirements under Rule 3006 (b). A proposed permit incorporating this permit revision will be submitted to EPA for a 45-day review pursuant to Rule 3003(j). If EPA does not raise any objections within the review period, a revised Title V permit will be issued to this facility.

Conclusion:

A Permit to Operate is recommended for application numbers 542010, 484387 – 484391, and 544054 subject to preceding conditions.