UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO.: MA0001511

STATE PERMIT NO.: 385

NAME AND ADDRESS OF APPLICANT:

Raytheon Company - Equipment Division
430 Boston Post Road
Wayland, Massachusetts 01778

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Raytheon Company - Equipment Division
430 Boston Post Road
Wayland, Massachusetts 01778

RECEIVING WATER: Sudbury River

CLASSIFICATION: Class B

I. Proposed Action, Type of Facility.

The above named applicant has applied to the U.S. Environmental Protection Agency for issuance of its NPDES permit to discharge into the designated receiving water. The facility is engaged in the development of techniques for the production of printed circuit boards. The discharges are from treated electroplating wastewater, treated sanitary waste, non-contact cooling water, boiler blowdown cooling tower blowdown and stormwater run-off.

II. Description of Discharge.

A quantitative description of the discharge in terms of significant effluent parameters based upon self monitoring data is shown on Attachment A.

III. Limitations and Conditions.

The effluent limitations of the draft permit, the monitoring requirements, and any implementation schedule (if required) may be

EXHIBIT 8

found on the following attachments:

Attachment B and C.

IV. Permit Basis and Explanation of Effluent Limitation Derivation.

The Equipment Division of Raytheon Company develops techniques and process sequences for the production of printed circuit boards. A pilot printed circuit finishing department is maintained to test and establish new procedures. The plating operation is only a small segment of the work performed at Raytheon Equipment Division in Wayland, Massachusetts. The plant operates five days per week. Metal plating and finishing process wastewaters are generated from rinse tanks and floor spillage in the printed circuit laboratory. This wastewater, averaging about 4,000 gpd, is treated by metal precipitation and chromium reduction, neutralized and then discharged (Outfall 001) to a storm drain which leads to the Class B Sudbury River. Sanitary wastewater averaging 18,000 gpd are treated by comminution, extended aeration, sand filtration and chlorination. The treated sanitary effluent (Outfall 002) discharges to the same stormdrain noted above. A recirculating cooling water system is operated 24 hours per day, 7 days per week, 365 days per year. The system incorporates four cooling towers(two new towers were added during the last 5 years) used for heating ventilation and air conditioning(HVAC) and other process needs. Under normal conditions a tower blow-down(outfall 003) of 4,000 gpd maximum daily is discharge from this system. Also, 120,000 gallons of uncontaminated non-contact cooling water is discharge from various sources into the storm drain. An algicide sold under the name of "Microbiocide 300" (EPA Registration number 31910-2-712) is periodically added to the cooling system to prevent excessive algae growth. The company has reported that they will be switching to " Microbiocide 100"(EPA registration number 10634-MA-1) containing n-alkyl dimethyl benzyl ammonium chloride(quaternary ammonium compound). EPA has allowed the use of Microbiocide 100.

Two boilers are operated at the Equipment Division. the boilers are blowdown once each day, five days per week, at an estimated 1,695 max. daily gallons per day. The blowdown effluent(Outfall 004), joins the same storm drain carrying the three other effluent to the Sudbury River.

The Sudbury River has its beginning in the town of Westborough, flowing from Cedar Swamp eastward to Framingham, then north through the towns of Sudbury, Wayland, Lincoln, and into the town of Concord, forming the Concord River at its confluence with the Assabet River. The Sudbury River is characterized by three distinct physical sections. Upstream of Framingham, the river is a narrow, rapidly flowing stream dotted with a few small impoundments. In Framingham, the river has two large impoundments: the first is part of the Metropolitan District Commission water

supply, and the second is created by the Colonna Dam in Saxonville. The third and unique section of the river is that which flows through the National Wildlife Refuge meadowlands in the towns of Sudbury, Wayland, Lincoln, and Concord. Through this area (river distance of 12 miles), the river's elevation changes only one foot and the river is akin to an elongated lake.

The Sudbury River is 41 miles long with a drainage area of 138 square miles, 29 of which drain to the MDC reservoirs. This area has been rapidly urbanized with significant population growth over the last 20 years. The Class B Sudbury River has suffered from a summer dissolved oxygen and coliform problem created by urban runoff, septic leachate, and primarily by adjoining meadowlands draining organic oxygen demanding material into the main channel of the river. The river receives no municipal wastewater discharges to its main stream above Raytheon. Low flows for the Sudbury River at the Raytheon Equipment Division storm rain are recalculated to be 18.0 cfs at 7Q10.

The Clean Water Act (CWA) requires that discharges satisfy both minimum technology and water quality requirements. At the present time industries are required to meet limitations based on Best Available Technology Economically Achievable (BAT) for toxic pollutants and Best Conventional Pollutant Control Technology (BCT) for conventional pollutants (BOD, TSS, pH, Fecal Coliform, and Oil and Grease), as required on Section 301 (b)(2)(A) and (E) of the CWA.

Final regulations establishing BPT/BAT requirements for the Metal Finishing Industry were promulgated by EPA on July 15, 1983, 40 CFR 133. On October 29, 1982, (47 FR 49180), EPA proposed that BPT requirements are stringent enough to also satisfy the BCT requirements of the CWA. EPA has, therefore, used the National Guidelines promulgated July 15, 1983 as the basis for the draft permit except where 1) receiving stream water quality, 2) state certification requirements or 3) federal anti-backsliding provisions (40CFR 122.44) or 4) best professional judgement(BPJ), pursuant to 40 CFR 402 (a)(1) dictate more stringent limits. The proposed permit limitations have been established on a concentration basis consistent with the final regulations.

OUTFALL 001- Electroplating wastewater

Outfall 001- Flow

The existing limits of 15,000 gpd average monthly and 25,000 gpd maximum daily flows are maintained as in the expiring permit based on anti-backsliding regulations. The flow volume discharged from this outfall during the last two years, has been lower that the flows established for this permit, hence, it is anticipated that the dilution ratio of 90 to 1 for the low flows(7Q10) will not be influenced by these low discharge flows.

Outfall 001- Conventional Pollutants

Three conventional pollutants are maintained in the new permit at the same level of the expired permit. Total suspended solids, oil and grease, and pH are limited at 20 mg/l average monthly, 30 mg/l maximum daily, 15 mg/l maximum daily and the range of 6.5 to 9.0 respectively. See attachment B.

Outfall 001 - Toxic pollutants

With the exception of lead reissued with a more stringent limit based on dilution calculation(.18 mg/l), all other pollutants established in the existing permit have been maintained in the new permit based on anti-backsliding regulations. See attachment B. The new requirements for the control of the average monthly and maximum daily concentrations of residual chlorine, zinc and Aluminum, are set at 0.5 mg/l and 2.6 mg/l; 4.2 mg/l and 1.5 mg/l; 1.5 and 2.0 mg/l respectively. Residual chlorine was set based on dilution calculations, zinc was set based on EPA technology requirements, and aluminum was set based on state technology requirements. Monitoring requirements for the control of formaldehyde, Toluene, 1,1,1,Trichloromethane, Trichloroflouromethane are necessary for the control of toxics and volatile organics(VO) which may be present in the discharge, these were reported in the permit application as potentially present. EPA have set monitoring of the pollutants indicated above based on Best Professional Judgement(BPJ), 40 CFR 402 (a)(1). Discharge monitoring reports (DMR), indicated that the copper limit was exceeded two times during the last two years of monitoring. See attachment A.

The limitation of 2.13 mg/l for total toxic organics (TTO) has been regulated again in this issuance as specified in the federal metal finishing effluent guidelines based on anti-backsliding. TTO is the summation of all quantifiable values greater than 0.01 mg/l for any of the priority pollutants found present. An alternative to the periodic testing for each compound is a submission of a statement by the permittee certifying that no dumping of concentrated toxic organics has occurred since filing of the last monitoring report. The permittee must also submit a satisfactory solvent management plan prior to utilizing the certification alternative. The plan must specify, to the satisfaction of EPA, procedures for ensuring that the TTO's used do not reach the wastewater discharge. The plan then becomes part of and an enforceable provision of the permit.

Outfall 002- Sanitary Wastewater

Discharge 002- Flow

The flow volume for this discharge has been maintained at the same

level as in the expiring permit, at 30,000 average monthly and 65,000 maximum daily limits. DMR reports for this parameter shows that for the last two years, limits, have been within the design capacity of the treatment plant. See attachment A.

Discharge 002- Conventional and Non-conventional Pollutants

Conventional pollutants; BOD, TSS and pH, have been maintained as in the expired permit. BOD and TSS and pH are set both at 30 mg/l average monthly and 50 mg/l maximum daily, and pH was set at 6.5 to 8.0 standard units. Settleable solids(SS) and Fecal Coliform are non-conventional pollutants regulated again in the new permit at 0.1 mg/l average monthly and 0.3 mg/l maximum daily and 200 organisms per 100 ml average monthly and 400 organisms per 100 ml maximum daily respectively. All these parameters have been regulated based on anti-backsliding pursuant to 40 CFR. 122.44.

Discharge 002- Toxic pollutants

The limit on Fluorides has been maintained as in the expired permit at 17.4 mg/l average monthly and 36 mg/l maximum daily, based on anti-backsliding. The limit for chlorine residual has been change from the range of 0.5 to 1.5 mg/l, after 15 minutes of contact time, to 0.5 mg/l, maximum daily, required at all times during disinfection. This requirement is based on new water quality standards required by the State. No violations were noted for this discharge during the last two years of reported DMRs.

Discharge 003- Combined surface blow-down

Discharge 003- Flow

The existing maximum daily flow limit set at 800 gallons has been changed. The newly proposed maximum daily and average monthly limits both set at 4,000 gpd are based on new flow information reported by permittee. DMRs indicates that the flow limitation exceeded the existing permit limits during three consecutive quarters. The flow increase was necessary due to an increase of cooling tower blowdown. The new permit requires the permittee to monitor and report analysis on a bi- monthly bases. The above limitation is base on BPJ requirements pursuant to 40 CFR 402(a)(1).

Discharge 003- Conventional pollutants

The two conventional pollutants regulated again for this discharge are temperature and pH, these are set at 85°F maximum daily and 6.5 to 8.0 s. u. respectively. these requirements are based on anti-backsliding.

Discharge 003- Toxic pollutants

A new, chlorine residual limit, has been regulated at 0.5 mg/l maximum daily for this discharge. Permit application shows traces of this pollutant, its control is necessary for the protection of micro organisms residing at the discharge area. This new requirement is based on BPJ, pursuant to 40 CFR 402(a)(1).

The existing requirement for the addition of up to 10 gallons per week of algicide containing less than 50% of the active ingredients: Sodium Dimethyldifluorcarbamate and dissodium Ethylene Bisdithhiocarbamate to the cooling water system will be suspended and replaced with the addition of up to 10 mg/l twice per week of active ingredients n-alkyl dimethyl benzyl ammonium chloride(quaternary ammonium compound). Also, the maximum daily addition of 10 mg/l of potassium hydroxide, organo phosphonate, polyacrylate polymer, sodium molybdate, and sodium 2-mercaptobenzothiazole(2 mg/l) are permitted. See attachment B.

Discharge 004- Boiler blowdown

The permittee is required to monitor and report for this discharge: Flow, Temperature.

Discharge 004- Flow

The flow limits proposed for this discharge were set at 1,695 gpd monthly average and 1,695 gpd maximum daily based on new flow information. The temperature set at 212 °F has been maintained based on anti-backsliding. The chlorine residual set at 0.5 mg/l maximum daily is based on state water quality requirements.

Discharge 005 - Mixed wastewater from all outfalls

Discharge 005 - Flow and toxicity requirements

The flow limit proposed for this outfall set at 172,695 gpd(for 8hr) is the summation of all flows reported in the permit application. Toxicity testing analyses permitted at LC50=100% was imposed based on stream dilution to control the impact of the combined flow into the aquatic community residing at the point of discharge. This requirement is based on Water Quality Requirements(please see attachment B).

V. State Certification Requirements.

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Division of Water Pollution has reviewed the draft permit and advised EPA that the limitations are adequate to protect

water quality. EPA has requested permit certification by the State and expects that the draft permit will be certified.

VI. Comment Period, Hearing Requests, and Procedures for Final Decisions.

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Water Quality Branch, JFK Federal Building, Boston, Massachusetts 02203. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues proposed to be raised in the hearing. A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston Office.

Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of the final permit decision any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of 40 C.F.R. §124.74, 45 Fed. Reg. 14279-14280 (April 1, 1983).

VII. EPA Contact.

Addition information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

Victor R. Alvarez
John F. Kennedy Federal Building
Boston, Massachusetts 02203
Telephone: (617)565-3501

August 8, 1990
Date

David A. Fierra
Director
Water management Division
Environmental Protection Agency

ATTACHMENT A

Discharge 001
Treated Industrial Wastewater from Electroplating process plus floor spillage.
Discharging Monitoring Reports(DMR) data, shown below is from 01/31/88 to 02/28/90.

PARAMETER NAME	PERMIT LIMITS AVE.M/WEEK.M/MAX.D	REPORTED LIMITS AVE.M/WEEK.M/MAX.D
FLOW, GPD	15,000/-/25,000	3,099/-/13,061
pH, s.u.(range)	6.0 TO 9.0	6.6 TO 9.0
TSS, mg/l	20/-/30	8.3/-/26
O & G, mg/l	-/-/15	/-/6.6
FLUORIDE, mg/l	17/-/36	4.6/-/17
CHROMIUM,T. mg/l	1.5/-/2.0	0.006 /-/0.05
CHROMIUM HEX. mg/l	0.05/-/ 0.10	0.005/-/0.002
**COPPER, T.mg/l	- /-/0.8	-/-/0.98
LEAD, T. mg/l	0.43/-/0.69	0. 07/-/0.20
NICKEL, T. mg/l	1.8/-/3.0	0.02/-/0.04
TIN, T. mg/l	2.0/-/3.0	0.21/-/2.5
TTS, MG/L	-/-/2.13	-/-/1.18
DISCHARGE 002 TREATED SANITARY WASTEWATER		
FLOW, GPD	30,000/-/65,000	19,657-48,300
BOD_5, GPD	30 / - / 50	12/ - / 43
pH, s.u.(range)	6.0 TO 9.0	6.5- 8.5
TSS, mg/l	30 / - / 50	3.63/-/21
SS, mg/l	01./- /0.3	<1/-/<1
FLUORIDE, mg/l	17.4/-/ 36	0.44/-/7.4
CHLORINE, mg/l	0.5/-/1.5	0.46/-/1.5
COLIFORM, 100/ml	200/200/400	0/4.2/100
DISCHARGE 003 COMBINED SURFACE BLOW OFF (Reported quarterly)		
TEMP, ^{o}F	-/-/85	-/75.4/80
**FLOW, GPD	-/-/800	342/-/5800
pH, s.u.(range)	6.0 to 9.0	7.95 to 8.8

NR = NOT REPORTED
* = VIOLATION 3 QUARTERS
** = VIOLATION 2 TIMES

Part I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 001, treated electroplating wastewater effluent including floor spillage.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations Average Monthly	Discharge Limitations Maximum Daily	Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
Flow (gpd)	15,000	25,000	Continuous	Meter Reading
TSS	20 mg/l	30 mg/l	2/Month	Composite
Aluminum, Total	1.5 mg/l	2.0 mg/l	2/Month	Composite
Copper, Total	0.8 mg/l	0.8 mg/l	2/Month	Composite
Chromium, Hexavalent	0.05 mg/l	0.10 mg/l	2/Month	Grab
Chromium, Total	1.5 mg/l	2.0 mg/l	2/Month	Composite
Chlorine, Residual	-	0.5 mg/l	2/Month	Grab
Tin, Total	2.0 mg/l	3.0 mg/l	2/Month	Composite
Lead, Total	.18 mg/l	.69 mg/l	2/Month	Composite
Nickel, Total	1.8 mg/l	3.0 mg/l	2/Month	Composite
Zinc, Total	2.6 mg/l	4.2 mg/l	2/Month	Composite
Fluorides	17.0 mg/l	36 mg/l	2/Month	Composite
Oil and grease	-	15 mg/l	2/Month	Composite
TTO	-	2.13 mg/l	1/Quarter	Grab
* Volatile Organics,	Report	Report	1/Quarter	Grab sample average

The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored continuously. Report daily range.

* Volatile Organics: Formaldehyde, Methylene Chloride, Toluene, 1,1,1, Trichloroethane, Trichloroflouromethane.

See page 6 of 9 for definition of Total Toxic Organics (TTO).

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the location where the effluent from electroplating process wastewater leaves the treatment facility and before mixing with or get diluted with other waters and wastewater discharges.

Part I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

2. During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 002 treated sanitary wastewater effluent.

a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow, GPD	30,000	65,000	2/Month	Total Daily
BOD	30 mg/l	50 mg/l	2/Month	Composite
TSS	30 mg/l	50 mg/l	2/Month	Composite
Settleable Solids	0.1 mg/l	0.3 mg/l	2/Month	Grab
Fluorides	17.4 mg/l	36 mg/l	2/Month	Composite
*Fecal Coliform, per 100 ml	200	400	2/Month	Grab
Chlorine Residual	-	0.5 mg/l	2/Month	Grab

The pH shall not be less than 6.5 standard units nor greater than 8.0 standard units and shall be monitored twice per month. Report range of 4 grabs.
There shall be no discharge of floating solids or visible foam in other than trace amounts.
Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge point, where the effluent exits the domestic treatment facility and prior to be diluted with other waters.
* Geometric mean

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 003 - Combined surface blow-down from the cooling water tower system.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow	4,000 gpd	4,000 gpd	2/Month	calculated
Temperature	-	85°F	2/Month	Grab
Chlorine Residual	-	0.5 mg/l	2/Month	Grab

The addition of up to 10 mg/l twice per week(maximum concentration) of " Microbiocide 100 containing: n-alkyl dimethyl benzyl ammonium chloride(quaternary ammonium compound), or other chemicals namely: potassium hydroxide, organo phosphonate, polyacrylate polymer, sodium molybdate, sodium 2-mercaptobenzothiazole(2 mg/l) to the cooling water blow-down is permitted. The use of other chemical additions to the cooling system is prohibited without written prior authorization from the permitting authority.

The pH shall not be less than 6.5 standard units nor greater than 8.0 standard units and shall be monitored once per month. Report range of 2 grabs.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge point prior to mixing with any other effluent or the receiving stream. system.

Part I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

4. During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 004- Boiler blowdown.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow	1,695 gpd	1,695 gpd	1/Month	Calculate
Temperature	-	212°F	1/Month	Grab

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge point prior to mixing with any other effluent or the receiving stream.

Part I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

5. During the period beginning on the effective date and lasting through the expiration date the permittee is authorized to discharge from outfall serial number 005, treated electroplating wastewater effluent Sanitary wastewater, Noncontact cooling, boiler blowdown, and cooling tower blowdown.

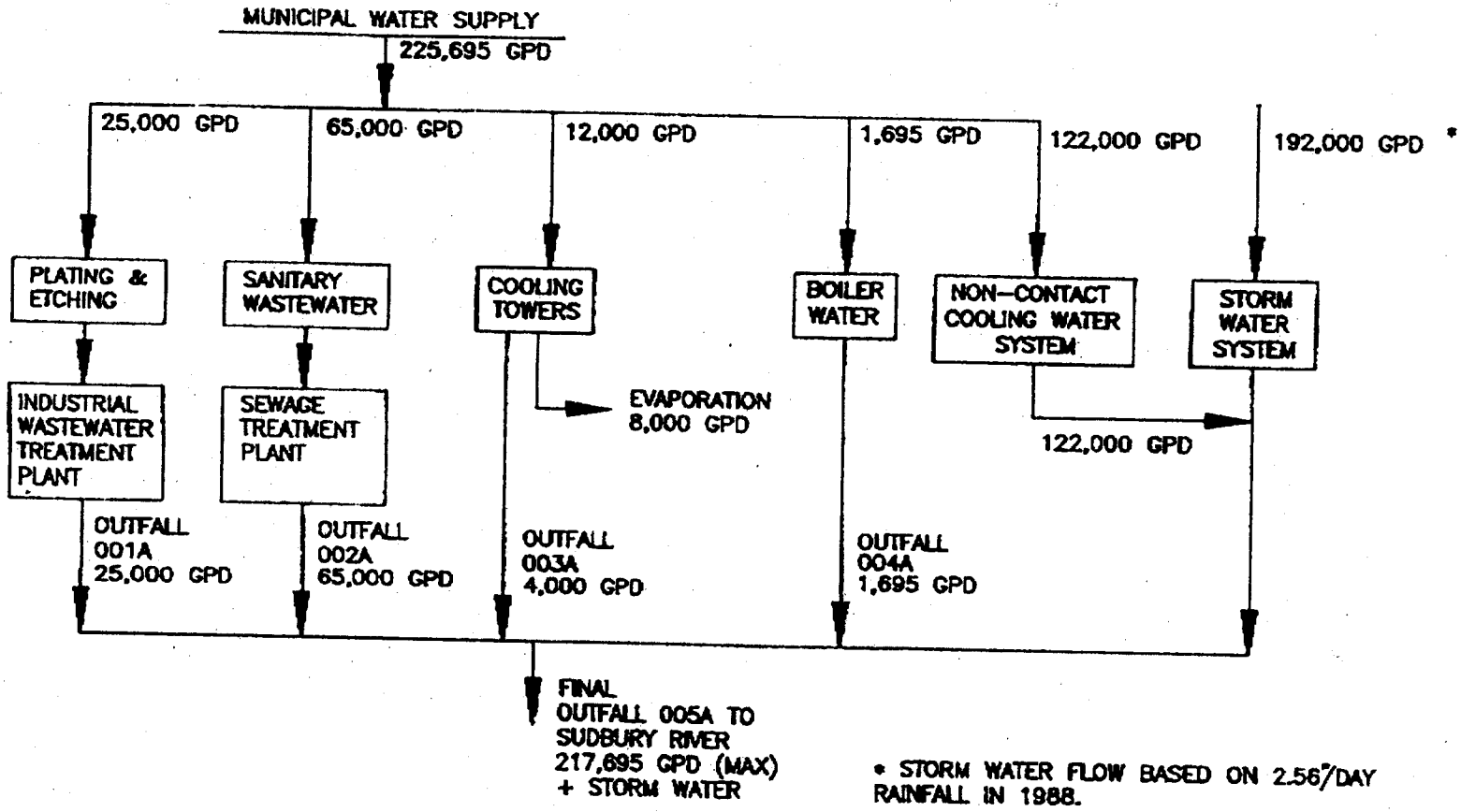
a. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations		Monitoring Requirements	
	Average Monthly	Maximum Daily	Measurement Frequency	Sample Type
Flow (gp8hrd)	172,695	-	4(1/qtr)	calculate
*Toxicity Testing (Attachment A of permit)	LC_{50} = 100%	-	4(1/qtr)	Composite

Samples taken in compliance with the monitoring requirements specified above shall be taken at the location where the effluent leaves the end of the pipe and before mixing with Sudbury River.

*Toxicity Testing Analyses shall be performed at times when all four discharges are active. Take samples on October(report November), January(report February), April(report March), and July(report August)

ATTACHMENT C



RAYTHEON COMPANY
WAYLAND, MA.
MAXIMUM PERMITTED
DISCHARGE LIMITS 8-10-90