

U N I V E R S I T Y O F

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# CONNECTICUT

ENVIRONMENTAL HEALTH AND SAFETY

License No. 06-01450-47  
Docket No. 030-10576  
Control No. 124940

April 16, 1998

John. D. Kinneman  
Division of Nuclear Materials Safety  
U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406-1415

Dear Mr. Kinneman:

Please find enclosed an amendment request to use the limits for discharge to the sanitary sewer in 10 CFR 20.2003 and thus have no requirement for sampling of the discharge from the sewer plant, along with additional information requested in your letter dated December 23, 1997.

If you have any technical questions regarding this amendment request, please call Edward Wilds at (860) 486-3613.

Sincerely,



Frank Labato  
Director

Enclosure:

1. Amendment Request
2. Additional information requested in letter dated December 23, 1997



### **Item 3 - Addresses Where Licensed Material Will be Used or Possessed.**

The University of Connecticut is submitting an updated list of authorized locations for the use and possession of licensed radioactive material to correct a name change for the Mansfield Training School campus to the Depot Campus and a relocation of a Stamford campus. The updated list is as follows:

<b><u>LOCATION</u></b>	<b><u>PROPOSED ACTIVITIES</u></b>
University of Connecticut, Storrs, CT 06269	Research and Development as defined in 10 CFR 30.4, Animal Studies, Educational Purposes, and Calibration of Gamma Survey Meters.
University of Connecticut at Avery Point, Avery Point Groton, CT. 06340	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut at Stamford, University Place Stamford, Connecticut 06901	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut at Hartford 85 Lawler Road West Hartford, CT 06117	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut at Waterbury 32 Hillside Avenue Waterbury, CT 06710	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut at Torrington University Drive Torrington, CT 06790	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut Depot Campus Mansfield, CT 06268	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.
University of Connecticut Marine Science Institute Building 27 Avery Point Groton, CT 06340	Research and Development as defined in 10 CFR 30.4, Animal Studies, and Educational Purposes.

University of Connecticut  
Noank Marine Research Laboratory  
Noank, CT 06340

Research and Development as defined in 10  
CFR 30.4, Animal Studies, and Educational  
Purposes.

## **Item 11 - Waste Management.**

The University of Connecticut requests that its license be amended to define its water pollution control facility as a sanitary sewerage for the purposes of 10 CFR Part 20. This classification is to allow waste disposal in accordance with 10 CFR Part 20.2003 without requiring the testing of sanitary sewage sludge for radioactive material content prior to disposal. See the enclosed information for details of the University's responses the U.S. Nuclear Regulatory Commission, Region I's letter dated December 23, 1997.

This is a partial response to the U.S. Nuclear Regulatory Commission's letter dated December 23, 1997. The following additional information is referenced to the paragraph number used by the U.S. Nuclear Regulatory Commission.

1. With regard to the existing sludge test results:
  - a. Provide a description of the test method utilized by ORISE.  
See the enclosed procedures from ORISE.
  - b. Provide the uncertainty of the test results.  
See the following tables.
  - c. Provide the MDC or MDA of the system.  
See the following tables.

#### HYDROGEN-3 AND CARBON-14 CONCENTRATIONS IN SLUDGE SAMPLES

Date	<sup>3</sup> H		<sup>14</sup> C	
	Activity <sup>a,b</sup>	MDC <sup>b</sup>	Activity <sup>a,b</sup>	MDC <sup>b</sup>
05/28/97 Silo 1	-0.27 ± 0.65	1.14	1.252 ± 0.238	0.371
05/28/97 Silo 2	-0.63 ± 0.61	1.08	0.116 ± 0.211	0.358
09/29/97 Silo 2 Replicate #A	0.96 ± 0.67	1.10	-2.146 ± 1.646	2.867
09/29/97 Silo 2 Replicate #B	0.16 ± 0.60	1.02	-1.386 ± 1.828	3.154
09/29/97 Silo 2 Replicate #C	0.27 ± 0.61	1.04	-1.242 ± 1.830	3.154
09/29/97 Silo 2 Replicate #D	0.82 ± 0.65	1.08	-0.302 ± 1.821	3.092
11/14/97 Silo 1 Replicate #A	-0.53 ± 0.40	0.71	3.40 ± 2.29	3.77
11/14/97 Silo 1 Replicate #B	-1.17 ± 0.38	0.71	1.27 ± 2.11	3.55
11/14/97 Silo 1 Replicate #C	0.46 ± 0.43	0.71	1.00 ± 1.88	3.17
11/14/97 Silo 1 Replicate #D	0.19 ± 0.42	0.71	0.77 ± 2.18	3.70

<sup>a</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>b</sup>Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

# PHOSPHORUS-32/33 AND SULFUR-35 CONCENTRATIONS IN SLUDGE SAMPLES

Date	<sup>32</sup> P/ <sup>33</sup> P		<sup>35</sup> S	
	Activity <sup>a,b</sup>	MDC <sup>b</sup>	Activity <sup>a,b</sup>	MDC <sup>b</sup>
05/28/97 Silo 1	0.117 ± 0.107	0.177	2.208 ± 1.346	2.221
05/28/97 Silo 2	-0.023 ± 0.106	0.180	1.537 ± 1.497	2.502
09/29/97 Silo 2 Replicate #A	0.055 ± 0.055	0.092	0.070 ± 0.163	0.275
09/29/97 Silo 2 Replicate #B	0.051 ± 0.064	0.108	0.180 ± 0.164	0.273
09/29/97 Silo 2 Replicate #C	0.093 ± 0.068	0.113	-0.143 ± 0.158	0.276
09/29/97 Silo 2 Replicate #D	0.056 ± 0.058	0.096	-0.090 ± 0.157	0.272
11/14/97 Silo 1 Replicate #A	0.08 ± 0.07	0.11	-2.50 ± 0.39	0.76
11/14/97 Silo 1 Replicate #B	0.12 ± 0.08	0.13	-2.48 ± 0.40	0.77
11/14/97 Silo 1 Replicate #C	0.11 ± 0.08	0.14	-2.29 ± 0.40	0.76
11/14/97 Silo 1 Replicate #D	0.12 ± 0.07	0.12	-2.43 ± 0.39	0.76

<sup>a</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>b</sup>Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

### CALCIUM-45 CONCENTRATIONS IN SLUDGE SAMPLES

<sup>45</sup> Ca		
Date	Activity <sup>a,b</sup>	MDC <sup>b</sup>
09/29/97 Silo 2 Replicate #A	0.006 ± 0.078	0.139
09/29/97 Silo 2 Replicate #B	0.078 ± 0.097	0.162
09/29/97 Silo 2 Replicate #C	-0.040 ± 0.089	0.164
09/29/97 Silo 2 Replicate #D	-0.012 ± 0.076	0.138

<sup>a</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>b</sup>Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

The initial <sup>14</sup>C test result of 1.25pCi/g ± 0.24pCi/g for silo #1 samples on 05/28/97 raised the possibility of licensed radioactive <sup>14</sup>C being present in the sanitary sewage sludge. In response to this test result Radiation Safety collected six additional replicate samples of silo #1 to determine whether the initial result was reproducible. The University sent the six replicate samples of sludge from silo #1 for confirmatory analysis of its <sup>14</sup>C content to Oak Ridge Institute for Science and Education (ORISE). ORISE conducted both the initial and confirmatory analysis of the sludge. The results of this replicate testing are given in the table below. Activities are reported as pCi/g of sludge at 95% confidence. ORISE altered the sample quantity in these tests in an attempt to minimize the risk of possible interferences. The laboratory also reported that it followed ESSAP's QC procedures and all QC results were within acceptable limits.

### CARBON-14 CONCENTRATION IN REPLICATE SLUDGE SAMPLES OF SILO #1

Sample ID	Activity <sup>a,b</sup>	MDC <sup>b</sup>
ST082897S1A	-1.1 ± 0.9	1.5
ST082897S1B	-1.5 ± 0.8	1.3
ST082897S1C	-0.9 ± 0.7	1.1
ST082897S1D	-0.8 ± 0.7	1.2
ST082897S1E	-1.2 ± 0.7	1.2
ST082897S1F	-1.4 ± 0.8	1.4

<sup>a</sup>Uncertainties represent the 95% confidence level, based only on counting statistics.

<sup>b</sup>Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

The confirmatory test results show that all samples from silo #1 were both below minimum detectable concentration (MDC) and below background levels (negative numbers). The University believes that the  $^{14}\text{C}$  content of 1.25pCi/g originally found in sanitary sewage sludge silo #1 most likely represented a false positive rather than a statistically accurate measure of the sludge's  $^{14}\text{C}$ . It is also possible that unusually high levels of organic material were delivered to that silo, and may have brought naturally occurring  $^{14}\text{C}$  levels up into the detectable range. If this were the case, then the decline of  $^{14}\text{C}$  levels over time due to loss of  $\text{CO}_2$  to the atmosphere, would explain the current, undetectable levels. Calculations based on our disposal records show that the  $^{14}\text{C}$  content of silo #1, suggested by the original testing exceeded the amount of licensed material put into the sanitary sewage system at that time. Consequently, this level must represent either an error or naturally occurring  $^{14}\text{C}$ . In any event, the new test results for  $^{14}\text{C}$ , coupled with the original test results for the other isotopes show that the sludge in silo #1 contains no detectable radioactive materials.

- d. Specify whether instrument background and/or natural background has been subtracted from the results.  
ORISE reports that only instrument background has been subtracted from the test results.
- e. For each pCi/gm designation, specify the material that comprises the gram (biomass, carbon, sludge). Note: This applies to test results and the background measurements/standards.

The test results are reported in pCi/gm of sludge. A gram of sludge consists of approximately 95% water and 5% solids. The table below gives the percent moisture measurements for one set of sludge samples.

**PERCENT MOISTURE IN SLUDGE SAMPLES**

Sample ID	Percent Moisture	Percent Solid
09/29/97 Silo 2 Replicate #A	96.17	3.83
09/29/97 Silo 2 Replicate #B	95.44	4.56
09/29/97 Silo 2 Replicate #C	95.31	4.69
09/29/97 Silo 2 Replicate #D	95.95	4.05

- f. Supply your calculations for background indicating how pCi/gm of carbon in biomass was determined.

Dr. Willard F. Libby's text "Radiocarbon Dating" states on pages 13 and 14 "the observed specific radioactivity in absolute disintegrations per minute per gram of carbon are recorded, Table 2 applying to the biosphere and Table 3 to the inorganic." These tables show a specific activity averaging near 15 dpm/gm. The text also states on page 17 "The average specific activity of all the biosphere samples is found to be  $15.3 \pm 0.5$  absolute disintegrations per minute per gram." There appeared to be a contradiction in the text. The first statement gives the specific activity per gram of carbon and the second statement gives the specific activity per gram of biosphere sample (biomass). Examination of the references for Table 3 also shows a contradiction. The article by H. Suess in *Science*, 120,467 (1954) states that Dr. Libby determined the specific activity of contemporaneous wood carbon to be  $15.3 \pm 0.1$  dpm. The next article by J. L. Kulp, H. W. Feely, and L. E. Tryon in *Science*, 114, 565 (1951) states that Dr. Libby determined the specific activity for modern wood to be 15.1 dpm/gm. The *CRC Handbook of Chemistry and Physics*, 75<sup>th</sup> Edition, CRC Press, Boca Raton also states in the table of Atomic Masses and Abundances that the natural abundance of  $^{14}\text{C}$  varies so widely that a meaningful natural abundance cannot be defined. An Internet search on  $^{14}\text{C}$  content in biomass led to a site for the University of Walkouts Radiocarbon Dating Laboratory in New Zealand. This page also listed a contradiction in the relative abundance of  $^{14}\text{C}$ . Dr. Wilds contacted Dr. Higham of the Radiocarbon Dating Laboratory to determine which listing of the natural abundance of  $^{14}\text{C}$  should be used for biomass. Dr. Higham stated that the two abundances listed on their home page represented two slightly different things. The percentage of 0.0000000010% represented the percent of  $^{14}\text{C}$  to the global carbon in living things. The other statement, 1  $^{14}\text{C}$  atom for every 1,000,000,000,000  $^{12}\text{C}$ , represents the abundance of  $^{14}\text{C}$  to inorganic  $^{12}\text{C}$  only. Dr. Higham believed the best estimate of the abundance is probably that  $^{14}\text{C}$  is  $1\text{e-}9$  ( $1 \times 10^{-9}$ ) percent of global carbon in living organisms and  $1\text{e-}10$  ( $1 \times 10^{-10}$ ) percent of inorganic carbon.

The University of Connecticut calculated an estimated activity for biomass using the  $^{14}\text{C}$  abundance recommended by Dr. Higham to try to resolve the discrepancy in Dr. Libby's text on radiocarbon dating. The following assumptions were made.

1. Start with 1 gram of generic biomass.
2. Each gram of generic biomass contains about 12% global carbon by weight.
3. There are  $6.02 \times 10^{23}$  atoms per 12.011 grams of carbon.
4. The abundance of  $^{14}\text{C}$  to global Carbon is  $1 \times 10^{-11}$  in living organisms.
5. The decay constant for  $^{14}\text{C}$  is  $2.3 \times 10^{-10} \text{ min}^{-1}$ .

A calculation estimating the activity of 1 gram of generic biomass using the above assumptions is given below:



$$(1 \text{ gm biomass}) \left( \frac{0.12 \text{ gm C}}{1 \text{ gm biomass}} \right) \left( \frac{6.02 \times 10^{23} \text{ C atoms}}{12.011 \text{ gm C}} \right) \left( 1 \times 10^{-11} \frac{{}^{14}\text{C}}{\text{Global C in biomass}} \right) \left( \frac{2.3 \times 10^{-10}}{\text{min.}} \right) \approx 14 \text{ dpm}$$

This calculation suggests that the specific activity stated on page 17 in Dr. Libby's text is correct. 15.3dpm/gm biomass converts to approximately 7pCi/gm biomass, the value used in our license amendment application.

The University of Connecticut also calculated an estimated activity for the  ${}^{14}\text{C}$  abundance in inorganic carbon recommended by Dr. Higham. This approximates the abundance of  ${}^{14}\text{C}$  in  $\text{CO}_2$  in the atmosphere. The following assumptions were made.

1. Start with one gram of inorganic carbon.
2. There are  $6.02 \times 10^{23}$  atoms per 12.011 grams of carbon.
3.  ${}^{12}\text{C}$  makes up 98.9% of inorganic carbon.
4. The abundance of  ${}^{14}\text{C}$  to  ${}^{12}\text{C}$  is  $1 \times 10^{-12}$ .
5. The decay constant for  ${}^{14}\text{C}$  is  $2.3 \times 10^{-10} \text{ min}^{-1}$ .

A calculation estimating the activity of 1 gram of carbon using the above assumptions is given below:

$$(1 \text{ gm carbon}) \left( \frac{6.02 \times 10^{23} \text{ C atoms}}{12.011 \text{ gm C}} \right) \left( 0.989 \frac{{}^{12}\text{C}}{\text{C}} \right) \left( 1 \times 10^{-12} \frac{{}^{14}\text{C}}{{}^{12}\text{C}} \right) \left( \frac{2.3 \times 10^{-10}}{\text{min.}} \right) \approx 11 \text{ dpm}$$

This difference represents the large variation of  ${}^{14}\text{C}$  in various compounds and demonstrates the inability to use a single value for the percent abundance of  ${}^{14}\text{C}$  in the environment.

2. With regard to your sludge testing program:


- f. Identify the total radioactive material that is disposed via sink disposal by isotope and time period (quarterly/yearly).

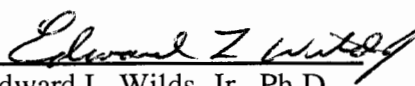
See the following table.

**RADIOACTIVE MATERIAL DISPOSED  
VIA SINK DISPOSAL BY ISOTOPE AND MONTH**

<b>Month &amp; Year</b>	<b><sup>14</sup>C (mCi)</b>	<b><sup>3</sup>H (mCi)</b>	<b><sup>32</sup>P (mCi)</b>	<b><sup>35</sup>S (mCi)</b>	<b><sup>33</sup>P (mCi)</b>	<b><sup>45</sup>Ca<sup>a</sup> (mCi)</b>
Jan 96	0.055	3.091	4.821	2.177	0.000	0.000
Feb 96	0.061	1.479	5.658	1.336	0.000	0.000
Mar 96	0.043	0.569	5.745	2.129	0.000	0.000
Apr 96	0.006	0.006	4.286	0.967	0.000	0.000
May 96	0.031	0.745	4.074	1.226	0.000	0.000
Jun 96	8.352	53.499	4.524	0.796	0.000	0.000
Jul 96	0.002	0.170	4.454	2.851	0.000	0.000
Aug 96	0.015	0.747	3.249	0.894	0.000	0.000
Sep 96	0.015	1.037	3.914	2.273	0.000	0.000
Oct 96	0.189	1.026	1.904	2.212	0.000	0.000
Nov 96	0.146	1.006	2.164	1.418	0.000	0.000
Dec 96	0.090	0.338	1.590	0.682	0.000	0.000
Jan 97	0.042	0.329	1.237	0.822	0.000	0.000
Feb 97	0.070	1.031	2.697	1.989	0.000	0.000
Mar 97	0.083	1.024	1.945	2.064	0.000	0.000
Apr 97	0.032	1.408	2.502	1.532	0.000	0.000
May 97	0.250	1.743	1.622	1.390	0.000	0.000
Jun 97	0.402	0.648	1.917	1.502	0.000	0.029
Jul 97	0.000	1.217	2.418	1.803	0.000	0.000
Aug 97	0.010	2.210	2.741	0.847	0.000	0.000
Sep 97	0.110	2.742	2.476	2.831	0.000	0.000
Oct 97	0.140	0.689	2.173	2.572	0.000	0.000
Nov 97	0.148	0.608	2.032	1.765	0.000	0.000
Dec 97	0.078	0.076	2.080	0.791	0.000	0.000

<sup>a</sup>Researchers are not permitted to dispose of <sup>45</sup>Ca via sink disposal. In June 1997 an accidental discharge occurred.

  
Hedley C. Freake, Ph.D.  
Radiation Safety Committee, Chair

  
Edward L. Wilds, Jr., Ph.D.  
Radiation Safety Manager

## 2.0 OVERVIEW OF FACILITY

### 2.1 GENERAL

The University of Connecticut Wastewater Treatment Facility, which has undergone the addition of various treatment processes over the past few decades, was completely renovated to improve the level of wastewater treatment, meet improved effluent quality requirements of the USEPA and Connecticut DEP, and increase the treatment capacity of the facility. To meet these requirements, treatment plant improvements were designed and installed to achieve the following:

- Reduce the Effluent BOD to 10 mg/L
- Reduce the Suspended Solids to 20 mg/L
- Reduce Ammonia-Nitrogen to 2 mg/L
- Increase the average daily flow to 3 MGD and peak flow to 7 MGD

These changes have been achieved through modifications and renovations to the following processes:

- Construction of a Headworks Building which improves grit removal as well as coarse and fine screening.
- Modifying the secondary treatment process, trickling filtration to extended aeration with denitrification.
- Construction of new secondary clarifies.
- Construction of chlorine contact and dechlorination facilities.
- Installations of new sludge thickening and sludge holding facilities.
- Construction of new plant control facilities including the installation of new instrumentation and SCADA control.

The University of Connecticut Wastewater Treatment Facility is designed for an average flow of 3.0 million gallons per day (3.0 MGD) and a peak flow of 7.0 MG). Presently the effluent flow rate is limited to 1.98 MGD by the facility's NPDES discharge permit, however, it is anticipated that this will be increased to 3.0 MGD with the issuance of a new discharge permit. Refer to Figures 2-1 and 2-2 and table 2-1 for design parameters. Influent wastewater (present and future) will principally includes sanitary sewage from the University's campus, the Town of Mansfield, the Mansfield Training School (Depot Campus), the Connecticut Technology Park and from a residential area known as Celeron Square. It is anticipated that these flows will generate average influent BOD (Biochemical oxygen demand), TSS (Total Suspended Solids) and TKN (total kjeldahl nitrogen) concentrations of 6,950 lbs/day, 6,490 lbs/day, and 40 mg/L, respectively. At an average daily flow of 3.0 MG), the BOD and TSS, expressed in mg/L, is expected to average 278 mg/l and 259 mg/l, respectively. The facility is designed to meet the requirements of the NPDES permit which limits the average monthly effluent concentration for BOD and TSS to 10 mg/L and 20 mg/L, respectively, and the maximum daily concentration to 45 mg/L. each. The facility is also designed to reduce the effluent ammonia nitrogen concentration to 2 mg/L and the effluent chlorine residual to 0.05 mg/l.

Wastewater is received at the Headworks Building of the treatment facility by gravity flow via a 30-inch influent pipe. Seven booster-pumping stations, located throughout the collection system, pump wastewater from lower areas of the system to the 30-inch gravity sewer. Wastewater from Celeron Square is pumped by an eighth booster pumping station to a 24-inch gravity sewer, this also enters the Wastewater Treatment Facility at the Headworks Building.

## **1.4 DISCHARGE PERMIT (NPDES)**

Federal laws were enacted in October, 1972 (P.L. 92-500, Title IV), which amended the Federal Water Pollution Control Act in such a way that a permit must be obtained and complied with in order to discharge wastewater treatment facility effluent into a body of water.

The permit clearly states the minimum quality of the effluent to be discharged. An application for renewal should be filed at least six months prior to the expiration date.

The laboratory test procedures required establishing effluent quality and compliance with the permit requirements are listed in Federal Register pages 28758-25760 (Vol. 38, No. 199, Tuesday, October 16, 1973). The State may petition for and receive waivers and variations on prescribed laboratory test procedures. The number of tests, type of sample tested and reporting /record keeping formats will be in accordance with the State's approved program.

NOTE: The University of Connecticut's NPDES permit number is CT 101320.

Refer to Appendix E for a copy of the NPDES permit issued to the University of Connecticut.

## **1.5 FACILITIES OVERVIEW**

Wastewater flow, from the University of Connecticut's campus, is received at the facility's "Headworks Building" where it is pretreated by passing through a coarse bar screen, an aerated grit chamber and a fine bar screen.

From the Headworks Building, the pretreated wastewater flows into a distribution box where the pH of the flow can be adjusted with hydrated lime before being directed to one or both of the two parallel "Carrousel" type extended aeration tanks for secondary treatment. At the University's wastewater treatment facility, the secondary treatment process is designed to remove suspended solids and BOD without the aid of a separate primary treatment process.

Wastewater, exiting the two aeration tanks, recombines and flows to a second distribution box from which the flow can be directed to one or both of the two parallel, center feed type circular clarifier tanks. The clarifiers serve two functions: First, mixed liquor suspended solids (activated sludge) is separated from the treated wastewater as the final step in the reduction of suspended solids and BOD pollutants. Second, settled activated sludge is rapidly collected, thickened; and either returned to the aeration tanks or wasted to the facility's solids processing facilities.

Clarified wastewater, exiting the two clarifier tanks recombines, flows through a flow measurement vault, and then enters the chlorine contact tank for disinfection, followed by dechlorination. Wastewater exiting the chlorine contact tank is dechlorinated before flowing to the Willimantic River outfall.

Settled activated sludge, which is removed from the clarifiers (waste/recycled activated sludge) is pumped to a gravity belt thickener for dewatering. The thickened sludge is then pumped to the thickened sludge holding tank from which sludge is removed for disposal.

Item 2. b.  
University and Non-University Facilities  
Contributing to the Sewage Treatment Facility

Bldg. # Building Name

0001	STORRS HALL
0002	GULLEY HALL
0003	PERSONNEL (OLD ADMISSIONS BLDG)
0004	KOONS HALL
0005	DAIRY BARN & SILO
0006	HAWLEY ARMORY
0007	MERLE S KLINCK (AG ENG LAB)
0011	COUNS & STUDENT DEVEL CTR
0012	HOUSE 29, 3-5 GILBERT RD
0013	HOUSE 13, HEART PROGRAM
0014	HOUSE 28, 7 GILBERT ROAD
0015	HOUSE 14, 8 GILBERT RD
0016	HOUSE 26, 9 GILBERT RD
0017	HOUSE 25, 11 GILBERT RD
0019	HOUSE 22, 13-15 GILBERT RD
0023	WOMEN'S CTR-4 WHITNEY RD
0024	URBAN RES. INSTIT., 6 WHITNEY
0025	HOUSE 23, 8-10 WHITNEY RD
0028	MINK BARN, RT 195 NORTH
0029	BENTON MUSEUM OF ART
0030	HORTICULTURE STORAGE
0031	LANDSCAPING (OLD MOTOR POOL)
0037	HALL BLDG
0038	BEACH HALL
0040	ATWATER LAB
0040A	ATWATER LAB-ORIG BLDG
0041	HOUSE 01 GURLEYVILLE RD
0042	HONORS CENTER
0043	LAKESIDE APARTMENTS (13)
0044	INTERNATIONAL HOUSE
0045	HOUSE 05 W/ATT GARAG STORRS RD
0047	HOUSE 11, 1204 STORRS RD
0049	PARKING SERVICES(ROSEBRKS HSE)
0051	ROSEBROOKS BARN RT 195 NORTH
0054	JACOBSON BARN
0055	HOUSE 41 W/ATT G HSB RN HIL EXT
0056	HOUSE 42, HSB RN HILL
0060	ART CERAMIC STUDIO
0061	MUSEUM GARAGE
0069	HOLCOMB HALL
0071	POULTRY HOUSE 2
0122	POULTRY CONTEST HOUSE (SMALL)
0123	POULTRY CONTEST HOUSE (SMALL)
0124	GRANGE SHELTER
0125	SKATING HOUSE
0126	WILBUR CROSS BLDG
0126A	WILBUR CROSS BLDG-ORIG BLDG
0126B	WILBUR CROSS BLDG-ADDITION
0127	WHITNEY HALL & CAFETERIA

0130 MANCHESTER HALL  
 0131 WOOD HALL  
 0132 OFFICIAL RESIDENCE,OAK HL RD  
 0133 CASTLEMAN BLDG. (ENG. I)  
 0133A CASTLEMAN-ORIG BLDG  
 0133B CASTLEMAN ADDITION 1994  
 0134 POULTRY COMMERCIAL HOUSE  
 0138 DESIGN & RESOURCE MGMT (DRM)  
 0139 SPRAGUE HALL  
 0140 HOUSE 40, 1445 STORRS RD  
 0141 HEATING & POWER PLANT  
 0141A HEATING & PWR PLANT-ORIG BLDG  
 0141B HEATING PLANT ADDITION 1971  
 0142 PUBLICATIONS  
 0145 PUERTO RICAN CNTR (ENG ANX A)  
 0146 THEATRE ANNEX  
 0147 ROTC HANGAR  
 0148 PHYSICAL EDUC/FIELD HOUSE  
 0148A SWIMMING POOL  
 0148B MEN'S GYMNASIUM  
 0148C FIELD HOUSE  
 0149 HARTFORD HALL, NC 1  
 0150 NEW HAVEN HALL, NC 2  
 0151 NEW LONDON HALL, NC 3  
 0152 FAIRFIELD HALL, NC 4  
 0153 WINDHAM HALL, NC 5  
 0154 LITCHFIELD HALL, NC 6  
 0155 MIDDLESEX HALL, NC 7  
 0156 TOLLAND HALL, NC 8  
 0157 HURLEY HALL, NC 9  
 0158 BALDWIN HALL, NC 10  
 0159 MCCONAUGHY HALL, NC 11  
 0159A MCCONAUGHY HALL-ORIG BLDG  
 0159B MCCONAUGHY HALL ADDITION 1993  
 0163 HANKS HALL (A,B) NW QD 1  
 0164 GOODYEAR HALL (A,B) NW QD 2  
 0165 RUSSELL HALL (A-D) NW QD 3  
 0166 BATTERSON HALL (A-D) NW QD 4  
 0167 TERRY HALL (A,B) NW QD 5  
 0168 ROGERS HALL (A,B) NW QD 6  
 0169 WRIGHT HALL (A,B) NW QD 7  
 0170 HORSE BARN  
 0171 WMS HEALTH SERV BLDG (INFIRM)  
 0171A WMS HEALTH SERV-ORIG BLDG  
 0171B WMS HEALTH SERV BLDG ADD  
 0172 BUDDS BLDG (ADMINISTRATION)  
 0173 TECHNICAL SERVICES CENTER  
 0174 PATHOLOGY LAB  
 0175 YOUNG BLDG(COL OF AG & NR)  
 0175A AGRICULTURE-CLASSRM & OFC  
 0175B AGRICULTURE AUDITORIUM  
 0176 HICKS HALL  
 0177 GRANGE HALL  
 0179 MNSFLD APTS BLDG 02 (4 UNITS)  
 0180 MNSFLD APTS BLDG 03 (6 UNITS)  
 0181 MNSFLD APTS BLDG 04 (4 UNITS)  
 0182 MNSFLD APTS BLDG 05 (4 UNITS)

0183 MNSFLD APTS BLDG 06 (6 UNITS)  
 0184 MNSFLD APTS BLDG 07 (4 UNITS)  
 0185 MNSFLD APTS BLDG 09 (4 UNITS)  
 0186 MNSFLD APTS BLDG 10 (4 UNITS)  
 0187 MNSFLD APTS BLDG 11 (4 UNITS)  
 0188 MNSFLD APTS BLDG 12 (6 UNITS)  
 0189 MNSFLD APTS BLDG 13 (4 UNITS)  
 0190 MNSFLD APTS BLDG 14 (4 UNITS)  
 0191 MNSFLD APTS BLDG 15 (6 UNITS)  
 0192 MNSFLD APTS BLDG 16 (4 UNITS)  
 0193 MNSFLD APTS BLDG 17 (6 UNITS)  
 0195 HEWITT, H.G. (PHARMACY)  
 0196 PHARMACY GREENHOUSE  
 0204 PLANT SCI GRNHSE 3-AGRON FARM  
 0212 RATCLIFFE HICKS BLDG  
 0213A STUDENT UNION  
 0213B STUDENT UNION - SOUTH  
 0214 FLORICULTURE BLDG  
 0215 MEMORIAL STADIUM & PRESSBOX  
 0215A MEMORIAL STADIUM  
 0215B MEMORIAL STADIUM PRESS BOX  
 0216 STADIUM CONCESSION STAND-SMALL  
 0217 STADIUM CONCESSION STAND-LARGE  
 0218 ATHLETIC FACILITIES BLDG  
 0219 HOUSE 06,10 WILLOWBRK RD  
 0221 JORGENSEN AUDITORIUM & THEATRE  
 0221A JORGENSEN AUDITORIUM  
 0221B JORGENSEN THEATRE (HARRIET)  
 0222 WHITE BLDG (ANIM INDUSTRIES)  
 0223 ALSOP HALL (A,B) W.C. 1  
 0224 HOLLISTER HALL (A,B) W.C. 2  
 0225 HOOK HALL (A,B) W.C. 3  
 0226 SPENCER HALL (A,B) W.C. 4  
 0227 HOUSE 47, 14 EASTWOOD RD  
 0231 CENTRAL WAREHOUSE  
 0232 PLANETARIUM  
 0233 DRAMA MUSIC BLDG  
 0234 MUSIC BUILDING  
 0235 ARJONA BLDG (HUMANITIES)  
 0236 MONTEITH BLDG (SOC. SCIENCES)  
 0237 ANDRE SCHENKER(SS) LECT HALL  
 0238 WARING CHEMISTRY LABS BLDG  
 0239 ENGINEERING II  
 0240 JONES BLDG (NUTR SCIENCES)  
 0241 JONES BLDG ANNEX  
 0241A NUTRITIONAL SCIENCES  
 0241B AGRIC PESTICIDES RESEARCH  
 0242 POULTRY FEED HOUSE  
 0243 HOUSE 55, 75 WILLOWBROOK RD  
 0244 COMMISSARY BAKERY & WAREHOUSE  
 0245 VON DER MEHDEN RECITAL HALL  
 0246 BUSINESS ADMIN, SCHOOL OF  
 0247 GENTRY BLDG. (SCHOOL OF ED.)  
 0248 PHARMACY RESEARCH  
 0251 POULTRY TEACHING HOUSE  
 0252 TORREY LIFE SCIENCES  
 0253 TOWERS DORMS, BLDG. 1 (A,B)

1 2 5 6 2 3

0254 TOWERS DORMS, BLDG. 2 (A,B)  
 0255 TOWERS DORMS, BLDG. 3 (A-D)  
 0256 TOWERS DORMS, BLDG. 4 (A-D)  
 0257 TOWERS DORMS, BLDG. 5 (A,B)  
 0258 TOWERS DORMS, BLDG. 6 (A,B)  
 0261 SHIPPEE HALL & DINING FACILITY  
 0262 ASC CAN-WASHING FACILITY  
 0263 MCMAHON HALL & DINING FACILITY  
 0264 HOUSE 36, 1459 STORRS RD  
 0270 SKATING RINK  
 0271 SKATING RINK MACHINE BLDG  
 0272 PIT GREENHOUSE (BEHIND FLOR)  
 0273 MINK SHED  
 0286 HOUSE 18, 1196 STORRS RD  
 0288 HOUSE 18A(SHED) 1196 STORRS RD  
 0289 ART DESIGN CENTER (HALL HOUSE)  
 0290 HALL, B C - GARAGE  
 0291 HOUSE 62, 11 WESTWOOD RD  
 0294 SINGER GARAGE, KING HILL RD  
 0295 BUCKLEY HALL  
 0296 HOUSE 63, 4 MOULTON RD  
 0297 HOUSE 63A (CABIN) MOULTON RD  
 0299 KESSELL BARN  
 0302 ART PRINTMAKING WORKSHOP  
 0303 HOUSE 09, 28 OAK HILL RD  
 0304 HOUSE 60, 5 WESTWOOD RD  
 0311 LIFE SCIENCES ANNEX  
 0312 HOUSE 36A, 1465 STORRS RD  
 0314 HOUSE 20, 1 HILLSIDE RD  
 0315 HOUSE 07A, 16 OAK HILL RD  
 0317 MOTOR POOL & VEHICLE MAINT  
 0318 BRONWELL BUILDING (ARTHUR B.)  
 0320 HOUSE 56, 48 DOG LANE  
 0324 WHETTEN GRADUATE CENTER  
 0325 WATSON HALL, ALUM QUAD 1  
 0326 BELDEN HALL, ALUM QUAD 2  
 0327 EDDY HALL, ALUM QUAD 3  
 0328 BROCK HALL, ALUM QUAD 4  
 0329 RYAN REFEC (ALUM DINING HL)  
 0330 PHILLIPS, DC BLD(COMMUNIC SCI)  
 0331 EDWARD V. GANT SCIENCE COMPLEX  
 0331A MATERIALS SCIENCE, INSTITUTE OF  
 0331B PHYSICS BLDG.  
 0331C MATH SCIENCES  
 0332A GRAD DORM ASHFORD  
 0332B GRAD DORM BRANFORD  
 0333C GRAD DORM COLCHESTER  
 0333D GRAD DORM DERBY  
 0333E GRAD DORM ENFIELD  
 0333F GRAD DORM FARMINGTON  
 0333G GRAD DORM GUILFORD  
 0333H GRAD DORM HEBRON  
 0334J GRAD DORM JEWETT CITY  
 0334K GRAD DORM KILLINGLY  
 0334L GRAD DORM LYME  
 0334M GRAD DORM MILFORD  
 0334N GRAD DORM NORWALK



0334P GRAD DORM PRESTON  
 0334Q GRAD DORM QUINEBAUG  
 0334R GRAD DORM RIDGEFIELD  
 0335 HOUSE 40A, 1451 STORRS RD  
 0338 CSEA CREDIT UNION/SUBWAY SUB  
 0339 TOWERS DORMS STUDENT CENTER  
 0341 HUMAN DEVELOPMENT CENTER  
 0342 BISHOP CENTER (CONT. ED)  
 0344 HALE HALL  
 0345 ELLSWORTH HALL  
 0346 PUTNAM REFECTORY  
 0349 BOUSFIELD, W A BLDG (PSYCH)  
 0350 CAMPUS SHOPPING PLAZA  
 0351 CAMPUS SHOP PLAZA-GAS STATION  
 0354 LIFE SCIENCES TRAILER  
 0364 BABBIDGE LIBRARY (HOMER)  
 0365 SCHOOL OF FINE ARTS - ART  
 0369 UNITED TECHNOLOGIES ENG BLDG  
 0370 FACILITIES TRAILER  
 0373 FAC MODULAR BLDG, GILBERT RD  
 0374 SPORTS CENTER/GAMPEL PAVILION  
 0377 SOCCER PRESS BOX  
 0378 BIOTECHNOLOGY CENTER  
 0379 DAILY CAMPUS BUILDING  
 0380 POLICE AND FIRE COMPLEX  
 0381 FACILITIES OPER BLDG, LEDOYT RD  
 0382 ADMISSIONS(OLD FACULTY ALUMNI)  
 0383 THOMAS J. DODD RESEARCH CENTER  
 0384 BIOLOGY BLDG/TECH QUAD PH I  
 0385 ATHLETIC EQUIP STG BLDG (MOON)  
 0387 FAC MGMT MODULAR, LEDOYT RD  
 0388 SEWAGE PLT CONTROL BLDG  
 0389 SEWAGE PLT PUMP & CHEM BLDG  
 0390 SEWAGE PLT HEADWORKS BLDG  
 0391 SWG PLT SLUDGE HOLDING TNKBLD  
 0392 SWG PLT SLUDGE TRANSFER BLDG  
 0393 SEWAGE STATION-FAC OPER BLDG  
 0394 SEWAGE STATION-FAC MODULAR  
 0395 SEWAGE STA-PLUMB SHP BLW GRD  
 0406 BATTING CAGE FACILITY  
 0407 NURSING MODULAR  
 0408 ASIAN AMERICAN MODULAR  
 0411 ORCHESTRA BAND BUILDING  
 0412 NEW MUSIC LIBRARY  
 0419 UNIVERSITY PROGRAMS BUILDING  
 0420 HEIFER FACILITY  
 0422 SATELLITE HUT (UCIMT)  
 0423 WHUS/ST POLICE PREFAB  
 0424 HOUSE 72, 25 HILLSIDE CIRCLE  
 0425 SOUTH CAMPUS DORMS, BLDG A - Open Sept. 98  
 0426 SOUTH CAMPUS DORMS, BLDG B - Open Sept. 98  
 0427 SOUTH CAMPUS DORMS, BLDG C - Open Sept. 98  
 0428 SOUTH CAMPUS DORMS, BLDG D - Open Sept. 98  
 1009 HOUSE 43, HRSBRN HILL  
 1011 HOUSE 46, 950 STORRS RD  
 1013 SEARS BARN, RT 195/SPRING HILL  
 1014 AGRONOMY BARN, GILLETTE FARM

1015 AGRONOMY GRNHSE, GILLETTE FARM  
 1016 HOUSE 44, 34 BONE MILL RD  
 1017 HOUSE 45, BONE MILL RD  
 1018 HYDRAULIC LAB-ENG,PNK RAV  
 1023 BEEF-SHEEP BARN  
 1025 SWINE BARN  
 1029 FARM MACH MTL SHED3(HAY DRYER)  
 1036 NORTHWOOD APARTMENTS, BLDG. 1  
 1037 NORTHWOOD APARTMENTS, BLDG. 2  
 1038 NORTHWOOD APARTMENTS, BLDG. 3  
 1039 NORTHWOOD APARTMENTS, BLDG. 4  
 1040 NORTHWOOD APARTMENTS, BLDG. 5  
 1041 NORTHWOOD APARTMENTS, BLDG. 6  
 1042 NORTHWOOD APARTMENTS, BLDG. 7  
 1043 NORTHWOOD APARTMENTS, BLDG. 8  
 1044 NORTHWOOD APARTMENTS, BLDG. 9  
 1045 NORTHWOOD APARTMENTS, BLDG. 10  
 1046 NORTHWOOD APARTMENTS, BLDG. 11  
 1047 NORTHWOOD APARTMENTS, BLDG. 12  
 1050 HOUSE 49, 986 STORRS RD  
 1051 KIRKPATRICK BARN/GARAGE  
 1052 FARM DEPT HQTRS,HRSBRN HL RD  
 1053 PLTRY ISLTN BREEDER HSE, PNK R  
 1054 PLTRY ISLTN BROODER HSE, PNK R  
 1059 PLTRY ISOLATN GARAGE PNK RAV  
 1063 AGRICULTURAL BIOTECHNOLOGY LAB  
 1064 SWINE FEEDING BARN (GARBAGE CK  
 1065 SWINE SHED (ADJACENT TO 1064)  
 1066 STORRS BRN 195 SO (POMOLOGY)  
 1067 BIOB SCI BLDG 5(OLD PRIM LAB)  
 1068 AGRONOMY PREFAB STORAGE BLDG  
 1069 HOUSE 37 & 37A, 1551 STORRS RD  
 1070 ASH BARN-RT 195N  
 1071 HOUSE 48, 853 STORRS RD  
 1072 HOUSE 48A, 853 STORRS RD  
 1073 HOUSE 19, 134 SEPARATIST RD  
 1080 BIOBEHAVIORAL SCI, PREFAB 1  
 1081 MICROCHEMISTRY LAB-PREFAB 2  
 1082 EH&S HAZARDOUS WASTE FACIL  
 1088 HOUSE 52, 968 STORRS RD  
 1091 HOUSE 51, 871 STORRS RD  
 1092 HOUSE 66, 1590 STORRS RD  
 1094 BIOBEHAVIORAL SCI, PREFAB 3  
 1095 AGRIC STORAGE BLDG, FARM AREA  
 1096 HOUSE 68, 1608 STORRS RD  
 1097 HOUSE 67, 1584 STORRS RD  
 1098 HOUSE 69, 1595 STORRS RD  
 1101 BIOBEHAVIORAL SCIENCES 4  
 1101A BIOB SCI PREFAB 4-ORIG BLDG  
 1101B BIOBEHAVIORAL 4 ANNEX  
 1106 BIOB SCI TRLR 6  
 1115 HOUSE 71, 1561 STORRS RD  
 1124 AVIAN RESEARCH BUILDING  
 1126 KELLOGG DAIRY CENTER  
 1128 LOCKER & TOILET BLDG-FARM AREA  
 1134 AG BIOTECH ANNEX  
 7004 MANSFIELD PROF. PLAZA-NERAC

7007 STORRS CONGREG CHRCH, N EG RD  
7009 UCONN CO-OP  
7010 COLLEGE THEATER BLDG  
7012 CENTENNIAL ALUMNI HOUSE  
7014 FIRST UNION  
7123 UCTV, KING HILL ROAD

Item 2. c.  
Non-University Sources  
Average Daily Discharge  
to Sewage Treatment Facility <sup>1</sup>

Building	Gallons
Bagelz	535
Better Ways	50
Celeron Square	8,000
Ctr. for Rehab. & Nursing	8,947
College Square	1,430
Courtyard Condo	6,274
Epic Sport Works	16
E.O. Smith High School	1,919
Fleet Bank	75
Glen Ridge - Mansfield Housing Authority	20,812
Holinko Estates	13,705
Huskies Restaurant	12,560
Juniper Hill - Mansfield Housing Authority	14,845
Mansfield Town Hall	7,378
New England Computer	382
Phil's Store	167
U.S. Post Office	84
South. New Eng. Telephone	70
Storrs Common	7,256
Uconn Co-op	113
Uni-Plaza	7,935
Wright's Way - Mansfield Housing Authority	6,748
67 Private Residences (including 2 churches) <sup>2</sup>	21,440
16 University Rental Houses <sup>2</sup>	5,120
TOTAL	145,861
Sewage Plant Avg. Daily Influent	1,130,000
% Non-University Contribution	13

1. Discharge quantities are based on water volumes supplied.

2. Housing estimates are based on assumption of four persons per house, and 80 gallons per person per day.

Item 2. d.  
Laboratory Sources  
Average Daily Discharge  
to Sewage Treatment Facility <sup>1</sup>

Laboratory Building	Gallons
Animal Industries (White)	11,756
Atwater Lab/Pathobiology	18,711
Beach Hall	17,591
Biobehavioral Sciences	17,876
Biotechnology	1,573
Castleman (Eng. I)	19,326
C.E. Waring Chemistry	38,272
Engineering II	18,973
Engineering III (Bronwell)	12,223
Jones (Nut. Sciences)	12,902
Klink (Ag. Eng. Lab)	2,408
Life Sciences Annex	15,231
Life Sciences (Torrey)	48,388
Materials Science	36,544
Pharmacy (Hewitt/Research)	23,973
Physics	29,899
United Tech. Engineering	18,400
W.B. Young (Coll. of Ag.)	21,751
TOTAL	365,797
Sewage Plant Avg. Daily Influent	1,130,000
% Laboratory Contribution	32
<b>% Non-Laboratory Contribution</b>	<b>68</b>

1. Discharge quantities are based on water volumes supplied.

Item 2.e.  
W.P.C.F. Flow Data Sheet

Year	Quarter	Dates	Influent Total	Influent AVG	Effluent Total	Effluent AVG
1995	4th	Oct 1 - Dec 31	101.701	1.133	101.005	1.123
1996	1st	Jan 1 - Mar 30	98.332	1.093	85.243	0.947
	2nd	Apr 1 - Jun 30	111.225	1.324	95.048	1.132
	3rd	Jul 1 - Sep 30	104.243	1.185	75.040	0.853
	4th	10/1 - 12/31	135.353	1.521	99.616	1.119
1997	1st	Jan 1 - Mar 30	146.170	1.624	94.821	1.054
	2nd	Apr 1 - Jun 30	75.401	0.829	86.602	0.952
	3rd	Jul 1 - Sep 30	62.462	0.679	73.205	0.796
	4th	10/1 - 12/31	80.909	0.879	91.221	0.992
1998	1st	Jan 1 - Mar 30	93.028	1.034	100.073	1.112
TOTALS			1008.824	11.300	901.873	10.078
Averages			100.882	1.130	90.187	1.008

NOTE : All values are in Million Gallons (MG)