APPLICANT'S NAME: NORTHROP GRUMMAN SPACE AND MISSION SYSTEMS CORP.

FACILITY PERMIT ID# 800408

CONTACT PERSON: Ron Frazer (310) 812-3021

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

EQUIPMENT ADDRESS: 3301 Aviation Blvd
Manhatten Beach, CA 90266

Title V Revision:
Application No. 537096

PERMIT TO CONSTRUCT
SECTION "H"

Equipment Description:
PROCESS 1: CONTROL EQUIPMENT

Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
SCRUBBER, PACKED BED, HARRINGTON, MODEL NO. HPH 66-4, LENGTH: 10FT 5IN; WIDTH: 7FT 3IN; HEIGHT: 8FT 2IN; WITH A 4FT PACKING DEPTH, A 20-HP EXHAUST FAN AND THREE 2-HP RECIRCULATION PUMPS. A/N: ~~503380~~537100	C-232	D349, D372, D383, D397, D398, D406, D407, D447, D477, D507, D508, D509, D552, D584, D596 **D525 ADD** **D540 ADD**		PM: (9) [Rule 404, 2-7-1986]	C8.1, C8.9, D90.1, E158.1, E159.1, I331.1, K67.3

Conditions:

C8.1 THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE FLOW RATE BEING MONITORED, AS INDICATED BELOW, IS NOT LESS THAN 100 GPM.

To comply with this condition, the operator shall install and maintain a(n) flow meter to accurately indicate the flow rate of the recirculating scrubbing solution.

C8.9 THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE pH BEING MONITORED, AS INDICATED BELOW, IS NOT LESS THAN 8 OF THE pH SCALE

To comply with this condition, the operator shall monitor and record the pH as specified in condition D90.1.

D90.1 THE OPERATOR SHALL PERIODICALLY MONITOR THE pH OF THE SCRUBBING SOLUTION ACCORDING TO THE FOLLOWING SPECIFICATIONS:

The operator shall use litmus paper or a portable pH analyzer to monitor the parameter.

The operator shall monitor once every day provided any equipment served by this control system is in operation.

E158.1 THE OPERATOR SHALL MAINTAIN A CONTINUOUS OVERFLOW OF WATER FROM THE SCRUBBER SUMP TO PREVENT THE BUILD UP OF CONTAMINATION.

E159.1 THE OPERATOR SHALL MAINTAIN INSPECTION PORTS WHICH, WHEN OPENED, ALLOW THE OBSERVATION OF THE SPRAY NOZZLES AND SCRUBBING SOLUTION BEING SPRAYED ON THE PACKING.

I331.1 THE CONDITIONS AND REQUIREMENTS FOR THIS DEVICE IN SECTION H SHALL TAKE EFFECT, AND SHALL SUPERSEDE THOSE IN SECTION D, WHEN THE MODIFICATIONS AUTHORIZED IN SECTION H ARE COMPLETED. THE OPERATOR SHALL NOTIFY THE AQMD WHEN THE MODIFICATIONS ARE COMPLETED.

K67.3 THE OPERATOR SHALL KEEP RECORDS, IN A MANNER APPROVED BY THE DISTRICT, FOR THE FOLLOWING PARAMETERS OR ITEMS:

pH of scrubbing solution on a daily basis.

Flow rate of recirculating scrubbing solution on a daily basis.

SECTION "H"

Equipment Description: **PROCESS 1: CONTROL EQUIPMENT**					
Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
SCRUBBER, FS21, HARRINGTON, WITH A MIST ELIMINATOR SECTION A/N: ~~516486~~537102	C-160	D189, D211, D371, D373, D374, D375, D378, D382, D386, D388, D390, D391, D394, D395, D403, D404, D478, ~~**D528**~~, D574, D613, **D537 ADD**		PM: (9) [RULE 404, 2-7-1986]	C8.3, C8.9, D90.1, E158.1, E159.1, I331.1, K67.3

Conditions:

C8.3 THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE FLOW RATE BEING MONITORED, AS INDICATED BELOW, IS NOT LESS THAN 150 GPM.

To comply with this condition, the operator shall install and maintain a(n) flow meter to accurately indicate the flow rate of the recirculating scrubbing solution.

C8.9 THE OPERATOR SHALL USE THIS EQUIPMENT IN SUCH A MANNER THAT THE pH BEING MONITORED, AS INDICATED BELOW, IS NOT LESS THAN 8 OF THE pH SCALE

To comply with this condition, the operator shall monitor and record the pH as specified in condition D90.1.

D90.1 THE OPERATOR SHALL PERIODICALLY MONITOR THE pH OF THE SCRUBBING SOLUTION ACCORDING TO THE FOLLOWING SPECIFICATIONS:

The operator shall use litmus paper or a portable pH analyzer to monitor the parameter.

The operator shall monitor once every day provided any equipment served by this control system is in operation.

E158.1 THE OPERATOR SHALL MAINTAIN A CONTINUOUS OVERFLOW OF WATER FROM THE SCRUBBER SUMP TO PREVENT THE BUILD UP OF CONTAMINATION.

E159.1 THE OPERATOR SHALL MAINTAIN INSPECTION PORTS WHICH, WHEN OPENED, ALLOW THE OBSERVATION OF THE SPRAY NOZZLES AND SCRUBBING SOLUTION BEING SPRAYED ON THE PACKING.

I331.1 THE CONDITIONS AND REQUIREMENTS FOR THIS DEVICE IN SECTION H SHALL TAKE EFFECT, AND SHALL SUPERSEDE THOSE IN SECTION D, WHEN THE MODIFICATIONS AUTHORIZED IN SECTION H ARE COMPLETED. THE OPERATOR SHALL NOTIFY THE AQMD WHEN THE MODIFICATIONS ARE COMPLETED.

K67.3 THE OPERATOR SHALL KEEP RECORDS, IN A MANNER APPROVED BY THE DISTRICT, FOR THE FOLLOWING PARAMETERS OR ITEMS:

pH of scrubbing solution on a daily basis.

Flow rate of recirculating scrubbing solution on a daily basis.

PERMIT TO CONSTRUCT
SECTION "H"

Equipment Description:

PROCESS 1: CONTROL EQUIPMENT					
Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
OXIDIZER, THERMAL, NO. 2, ALLIANCE SYSTEMS, MODEL NO. 306-RTO, 3 BED HOT ROCK TYPE, NATURAL GAS, WITH A 30-HP EXHAUST FAN, 10-HP BYPASS FAN AND A 3-HP COMBUSTION BLOWER, 1.5MMBTU/HR Reference A/N ~~445656~~537105	C-460	D157, D481, D587, D588, **D572 ADD**	NOX: PROCESS UNIT	CO: 2000 PPMV (5);[RULE 407, 4-2—1982]; NOX: 130 LBS/MMSCF NATURAL GAS (1)[RULE 2012, 5-6-2005]; PM: (9)[RULE 404, 2-7-1986]; PM: 0.1 GRAINS/SCF(5)[RULE 409, 8-7-1981]	A72.1, D29.2, E193.1, I331.1, K40.1,

Conditions:

A72.1 THE OPERATOR SHALL MAINTAIN THIS EQUIPMENT TO ACHIEVE A MINIMUM DESTRUCTION EFFICIENCY OF 95% FOR ROG DURING THE NORMAL OPERATION OF THE EQUIPMENT IT VENTS.

D29.2 THE OPERATOR SHALL CONDUCT SOURCE TEST(S) FOR THE POLLUTANT(S) IDENTIFIED BELOW:

Pollutant(s) to be tested	Required test method(s)	Averaging Time	Test Location
VOC	Approved District Method	District Approved averaging time	Simultaneous inlet and outlet

The test shall be conducted at least once during the life of the permit but no later than July 9, 2015 unless otherwise approved in writing by the District.

The test shall be conducted to determine the VOC emissions using an approved District method to determine compliance with all applicable permit condition(s), Rules and Regulations.

The test shall be conducted while the oxidizer is operating at a temperature of not less than the minimum operating temperature specified in this permit. If the operating temperature during the source test is greater than the minimum operating temperature specified in the permit, the minimum operating temperature specified in this permit may be increased to reflect the operating temperature during the source test.

The operator shall comply with administrative conditions NOs. 8, 9, and 10 of Section E of this facility permit.

E193.1 THE OPERATOR SHALLL OPERATE AND MAINTAIN THIS EQUIPMENT ACCORDING TO THE FOLLOWING REQUIREMENTS:

The combustion chamber temperature shall be maintained at a minimum of 1,500 degrees Fahrenheit whenever the equipment it serves is in operation

The operator shall operate and maintain a temperature measuring and recording system to continuously measure and record the combustion chamber temperature pursuant to the operation and maintenance requirements specified in 40 CFR Part 64.7. Such a system shall have an accuracy of within 1% of the temperature being monitored and shall be inspected, maintained, and calibrated on an annual basis in accordance with the manufacturer's specifications

For the purpose of this condition, a deviation shall be defined as when a combustion chamber temperature of less than 1,500 degrees Fahrenheit occurs whenever the equipment it serves is in operation. The operator shall review the records of the combustion chamber temperature on a daily basis to determine if a deviation occurs or shall install an alarm system to alert the operator when a deviation occurs

Whenever a deviation occurs, the operator shall inspect this equipment to identify the cause of such a deviation, take immediate corrective action to maintain the combustion chamber temperature at or above 1,500 degrees Fahrenheit, and keep records of the duration and cause (including unknown cause, if applicable) of the deviation and the corrective action taken

All deviations shall be reported to the AQMD pursuant to the requirements specified in 40 CFR Part 64.9 and Condition Nos. 22 and 23 in Section K of this permit. The report shall include the total operating time of this equipment and the total accumulated duration of all deviations for each semi-annual reporting period specified in Condition No. 23 in Section K of this permit

The operator shall submit an application with a Quality Improvement Plan (QIP) in accordance with 40 CFR Part 64.8 to the AQMD if an accumulation of deviations exceeds 5 percent duration of this equipment's total operating time for any semi-annual reporting period specified in Condition No. 23 in Section K of this permit. The required QIP shall be submitted to the AQMD within 90 calendar days after the due date for the semi-annual monitoring report

The operator shall inspect and maintain all components of this equipment on an annual basis in accordance with the manufacturer's specifications.

The operator shall keep adequate records in a format that is acceptable to the AQMD to demonstrate compliance with all applicable requirements specified in this condition and 40 CFR Part 64.9 for a minimum of five years

I331.1 THE CONDITIONS AND REQUIREMENTS FOR THIS DEVICE IN SECTION H SHALL TAKE EFFECT, AND SHALL SUPERSEDE THOSE IN SECTION D, WHEN THE MODIFICATIONS AUTHORIZED IN SECTION H ARE COMPLETED. THE OPERATOR SHALL NOTIFY THE AQMD WHEN THE MODIFICATIONS ARE COMPLETED.

K40.1 THE OPERATOR SHALL PROVIDE TO THE DISTRICT A SOURCE TEST REPORT IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS:

Source test results shall be submitted to the District no later than 60 days after the source test was conducted.

PERMIT TO CONSTRUCT
SECTION "H"

Equipment Description:

PROCESS 11: D1 WEST LAB P13.1
SYSTEM #1: Photolithographic Process

Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
BENCH, PHOTORESIST COATER NO. 1, LENGTH: 6FT 10IN; WIDTH: 3FT; HEIGHT: 6FT 8IN; WITH TWO WAFER CONVEYORS, TWO SPINNERS AND FOUR HOT PLATES A/N: ~~523834~~537099	D346	C364			~~B59.50~~B59.49, C1.42
BENCH, PHOTORESIST COATER NO. 2, LENGTH: 6FT 10IN; WIDTH: 4FT 4IN; HEIGHT: 6FT 8IN; WITH TWO WAFER CONVEYORS, TWO SPINNERS	D347	C364			~~B59.50~~B59.49, C1.42

AND FOUR HOT PLATES A/N: ~~523834~~537099					
BENCH, TRACK DEVELOP STATION NO. 1, POTASSIUM HYDROXIDE. A/N: ~~523834~~537099	D397	C232			B59.9
BENCH, TRACK DEVELOP STATION NO. 2, POTASSIUM HYDROXIDE. A/N: ~~523834~~537099	D398	C232			B59.9
BENCH, DEVELOPER, C&D SEMICONDUCTOR, MODEL 8800, LENGTH: 4FT 11IN; WIDTH: 3FT 11IN; HEIGHT: 5FT 10IN; A/N: ~~523834~~537099	D477	C232			B59.4, B59.36
BENCH, PHOTORESIST COATER, C&D, SEMICONDUCTOR SERVICES, MODEL 8800, LENGTH: 8FT; WIDTH: 2FT 11IN; HEIGHT: 3FT 11IN A/N: ~~523834~~537099	D481	C460			B59.49, ~~C1.37~~. C1.42
OVEN, NO. 2, VAPOR PRIME, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED, 2.2 KVA A/N: ~~523834~~537099	D349	C232			~~B59.52, C1.46~~ 59.52 change P11s2
OVEN, NO. 1, PHOTORESIST BAKE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D350	C364			~~B59.5, C1.42~~
OVEN, NO. 3 PHOTORESIST BAKE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D352	C364			~~B59.5, C1.42~~
OVEN, NO. 4, PHOTORESIST BAKE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D353	C364			~~B59.5, C1.42~~
OVEN, NO. 5, PHOTORESIST BAKE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D354	C364			~~B59.5, C1.42~~

OVEN, LABLINE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D587	C460			~~B59.62, C1.42~~
OVEN, LABLINE, LENGTH: 1FT 10IN; WIDTH: 2FT; HEIGHT: 2FT 11IN; ELECTRICALLY HEATED. A/N: ~~523834~~537099	D588	C460			~~B59.62, C1.42~~
OVEN, BARNSTEAD, LABLINE, MODEL 3497M-3 A/N: ~~523834~~537099	D589	C364			~~B59.62, C1.42~~
OVEN, TRW, NO. 2, PHOTORESIST BAKE, ELECTRICALLY HEATED A/N: ~~523834~~537099	D277	C364			
BENCH, PHOTORESIST COATER, C&D, SEMICONDUCTOR SERVICES, MODEL 8800 SERIES. A/N 537099	D572	C460 ~~C305~~	**ADD**		B59.49, C1.42 ~~B59.53, C1.51~~

Conditions:

P13.1 All devices under this process are subject to the apoplicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1164
VOC	District Rule	109

B59.4 The operator shall not use the following material(s) in this device:

Materials containing VOC.

~~B59.5 The operator shall not use the following material(s) in this device.~~

~~Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 8/13/99 or earlier except nitric acid and hydrofluoric acid.~~

B59.9 The operator shall not use the following material(s) in this device.

Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 3/17/000 or earlier except hydrochloric acid.

B59.36 The operator shall not use the following material(s) in this device.

Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 5/02/03 or earlier except hydrochloric acid and hydrofluoric acid.

B59.49 The operator shall not use the following material(s) in this device.

Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of ~~5/02/03~~9/10/10 or earlier except cresol, isopropyl alcohol, methanol, xylene, phenol, cellosolve acetate, and chlorobenzene.

~~B59.50 The operator shall not use the following material(s) in this device.~~

~~Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 5/02/03 or earlier except cresol, xylene, isopropyl alcohol, methanol, and chlorobenzene.~~

~~B59.52 The operator shall not use the following material(s) in this device.~~

~~Toxic air contaminants in table 1 of rule 1401 with a listing date of 5/02/03 or earlier except hydrofluoric acid, hydrochloric acid, ammonia, chlorine or isopropyl alcohol~~

~~B59.53 The operator shall not use the following material(s) in this device.~~

~~Toxic air contaminants in table 1 of rule 1401 with a listing date of 5/02/03 or earlier except xylene, cresol, isopropyl alcohol and ammonia.~~

~~B59.62 The operator shall not use the following material(s) in this device.~~

~~Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 3/04/05 or earlier except xylene, cresol, cellosolve acetate~~

~~C1.37 The operator shall limit the material processed to no more than 80 lb(s) in any one month.~~

~~For the purpose of this condition, material processed shall be defined as photoresist coatings (Microposit 1822/1813).~~

~~The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition.~~

C1.42 The operator shall limit the material processed to no more than ~~649~~790 gallon(s) per month.

For the purpose of this condition, material processed shall be defined as materials containing VOC. This limit shall be based on the total combined limit for equipment ~~D277~~, D346, D347, ~~D350, D352 through D354,~~ D481, ~~D587 through D589~~and D572.

C1.46 The operator shall limit the material processed to no more than 2.0 gallon(s) in any one calendar month.

For the purpose of this condition, material processed shall be defined as material containing VOC. ~~The limit shall be based on the total combined limit for equipment D349 and D552.~~

~~C1.51 The operator shall limit the material processed to no more than 282 gallon(s) in any one calendar month.~~

~~For the purpose of this condition, material processed shall be defined as materials containing VOC.~~

PERMIT TO CONSTRUCT
SECTION "H"

Equipment Description:

PROCESS 11: D1 WEST LAB
SYSTEM 2: Integrated Circuit Fabrication.

Equipment	Device ID	Connected To	Source Type/ Monitoring Unit	Emissions	Equipment Specific Conditions
PLASMA ETCHER, ETCH NO. 1, 65-KVA A/N: ~~516129~~537112	D374	C160			B59.8
PLASMA ETCHER, ETCH NO. 2, 65-KVA A/N: ~~516129~~537112	D375	C160			B59.8
PLASMA ETCHER, CLEAN NO. 1, MATRIX, 6.0-KVA A/N: ~~516129~~537112	D378	C160			B59.8
PLASMA ETCHER, CLEAN NO. 5, MATRIX, 6.0-KVA A/N: ~~516129~~537112	D382	C160			B59.8
PLASMA ETCHER, CLEAN NO. 6, MATRIX, 6.0-KVA A/N: ~~516129~~537112	D383	C232			B59.8
PLASMA ETCHER, CLEAN NO. 9, MATRIX, 6.0-KVA A/N: ~~516129~~537112	D386	C160			B59.8
PLASMA ETCHER, CLEAN NO. 11, MATRIX, 6.0-KVA A/N: ~~516129~~537112	D388	C160			B59.8
PLASMA ETCHER, DEPOSITION NO. 1, PLASMA THERM INC., 65-KVA A/N: ~~516129~~537112	D390	C160			B59.8
PLASMA ETCHER, DEPOSITION NO. 2, PLASMA THERM INC., 65-KVA A/N: ~~516129~~537112	D391	C160			B59.8

PLASMA ETCHER, CLEAN NO. 1, MATRIX, 21.4-KVA A/N: ~~516129~~537112	D403	C160			B59.52
PLASMA ETCHER, CLEAN NO. 2, MATRIX, 21.4-KVA A/N: ~~516129~~537112	D404	C160			B59.52
PLASMA ETCHER, CLEAN NO. 4, MATRIX, 21.4-KVA A/N: ~~516129~~537112	D406	C232			B59.52
PLASMA ETCHER, MATRIX, MODEL EHP500, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT; WITH THREE VACUUM PUMPS A/N: ~~516129~~537112	D450	C233			B59.13
PLASMA ETCHER, ICP NO. 1, TRIKON, MODEL OMEGA, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT; 65-KVA WITH THREE VACUUM PUMPS, 2.0-HP TOTAL A/N: ~~516129~~537112	D507	C232			B59.52
PLASMA ETCHER, ICP NO. 2, TRIKON, MODEL OMEGA, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT; 65-KVA WITH THREE VACUUM PUMPS, 2.0-HP TOTAL A/N: ~~516129~~537112	D508	C232			B59.52
PLASMA ETCHER, ICP NO. 3, TRIKON, MODEL OMEGA, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT; 65-KVA WITH THREE VACUUM PUMPS, 2.0-HP TOTAL A/N: ~~516129~~537112	D509	C232			B59.52
PLASMA ETCHER, DESCUMMER, BRANSON/IPC, MODEL REACTOR CENTER PM 1813, LENGTH: 3FT; WIDTH: 3FT; HEIGHT: 3FT. A/N: ~~516129~~537112	D528	~~C160~~ C233			B27.7
ION IMPLANTER, ION BEAM MILL, VACUUM PUMP A/N: ~~516129~~537112	D182	C233			
DEPOSITION REACTOR, SPUTTERING NO. 1, 21.4-KVA A/N: ~~516129~~537112	D407	C232			B59.52
PROCESS TANK, PASS-THRU ACID UNIT A/N: ~~516129~~537112	D189	C160			
DEPOSITION REACTOR, VAPOR PRIME, Y.E.S., LENGTH: 1FT 8IN; WIDTH: 2FT; HEIGHT: 2FT 4IN, ELECTRICALLY HEATED	D552	C232			B59.52 C1.46

A/N: ~~516129~~537112					
PLASMA ETCHER, ICP NO.3, TRIKON, MODEL OMEGA, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT; 65-KVA WITH THREE VACUUM PUMPS, 2.0-HP TOTAL A/N: ~~516129~~537112	D584	C232			B59.58
PLASMA ETCHER, NO. 1, MATRIX, MODEL 105E, LENGTH: 3FT; WIDTH: 4FT; HEIGHT: 6FT A/N: ~~516129~~537112	D540	~~C233~~ C232			B59.4
PLASMA ETCHER, TEGAL, MODEL 110, LENGTH: 2FT 9IN; WIDTH: 6FT 4IN; HEIGHT: 6FT 10IN; WITH TWO VACUUM PUMPS A/N: ~~516129~~537112	D596	C232			B59.66, C1.55
PLASMA ETCHER, SURFACE TECHNOLOGIES SYSTEMS, MPX A/N: ~~516129~~537112	D613	C160			B59.71
BENCH, TRACK DEVELOPER, C&D SEMICONDUCTOR SERVICES, MODEL 8800 SERIES, LENGTH: 4FT 10IN; WIDTH: 4FT; HEIGHT: 3FT 8IN A/N ~~445612~~ 537112	D525	C232 ~~C6~~	**ADD**		59.70, 59.4
BENCH, TRACK DEVELOPER, C&D SEMICONDUCTOR SERVICES, A/N ~~516969~~ 537112	D537	C160 ~~C6~~	**ADD**		59.70, 59.4
VACUUM METALIZING FIJI F200 PLASMA ATOMIC LAYER DEPOSITION (ALD) A/N ~~516124~~ 537112	D611	~~C161~~	**ADD**		59.70, 59.4
OVEN, OZONE PHOTOREACTOR, MODEL PR-100 A/N 537112	D614		**ADD**		59.70, 59.4

Conditions:

B27.7 THE OPERATOR SHALL NOT USE MATERIALS CONTAINING ANY TOXIC AIR CONTAMINANTS (TAC) IDENTIFIED IN THE SCAQMD RULE 1401, AS AMENDED 5/02/03

B59.4 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIAL(S) IN THIS DEVICE:

Materials containing VOC

B59.8 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIAL(S) IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 3/17/00 or earlier except ammonia.

B59.13 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIAL(S) IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 8/18/00 or earlier

B59.52 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIAL(S) IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 5/02/03 or earlier except hydrofluoric acid, hydrochloric acid, ammonia, chlorine or isopropyl alcohol.

B59.58 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIALS IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 3/04/05 or earlier except hydrofluoric acid or chlorine.

B59.66 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIALS IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 3/07/08 or earlier

B59.70 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIALS IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 9/10/10 or earlier.

B59.71 THE OPERATOR SHALL NOT USE THE FOLLOWING MATERIALS IN THIS DEVICE:

Toxic air contaminants in table 1 of rule 1401 with a listing date of 9/10/10 or earlier except chlorine.

C1.46 THE OPERATOR SHALL LIMIT THE MATERIAL PROCESSED TO NO MORE THAN 2.0 GALLONS PER MONTH.

For the purpose of this condition, material processed shall be defined as materials containing VOC. The limit shall be based on the total combined limit for equipment D349 and D552.

C1.55 THE OPERATOR SHALL LIMIT THE MATERIAL PROCESSED TO NO MORE THAN 240 IN ANY ONE MONTH.

For the purpose of this condition, material processed shall be defined as number of wafers processed in this equipment.

Background:
Northrop has filed the following applications on 5/22/2012 to consolidate devices that were originally located at the D1 East Labs under Process 10. D1East will eventually be shut down and these applications are part of the consolidation which will take approximately a year to conclude. The following table illustrates the applications filed and dates permits to operate were issued.

Application No.	Permit Action	Device No.	Previous app. No.	Previous P/O
537096	RECLAIM/Title V revision application		523833	
537099	Permit to Construct Add D572 to P11,S1	Process 11 System 1 Photolithographic system	523834	G17587 Issued 4/20/2012
537112	Permit to Construct Add D525, D537, D611 & D614 to P11, S2	Process 11 System 2 Integrated circuit MFG	516129	G17588 issued 4/20/2012
537100	Permit to Construct Add D525 to exhaust	C232 Scrubber	503380	G17591 issued 4/20/2012
	Add D540		509412	Cancel
537102	Permit to Construct Add D537 to exhaust	C160 Scrubber	516486	G17589 issued 04/20/2012
	Remove D528		509410	Cancel
537105	Permit to Construct Add D572 to exhaust	C460 Oxidizer	445656	G14886 issued 9/07/2011
509409	Add D528 Remove D540	C233 Scrubber	455307	G17590 Issued 4/20/2012

Application no. 537099 was submitted to the District to modify this operation by the addition of device D572, a photoresist coater. This device had a combined usage limit of 282 gallons photoresist per month with D571 in Process 10, System 1 under condition C1.51. D572 will add 141 gallons per month to Process 11, System 1 usage under condition C1.41 to increase the total monthly usage from 649 gallons photoresist per month to 790 gallons per month. D572 will be exhausted to oxidizer C460

Application no 537112 was submitted to the District to modify Process 11, System 2, integrated Circuit MFG by adding devices D525(developer), D527(developer), E611(vacuum metalizer) and D614(ozone oven). D525 will be vented to scrubber C232, device D537 will be vented to scrubber C160, D611 and D614 will be vented to general exhaust which vents to the atmosphere.

Application no 537100 was submitted to the District to add D525 to the exhaust of C232. Application no. 537102 was submitted to the District to add D537 to the exhaust of C160. Application no. 537112 was submitted to the District to add D572 to the exhaust of C460.

Northrop had filed three applications on 3/30/2010 to make changes to the exhaust of C160, C232 and C233. It came to their attention that D528 was listed on the facility permit as being connected to C160 but was actually connected to C233. Application no. 509410 was submitted to remove D528 from C160. Application no. 509409 was submitted to connect D528 to C233. Also, D540 was listed on the facility permit as being connected to C233 but was actually connected to C232. Application no. 509412 was submitted to connect D540 to C232. These changes will be made to both Section D and Section H, but Section D will be issued later when all the Section H changes have been made. Application no. 509410 will be cancelled and the changes to C160 incorporated into a/n 537102. Application no. 509412 will also be cancelled with the changes to C232 incorporated into a/n 537100. Application no. 509409 will be issued a permit to operate with D528 connected to C233 and D540 removed from this same control device.

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

District records indicate that during the last two years Northrop Grumman was issued one Notice of Violation (NOV). NOV P50342 was issued on 5/5/2010 for failure to conduct the source tests for boilers D365 and D457. Northrop has since conducted the source tests and is currently operating in full compliance. There are no other NOV’s, NC’s or Complaints on record against this facility as of 7/18/2012.

Emissions Calculations:

Process 11, System 1, Application No. 537099

D572 Photoresist Coater:

Material voc content densit

	Material	VOC content
1	AP 3000 ADHESION PROMOTER	8.04 LBS/GALLON
2	AZ 4330 RS RESIST	5.67 LBS/GAL
3	AZ 4620 RESIST	5.17LBS/GAL
4	AZ 5206 RESIST	6.83
5	AZ 5214 RESIST	6.17
6	AZ EBR SOLVENT	8.04 LBS/GAL
7	HMDS ADHESION PROMOTER	6.41 LBS/GAL
8	JSR NFR 016D2 RESIST	6.66
9	PFI 88 RESIST	6.73
10	950 PMMA	7.92
11	S1813 RESIST	6.12
12	SPR 222	5.90
13	SPR 511	6.27
14	MIBK	6.66
	AVERAGE VOC	6.61 LBS/GAL

100% COLLECTION
95% DESTRUCTION
95.0% overall
Add 141 gallons from the original 282 gal/month limit under condition C1.51
R1 = 141 gal/month)(6.61 lbs VOC/gal)/30 day/month = 31.1 lbs VOC/day
R2 = 31.1 lbs VOC/day(1-0.95) = 1.56 lbs/day, @8hrs/day 0.194 lbs/hr
Condition C1.51 for D571 will be reduced from 282gal/month to 141gal/month
Condition C1.42 will add 141 gal/month to 649 gal/month for a total of 790 gallons per month. D572 was controlled by oxidizer C305 and will continue to be controlled by C460 so there will be no increase in VOC from this facility by this change.

Process 11, System 2, Application 537112
Device D525 track developer:
The previous emissions were taken from the original application no. 424219 since the previous a/n 445612 had no emissions estimate.
Uncontrolled PM emissions (D525)
PM =0.020 lb/day
The device will continue to be vented to a scrubber. It was originally vented to C6 and now will be vented to C232.

Controlled PM emissions:
PM (1-.90) = 0.020 x 0.10 = 0.00201b/ day
This device uses no VOC and is conditioned under B59.4 not to use materials containing VOC.
VOC=0

Device 537 Track Developer:

The previous application no. 516969 was an administrative application used to remove devices from the system. There were no emissions associated with this application. The emissions estimate for this device was taken from the original application 455548. This equipment uses an alkaline solution to soften and remove photoresist. The alkaline has neither VOC nor toxic materials listed in 1401 amended 3/04/05. D537 is conditioned so that it may not use materials containing VOC or materials containing toxics as listed in Rule 1401 amended 9/10/2010. The PM10 emissions from this equipment are vented to scrubber C6.

Device D611

The emissions estimate has been taken from the previous application no. 516124.
The maximum number of batches this equipment can perform is 24 batches per day. That is one batch per hour which includes loading, processing and unloading of the device. The applicant has provided usages of Dimethylamine of 0.552 grams for 16 batches per week. Assuming a worst case of 24 batches in one day and assuming all the dimethylamine is vented to the atmosphere, the following maximum Dimethylamine emission will occur:

0.552 grams(24 batches/16 batches) = 0.828 grams D/day, 0.00182 lbs/day

The following methane emissions were determined with a usage of 0.915 grams per 16 batches processed:

0.915 grams(24 batches/16 batches) = 1.37 grams CH_4/day

Assuming the maximum PM10 emission would be equivalent to the maximum methane emission, the worst case is still negligible.

1.37 gm/day/(454 gm/lb) = 0.003 lbs/day

D614 Ozone Oven:

The Ozone oven is used to clean processed parts of any residual organics. The oven is equipped with a UV light source which cause the existing oxygen within the air to reform into ozone. The ozone will react with any residual organics such as fingerprints or other smudges and completely clean the surface of the product. The following is an ozone estimate:
Chamber volume 28cm W x 30cm D x 8cm H = 672 cm^3
Molecular weight to air = 29.0
Oxygen content 20.9 mole%

PV = nRT, n = PV/RT

P= 1atm
V= 672 cm^3 , 0.672 lt, 0.0237 ft3,
Flowrate – 0.0353cfm
N=?
R = 0.7302 ft^3-atm/lb-mole-^{0}R
T = 528^{0}R

n = 1atm(0.0353ft^3/min)/[(0.7302ft^3-atm/lbmole-^{0}R)(528^{0}R)]
= 9.156E-05 lb-mole/min

21% mole% oxygen
= 1.923E-05 lb-mole O_2/min

1.5 moles O_2 to form 1.0 mole O_3
= (1.923E-05 lb-moleO_2/min)/(1.5moleO_2/1.0moleO_3)
= 1.282E-05 lb-mole O_3/min(15.9994lb/mole)(3)
= 6.153E-04 lbs O_3/min

Batch operations: Max
10 minutes per batch.
One batch per day
365 days per year
= 6.153E-03 lbs O_3/day

Risk Assessment:

Process 11, System 1 (application no. 537099)
D572

Product	Contaminant	CAS#	Wt%
AP3000	Propylene Glycol monomethyl ether	107-98-2	>98
AZ P4330-RS	Cresol compounds(resin)	1319-77-3	30
AZ 5214	Cresol compounds(resin)	1319-77-3	≥22
	Phenolic compounds(resin)	108-95-2	≥1
JSR NFR 016D2	Cresol-Formaldehyde(Novolac) Resin		30
	Phenolic compound		10
PFI-88A2	Novolac resin		22
S1813-J2	Novolac Resin		28
SPR 220	Cresol Novolac Resin		<35
	Cresol	1319-77-3	<0.5
SPR 511-A	Cresol Novolac Resin		<30
	Cresol	1319-77-3	<0.9
	Xylene	1330-20-7	5.0

Total VOC Daily increase – 1.6 lbs/day
@ 8hrs/day - 0.1944 lbs/hr
The Risk assessment was performed assuming that the individual toxic emission was equivalent to the controlled VOC emission of 1.6 lbs/day or 0.1944 lbs/hr each. Cresol, IPA, Xylene, Methanol, Chlorobenzene, Phenol, Cellosolve Acetate, Propylene glycol monomethyl ether were each assigned an emission of 0.1944 lbs per hour. The actual emission estimate would be 1/8th this amount but to show that even at this emission, the increase would pass Tier 2 screening. There are no carcinogenic emissions, so there is no increase in the MICR. The hazard indicies all remain less than one for all targeted organs.

Process 11, System 2 (application no. 537112)
Addition of D525, D537, D611 & D614;
D525:
No toxics(5/02/03) and no VOC

D537:
No toxics (3/04/05) & no VOC

D611:
No toxics (3/04/05) & no VOC

D614:
No toxics(9/10/2010) and no VOC

Add conditions to previously mentioned devices;

B59.70 The operator shall not use the following material(s) in this device.
Toxic Air Contaminants in Table 1 of Rule 1401 with a Listing Date of 9/10/10 or earlier

B59.4 The operator shall not use the following material(s) in this device.

Materials containing VOC

Control Evaluation:
Scrubber Evaluation:
Application no. 537100:
C232

Location	ID. No.	Equipment Description	Exhaust Flow (cfm)
D1W	D349	DEPOSITION REACTOR	50
D1W 5N	D372	BENCH, ACID/CAUSTIC SINK	900
D1W 7S	D383	PLASMA ETCHER	100
D1W 5S	D397	BENCH, TRACK DEVELOPER	300
D1W 5S	D398	BENCH, TRACK DEVELOPER	300
D1W 4S	D406	PLASMA ETCHER	100
D1W 1S	D407	SPUTTERER	100
D1W 7S	D447	BENCH, ACID ETCH SINK	1200
DIW 7S	D477	BENCH TRACK DEVELOPER	75
D1W	D507	PLASMA ETCHER	75
D1W	D508	PLASMA ETCHER	75
D1W	D509	PLASMA ETCHER	75
D1W	**D540**	**PLASMA ETCHER**	**100**
D1W	D552	DEPOSITION REACTOR	50
D1W	D584	PLASMA ETCHER	75
D1W	D596	PLASMA ETCHER	188
D1W METALS BAY	**D525**	**TRACK DEVELOPER *added***	**80**
		TOTAL EXHAUST FLOW	3,843
		Scrubber capacity	17,000
		Excess Capacity	+13,157

Scrubber Evaluation:
Application no. 537102:

C160

Location	ID. No.	Equipment Description	Exhaust Flow (cfm)
D1W	D189	PROCESS TANK, PASS-THRU	5
D1W 8S	D211	BENCH, ACID/CAUSTIC SINK	300
D1W 2/4N	D371	BENCH, ACID/CAUSTIC SINK	1800
D1W 3S	D373	BENCH, ACID/CAUSTIC SINK	750
D1W 3S	D374	PLASMA ETCHER	100
D1W 8S	D375	PLASMA ETCHER	100
D1W 2/4N	D378	PLASMA ETCHER	100
D1W 8S	D382	PLASMA ETCHER	100
D1W 2S	D386	PLASMA ETCHER	100
D1W 2S	D388	PLASMA ETCHER	100
D1W 8S	D390	PLASMA ETCHER	100
D1W 6N	D391	PLASMA ETCHER	100
D1W 4S	D394	BENCH, ACID/CAUSTIC SINK	200
D1W 4S	D395	BENCH, ACID/CAUSTIC SINK	200
D1W 3S	D403	PLASMA ETCHER	100
D1W 4S	D404	PLASMA ETCHER	100
D1W 4S	D478	BENCH, ACID/CAUSTIC SINK	1150
~~**D1W**~~	~~**D528**~~	~~**PLASMA ETCHER, DESCUMMER**~~	~~**25**~~
D1W 4S	D574	BENCH, ACID	200
D1W 1S	D613	PLASMA ETCHER	25
D1W METALS BAY	R219	12 GAS CABINETS	60
D1W METALS BAY	**D537**	**DEVELOPER, TRACK *added***	**80**
		Total exhaust flow	5,770
		Scrubber Capacity	24,000
		Excess Capacity	+18,230

Afterburner Evaluation"
Application no. 537105:
C460

Location	ID. No.	Equipment Description	Exhaust Flow (cfm)
D1W 9S	D157	BENCH, SOLVENT CLEANING	800
D1W 9S	D481	BENCH, SOLVENT CLEANING	90
D1W 9S	D587	OVEN, LABLINE	20
D1W 9S	D588	OVEN, LABLINE	20
D1W 8S	D572	COATER	220
		Total exhaust flow	1,150
		Oxidizer Capacity	5,000
		Excess Capacity	+3,850

RULE EVALUATION

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 not result in a emission increase from the facility. A Rule 212(c) (2) notice will not be triggered since the emission increase is below the daily maximum specified in 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 not result in an increase of toxic emissions in excess of the one in a million. Therefore 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 emission increase due to the operation of this equipment is negligible and the following summarizes the emission increase:

	Maximum Daily Emissions					
	ROG	NO_x	PM_{10}	SO_2	CO	Pb
Emission increase	1.4	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 the proper maintenance and operation of this equipment, compliance with this rule is expected.

Rule 402: With proper maintenance and operation, this equipment is not expected to create a nuisance.

Rule 1164: All VOC's are vented to an afterburner in compliance with the requirements of this rule. Compliance with this rule is expected.

Rule 1303(a):The emissions from the chemical operations are vented to a scrubber and all VOC's are vent to an afterburner. BACT is applied for each criteria pollutant. Compliance with BACT is achieved.

Rules 1303(b)(1) modeling:

The hourly emissions from this equipment are below the screening levels in the Appendix A table. Compliance is expected.

Rule 1303(b)(2) Offsets:

No PM10 offsets are required for this operation since the emissions are less than 0.49 lbs PM10/day and the VOC emissions are being moved from Process 10 System 1 to Process 11, system 1 within the facility. So, there will be no increase in the facility VOC emissions.

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

Rule 1401: Compliance with this rule is expected.

RULE 2005: Northrop Grumman is a NOx RECLAIM facility. The proposed project will not result in an increase in NOx emissions. Compliance with rule is expected.

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 2nd permit revision to the Title V renewal permit issued to this facility on September 7, 2011. 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 Cumulative to date. Title V permit renewed Sept.7, 2011	0	0	0	0	0	0
2nd Permit Revision; A/N 537096 Facility permit revision to; A/N 5537099 add D572 to Process 11, System 1 A/N 537112 add D525, D537, D611 & D614 to Process 11, System 2 A/N 537100 vent D525 to C232 A/N 537102 vent D537 to C160 A/N 537105 vent D572 to C460	0	0	0	0	0	0
Cumulative Total	0	0	0	0	0	0
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.

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:

This equipment will operate in compliance with all District Rule and Regulations. Permits to Construct are recommended for application numbers 537099, 537100, 537102, 537105 & 537112 subject to preceding conditions.