UNIVERSITY OF
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

Frank Labato
Director

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

233 Glenbrook Road, U-97, Storrs, Connecticut 06269-4097 (860) 486-3613 Fax: (860) 486-1106

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:

LOCATION	PROPOSED ACTIVITIES
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

	^{3}H		^{14}C	
Date	Activity[a,b]	MDC[b]	Activity[a,b]	MDC[b]
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

[a]Uncertainties represent the 95% confidence level, based only on counting statistics.
[b]Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

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

	$^{32}P/^{33}P$		^{35}S	
Date	Activity[a,b]	MDC[b]	Activity[a,b]	MDC[b]
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

[a]Uncertainties represent the 95% confidence level, based only on counting statistics.
[b]Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

CALCIUM-45 CONCENTRATIONS IN SLUDGE SAMPLES

	^{45}Ca	
Date	Activity[a,b]	MDC[b]
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

[a]Uncertainties represent the 95% confidence level, based only on counting statistics.
[b]Activity, Uncertainty, and Minimum Detectable Concentration (MDC) are listed in pCi/g of sludge.

The initial ^{14}C test result of 1.25pCi/g ± 0.24pCi/g for silo #1 samples on 05/28/97 raised the possibility of licensed radioactive ^{14}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 ^{14}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[a,b]	MDC[b]
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

[a]Uncertainties represent the 95% confidence level, based only on counting statistics.
[b]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}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}C. It is also possible that unusually high levels of organic material were delivered to that silo, and may have brought naturally occurring ^{14}C levels up into the detectable range. If this were the case, then the decline of ^{14}C levels over time due to loss of CO_2 to the atmosphere, would explain the current, undetectable levels. Calculations based on our disposal records show that the ^{14}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}C. In any event, the new test results for ^{14}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±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±0.1dpm. 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*, 75th Edition, CRC Press, Boca Raton also states in the table of Atomic Masses and Abundances that the natural abundance of ^{14}C varies so widely that a meaningful natural abundance cannot be defined. An Internet search on ^{14}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}C. Dr. Wilds contacted Dr. Higham of the Radiocarbon Dating Laboratory to determine which listing of the natural abundance of ^{14}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}C to the global carbon in living things. The other statement, 1 ^{14}C atom for every 1,000,000,000,000 ^{12}C, represents the abundance of ^{14}C to inorganic ^{12}C only. Dr. Higham believed the best estimate of the abundance is probably that ^{14}C is 1e-9 ($1x10^{-9}$) percent of global carbon in living organisms and 1e-10 ($1x10^{-10}$) percent of inorganic carbon.
The University of Connecticut calculated an estimated activity for biomass using the ^{14}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 6.02×10^{23} atoms per 12.011 grams of carbon.
4. The abundance of ^{14}C to global Carbon is 1×10^{-11} in living organisms.
5. The decay constant for ^{14}C is 2.3×10^{-10} min^{-1}.

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

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

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}C abundance in inorganic carbon recommended by Dr. Higham. This approximates the abundance of ^{14}C in CO_2 in the atmosphere. The following assumptions were made.

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

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

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

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

Month & Year	^{14}C (mCi)	^{3}H (mCi)	^{32}P (mCi)	^{35}S (mCi)	^{33}P (mCi)	^{45}Ca[a] (mCi)
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

[a]Researchers are not permitted to dispose of 45Ca 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

[47am897c.wpd]

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 course 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 frown 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.

Frown the Headworks Building, the pretreated wastewater flows into a distribution box where the pH of the flow call 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. Wastewnter exiting the chlorine contact tank is dechorinated 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 HSBRN HIL EXT
0056	HOUSE 42, HSBRN 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)

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 [1]

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) [2]	21,440
16 University Rental Houses [2]	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.

4/16/98

Item 2. d.
Laboratory Sources
Average Daily Discharge
to Sewage Treatment Facility [1]

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
% Non-Laboratory Contribution	**68**

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)