
Disposal of Radioactive Materials Into Sanitary Sewers by NRC Specific Licensees

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ABSTRACT

The discharge of radioactive materials to municipal sewer systems is regulated by the U.S. Nuclear Regulatory Commission (NRC) in accordance with 10 CFR Part 20, or by Agreement States in accordance with state regulations. This report presents information, excerpted from NRC license files, on NRC licensees' discharges of radioactive materials to sanitary sewer systems. The specific license files at all four NRC Regional Offices and at NRC Headquarters were reviewed for this information. The data collected from inspectors' field notes indicated that about 449 specific licensees or about 6.7% percent of a total of 6,700 specific licensees discharged radioactive materials to sanitary sewer systems pursuant to the criteria in 10 CFR Part 20. Data collected from license applications indicate that 1,984 specific licensees or about 29.7% percent of a total of 6,700 specific licensees had plans for potential discharges of radioactive materials to sanitary sewer systems pursuant to the criteria in 10 CFR Part 20.

The reviewed files are not set up to provide a data base of the quantities and types of materials actually discharged to sanitary sewers. However, NRC inspections of licensed facilities routinely include a review of licensees' records and checks for compliance with Part 20 on discharges of radioactive materials to sanitary sewers.

*then why
were they
reviewed?*

*nothing said
about those
that don't
make mention
of disposal
in their
application and
still can say
license Part 20*

DRAFT

*omit disclaimer
on NRC involvement*

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SUMMARY

In accordance with 10 CFR Part 20, the U.S. Nuclear Regulatory Commission (NRC) regulates licensees' discharges of radioactive materials into sanitary sewer systems. This report presents information, excerpted from NRC license files, on NRC licensees' discharges of radioactive materials to sanitary sewer systems. The license files at all four NRC Regional Offices and at NRC Headquarters were reviewed for information about the discharge of radioactive materials into sanitary sewers. Only those categories of specific licensees that had some potential for permissible discharges into sanitary sewers were selected for review from the coded category list of 26 August 1994.

Inspectors' field notes indicated that 449 or 6.7% of all specific licensees discharged radioactive material to sanitary sewers. Data from license applications indicated 1,984 or about 29.7% of all specific licensees had plans for potential discharges of radioactive materials to sanitary sewers.

The reviewed files are not set up to provide a data base of the quantities and types of materials actually discharged to sanitary sewers. However, NRC inspections of licensed facilities routinely include a review of licensees' records and checks for compliance with Part 20 on discharges of radioactive materials to sanitary sewers.

*Some comments
as abstract*

Consider

*Is it necessary to discuss # of licensees that
have provided info indicating they will discharge.
Numbers can be misleading.*

1 INTRODUCTION

1.1 Background

The Nuclear Regulatory Commission's (NRC's) regulations allow the disposal of certain licensed radioactive materials into sanitary sewer systems under certain conditions. The conditions are set out in § 20.2003 (formerly § 20.303) of 10 CFR Part 20, "Standards for Protection Against Radiation." This report presents information, excerpted from Nuclear Regulatory Commission (NRC) license files, on NRC licensees' discharges of radioactive materials to sanitary sewer systems. It comprises part of the information for the NRC to consider in addressing recent concerns about the adequacy of the current regulatory conditions to protect the public and the environment (see ANPR "Disposal of Radioactive Material by Release into Sanitary Sewer Systems," published February 25, 1994 at 59 FR 9146).

1.2 Method and Types of Licenses Reviewed

1.2.1 Method

The licensing files at all four NRC Regional Offices and at NRC Headquarters were reviewed for information about the discharge of radioactive materials into sanitary sewers. Inspectors' field notes or reports from the most recent inspection were reviewed. The applications for licenses were also reviewed for the licensees' representations on intent to discharge to sanitary sewers. This statement of intent is merely an indication of licensees' plans for potential discharges.

1.2.2 Types of Licenses Reviewed

Not all types of licensees are candidates for discharge of radioactive materials to sanitary sewers. For example, those licensees who use only sealed sources in fixed gauges would not have any material for sanitary sewer discharge. Only those categories of licenses that have some potential for permissible discharges into sanitary sewers were reviewed. Of the approximately 6,700 NRC specific licensees, 3,183 were selected for review.

The NRC codes each category of license with a five digit numerical code. For example, the "Medical Private Practice - Limited" license category is assigned the code 02200, while the category "Measuring Systems Fixed Gauges" is assigned the code 03120. License files under all codes pertinent to sewer discharges were selected and reviewed from the coded category list of licensees of 26 August 1994. A summary table for all program and licensing codes, derived from the NRC's revised Program Code Descriptions of October 1992, is in Appendix A.

Discharges of radioactive materials to sanitary sewers in patients' excreta and discharges from the use of generally-licensed in vitro kits, both of which are exempt from the 10 CFR Part 20 discharge requirements, are not included in this review. (See paragraph 20.2003(b) and paragraph 31.11(f) of 10 CFR Parts 20 and 31.)

1.3 Overview of the Data Collected

Most of the selected-category license files were readily available for review in the docket-file rooms. Those files that were removed from the file rooms or in use by others were not reviewed. Of a total of 3,183 files in codes selected for review as having a potential for discharging to the sewer, 2,561 or about 81 percent were reviewed. A detailed listing of the results of this study by program code is included as Appendix B. To preclude overestimating the number of licensees discharging to the sanitary sewer, the summary projections that follow were developed from

*to report to the files
OK just to get
files*

what is difference?

*explain
what a
field note
is*

*but does not preclude
disposal*

*reviewed
selection
based on
previous
history*

only those program codes that were reviewed and that indicated actual or potential discharges. Results by program code are also explained in Section 2 of this report.

- From the reviewed files, the number of licensees reported to discharge to sewers in inspectors' field notes was 341. An estimate, projected from inspectors' field note data, of the total number of licensees discharging to sanitary sewers is 449 or about 6.7% of all specific licenses.
- Of the number of reviewed ^{license} applications, 1,650 indicated plans for potential discharge to sanitary sewers. An estimate, projected for all applications with potential for discharging to sanitary sewers is 1,984 or about 29.7% of all specific licenses.
- Of those reviewed licensees who indicated plans for potential disposal of radioactive materials to sanitary sewers only about 17% were reported in inspectors' field notes as actually having done so. Conversely, of the total number of licensees reviewed, only about 4% of those who had not indicated plans for potential disposal of radioactive materials into sanitary sewer were reported in inspectors' field notes as having done so.
- The reviewed files are not set up to provide a data base of the quantities and types of materials actually discharged to sanitary sewers. However, NRC inspections of licensed facilities routinely include a review of licensee records and checks on discharges of radioactive materials to sanitary sewers for compliance with 10 CFR Part 20.

Licensees keep account of such discharges in various ways. In one method of accounting a licensee might use and discharge known discrete amounts of materials, and the total of such operations over a period of time is known not to discharge in excess of permissible amounts. In another method a licensee might keep a log at each designated sink and record pertinent data for each discharge. And in another method a licensee might collect the sink drainage in a holding tank from which to discharge monitored and recorded quantities and types of material under qualified supervision at various times.

How we want to put this much information in the?

what is difference between licensee monitor

what is difference

is this needed?

this is the summary for the facilities

needs to be explained - looks like flaw in licensing process

2 SUMMARIES OF COLLECTED DATA PER PROGRAM CODE

2.1 General

Each reviewed license category and its program code is separately listed, and a short description is given of the type of license issued in that category. There follows for each listed code:

- The number of licenses listed for each code in the list of 26 August 1994. *- # of licenses in 1994 or when reviewed was done - makes a big difference*
- The number of licenses available for review in each code.
- From inspectors' field notes, the number and the percentage of reviewed licensees reported to discharge to sanitary sewers. *limited to application for license or includes license amendment*
- From the application for license, the number and percentage of reviewed license files indicating plans for potential disposal to sanitary sewers.
- The radionuclides typically licensed in that category. *→ nice to know but is this license or what types or what is discharged use of this is misleading when it comes to sewer discharge*

Some references to the kinds of radioactive materials licensed under a program code (license category) are given in the category descriptions. A listing of the abbreviations and the material type descriptions used in this section is in Appendix C. The NRC maintains a computer data base that can identify the types and amounts of radioactive materials that each licensee is authorized to possess or use.

2.2 Analysis by Specific Program Codes Used in Materials and Fuel Licensing and Inspection Programs

2.2.1 Byproduct Material Program Codes

Byproduct materials are any radioactive materials (except special nuclear material) produced in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear materials, e.g., as in a nuclear reactor. Byproduct material does include activation products from nuclear reactors and from plutonium-beryllium neutron sources, but does not include activation products from other neutron sources such as californium-252 or accelerators. (See 10 CFR 30.4 and 40.4 for a definition of byproduct material.)

2.2.1.1 Academic Broad and Academic Other Licenses

Academic Broad and Academic Other licenses are issued to educational institutions for the possession and use of radionuclides for teaching, training, and some research purposes, such as carbon-14 dating, equipment calibration, tracer studies, and the identification of substances in compounds.

Academic Broad-Type A

Program Code 01100

Academic Broad-Type A licenses are issued to larger institutions where there is a diversity in the utilization of various radionuclides. The kinds and uses of radionuclides may change frequently, even within the same institution. Quantities are usually in the multicurie range. The "Authorized Use" condition on these licenses may permit the

teaching and training of students, research and development (as defined in 10 CFR 30.4), or laboratory research, including animal studies. If the "Authorized Use" includes medical research, diagnosis or therapy, the license should be listed under program code 02110 (Medical Institution Broad), with this program code as a secondary code. (See Regulatory Guides 10.5 and 10.8 for further explanation.)

- The number of licenses in the list of 26 August 1994 is 48.
- The number of licenses available for review was 27.
- Of the number of license files reviewed, inspectors' field notes show 12, or ~~44%~~ ^{15 this is useful percentage?} as discharging radioactive materials to sanitary sewers, which projects to 21 licensees of this code so discharging.
- Of the number of license files reviewed, 11 applications for licenses, or 41%, indicated plans for potential discharge to sanitary sewers, which projects to 20 licensees of this code with such plans.

Typical radionuclides of use in this code¹ are:

31.11, 35.100, 35.200, 35.300, 35.500, A, A1, A1X, A3, A3X, A83X, Ac227, Am241, Am243, Au198, Ba133, C14, Ca45, Cd109, Cd115, Ce144, Cf252, Cl36, Cm242, Cm243, Cm244, Cm248, Co58, Co60, Cr51, Cs134, Cs137, Cu64, DU, Dy159, Dy165, Eu152, Eu154, Eu155, Fe55, Fe59, Gd153, Gr2, Gr3, H3, I125, I129, I131, I135, In114, K42, Kr85, Mn54, Mo99, MoTc.

Academic Broad-Type B, Program

Program Code 01110

Academic Broad-Type B licenses are issued for the possession and use of fewer radionuclides and in smaller quantities than Type A licenses. (See 10 CFR 33.100, Schedule A, Column I.)

- The number of licenses in the list of 26 August 1994 is 10.
- The number of licenses available for review was 8.
- Of the number of license files reviewed, inspectors' field notes show 1 or 12.5% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.
- Of the number of license files reviewed, 2 applications for licenses, or 25% indicated plans for potential discharge to sanitary sewers, which projects to 3 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, Am241, Ba133, Bi210, C14, Ca45, Cd109, Cf252, Cl36, Co60, Cs137, Dy159, Gd153, H3, Hg203, I125, I131, Ir192, K42, Mn54, Mo99, P32, P33, Pa233, Pb210, Pm145, Pm147, Po208, Po209, Po218, Ra226, Ru103, S35, Sm145, Sr85, Sr90, Tc99m, Th228, Th230, Ti204, TypB, W181, Yb169, Zn65.

Academic Broad-Type C

Program Code 01120

Academic Broad-Type C licenses are issued for the possession and use of a limited number of radionuclides and in smaller quantities than Type B licenses. (See 10 CFR 33.100, Schedule A, Column II.)

¹A listing of the abbreviations and the material type descriptions used in this section is in Appendix C.

- The number of licenses in the list of 26 August 1994 is 15.
- The number of licenses available for review was 13.
- Of the number of license files reviewed, inspectors' field notes show 4 or 30.8% as discharging radioactive materials to sanitary sewers, which projects to 5 licensees of this code so discharging.
- Of the number of license files reviewed, 7 applications for licenses, or 53.8%, indicated plans for potential discharge to sanitary sewers, which projects to 8 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A3, Am241, Bi207, C14, Ca45, Cl36, Co60, Cr51, Cs137, Fe55, Fe59, H3, Hg203, I125, I131, P32, Pb210, Po210, S35, Sr90, TypC, U235, Zn65.

2.2.1.2 Medical Institution Broad & Medical Institution Other

A medical institution is defined in 10 CFR 35.2 to be an organization in which several medical disciplines are practiced. It typically provides 24-hour per day medical, surgical or psychiatric treatment, nursing, food, lodging, etc., to ill or injured patients. Medical Institution Broad and Medical Institution Limited licenses are issued to organizations for the application of byproduct material, or its radiation, to humans. Radioactive material administered to patients is considered to be an in-vivo procedure. (Use of radioactive material in test tubes in the laboratory is considered to be an in-vitro procedure, and these licensees are in program code 02410.) Separate licenses are issued to authorize teletherapy. These licensees are listed under program code 02300.

Medical Institution Broad

Program Code 02110

Medical Institution Broad licenses are issued to larger medical institutions for the possession and use of a wide range of radionuclides in medical research, diagnosis and therapy. These licensees have Radiation Safety Committees, and these committees are allowed to authorize their own users. Some medical institutions have "hybrid broad" licenses. These licenses authorize routine clinical procedures using the Group medical licensing system and include a Broad-Type A, Broad-Type B, or Broad-Type C authorization for research. These licenses should be assigned program code 02120 for the primary code and 03610, 03611 or 03612, as appropriate, for the secondary code.

- The number of licenses in the list of 26 August 1994 is 82.
- The number of licenses available for review was 40.
- Of the number of license files reviewed, inspectors' field notes show 18 or 45% as discharging radioactive materials to sanitary sewers, which projects to 37 licensees of this code so discharging.
- Of the number of license files reviewed, 21 applications for licenses, or 52.5%, indicated plans for potential discharge to sanitary sewers, which projects to 43 licensees of this with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.290, 35.300, 35.320, 35.400, 35.490, 35.500 A, A1, A1X, A3, A3X, Am241, As74, Au198, Ax, Br82, C14, Ca45, Ca47, Cd109, Cd115, Ce141, Cl36, Co58, Co60, Cr51, Cs137, Cu64, DU, Dy165, Fe55, Fe59, Ga72, Gd153, Gr12, Gr3, Gr4, Gr5, Gr6, H3, Hg195.

wording poor

Medical Institution Limited**Program Code 02120**

Medical Institution Limited licenses, issued pursuant to 10 CFR 35.11, are granted to a hospital, a medical center or facility, or a clinic for the possession and use of radionuclides in well established diagnostic and therapeutic medical procedures. The types of use referenced on the license are the titles of sections 35.100, 35.200, 35.300, 35.400, 35.500, and 35.600 that describe both the type of material and its intended use.

- The number of licenses in the list of 26 August 1994 is 1,233.
- The number of licenses available for review was 1,078.
- Of the number of license files reviewed, inspectors' field notes show 62 or 5.8% as discharging radioactive materials to sanitary sewers, which projects to 71 licensees of this code so discharging.
- Of the number of license files reviewed, 935 applications for licenses, or 86.7%, indicated plans for potential discharge to sanitary sewers, which projects to 1,069 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.290, 35.300, 35.320, 35.400, 35.490, 35.500 A, A1, A1X, A3, A3X, Am241, As74, Au198, Ax, Br82, C14, Ca45, Ca47, Cd109, Cd115, Ce141, Cl36, Co58, Co60, Cr51, Cs137, Cu64, DU.

Medical Institution Custom**Program Code 02121**

Medical Institution Custom licenses are issued to a hospital, a medical center or similar facility, or a clinic for the possession and use of radionuclides for diagnostic and therapeutic procedures. The radionuclides are specified without referencing the subpart titles in 10 CFR Part 35. For example, a hospital could be authorized to use sodium iodide labeled with I-131 for diagnosis of thyroid function and treatment of hyperthyroidism, or to use an I-125 source in a Lixiscope for imaging.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0%, as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 3 applications for licenses, or 75%, indicated plans for potential discharge to sanitary sewers, which projects to 3 licensees of this code with such plans.

Typical radionuclides of use in this code are:

35.100, 35.200, 35.290, 35.300, Ag110, Ag111, Au198, Au199, Bi210, C14 Ca45, Cd115, Cl36, Cr51, Cu64, H3, I125, I131, K42, Na24, P32, P33, Pd109, Rb86, S35, Se75.

2.2.1.3 Medical Private Practice Licensees

Medical Private Practice licenses are issued, pursuant to 10 CFR 35.12, to a physician or physicians for the possession and use of radionuclides in well established diagnostic and therapeutic procedures usually in their offices outside a medical institution.

Medical Private Practice-Limited

Program Code 02200

Medical Private Practice-Limited licenses are issued to a physician or physicians for the possession and use of radionuclides for routine diagnostic and therapeutic clinical procedures in their private office(s). The types of use listed on this license are typically radiopharmaceutical therapy procedures that do not require hospitalization for radiation safety purposes.

- The number of licenses in the list of 26 August 1994 is 364.
- The number of licenses available for review was 308.
- Of the number of license files reviewed, inspectors' field notes show 2 or 0.65%, as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 246 applications for licenses, or 79.9%, indicated plans for potential discharge to sanitary sewers, which projects to 291 licensees of this code with such plans.

*Reminds
discharge
on why
and ask*

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.290, 35.300, 35.320, 35.400, 35.500, C14, Gr12, Gr3, Gr3xg, H3, 1125, 1131, P32, Se75, Sr89, Sr90, Tc99, Tc99m, U235, VIT.

Medical Private Practice-Custom

Program Code 02201

Medical Private Practice Custom licenses are issued to a physician or physicians for the possession and use of radionuclides for diagnostic and therapeutic procedures listed on the license without reference to Part 35 Subparts, in their private office(s). Several examples of use are referenced under program code 02201.

- The number of licenses in the list of 26 August 1994 is 32.
- The number of licenses available for review was 29.
- Of the number of license files reviewed, inspectors' field notes show 1 or 3.4% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.
- Of the number of license files reviewed, 8 applications for licenses, or 27.6%, indicated plans for potential discharge to sanitary sewers, which projects to 9 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.290, 35.300, 35.500, C14, Cr51, H3, 1125, 1131, VIT.

Mobile Nuclear Medicine Service**Program Code 02220**

Mobile Nuclear Medicine Service licenses are issued to a physician or physicians for the receipt of radioactive material at a central facility and preparation of patient doses to be administered at outlying small hospitals, nursing homes, etc., where clinical studies are conducted. (If a medical institution conducts a mobile nuclear medicine service, in addition to performing routine diagnostic and therapeutic procedures at its own location, the license should be assigned a primary program code of 02120 or 02121 and a secondary program code of 02220.)

- The number of licenses in the list of 26 August 1994 is 30.
- The number of licenses available for review was 24.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 20 applications for licenses, or 83.3%, indicated plans for potential discharge to sanitary sewers, which projects to 25 licensees of this code with such plans.

Typical radionuclides of use in this code are:

35.100, 35.200, 35.250, 35.500, I131, P32, Tc99m, VIT.

Veterinary Non-Human**Program Code 02400**

Veterinary licenses are issued to veterinarians for the possession and use of radionuclides in medical diagnosis or therapy procedures on animals. This category does not include any animal research or any of the activities described above in program codes 02110, 02120 and 02121.

- The number of licenses in the list of 26 August 1994 is 57.
- The number of licenses available for review was 33.
- Of the number of license files reviewed, inspectors' field notes show 2, or 6.1% as discharging radioactive materials to sanitary sewers, which projects to 3 licensees of this code so discharging.
- Of the number of license files reviewed, 18 applications for licenses, or 54.5%, indicated plans for potential discharge to sanitary sewers, which projects to 31 licensees of this code with such plans.

Typical radionuclides of use in this code are:

I131, P32, Sr89, Tc99m.

In-Vitro Testing Laboratories**Program Code 02410**

In-Vitro Testing Laboratory licenses are issued to individuals or facilities for the possession and use of radionuclides for performing In-Vitro analyses and are not included in larger programs covered by program codes 02110, 02120 or 02121.

- The number of licenses in the list of 26 August 1994 is 106.
- The number of licenses available for review was 90.

Section 2

*the review could
be my knowledge
of this license*
Summaries

- Of the number of license files reviewed, inspectors' field notes show 29, or 32% as discharging radioactive materials to sanitary sewers, which projects to 34 licensees of this code so discharging.
- Of the number of license files reviewed, 51 applications for licenses, or 56.6%, indicated plans for potential discharge to sanitary sewers, which projects to 60 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, A, AX, C14, Ca45, Cl36, Cr51, Cu64, Fe59, Gr12, Gr3, H3, Hg203, I125, I131, Ni63, P32, P33, Rb86, S35, Sn119, VIT, Zn65.

Nuclear Pharmacies

Program Code 02500

Nuclear Pharmacy licenses are issued to nuclear pharmacies for the possession and distribution of radiopharmaceuticals and other items to hospitals and physicians. These licensees usually purchase various radioactive materials in bulk from larger firms and prepare and distribute patient dosages. Note that most customers are medical use licensees.

- The number of licenses in the list of 26 August 1994 is 66.
- The number of licenses available for review was 40.
- Of the number of license files reviewed, inspectors' field notes show 7, or 17.5% as discharging radioactive materials to sanitary sewers, which projects to 12 licensees of this code so discharging.
- Of the number of license files reviewed, 20 applications for licenses, or 50%, indicated plans for potential discharge to sanitary sewers, which projects to 33 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.300, 35.400, 35.500, A, A3, ACR, AGR1XITC, AGR4XI131, AX, DU, GR12, GR4, GR5, GP6, I125, I131, Mo99, MoTc, Re186, Sn113, Tc99, Tc99m, VIT.

Medical Product Distribution-32.72 Prepared Radiopharmaceuticals

Program Code 02511

Medical Product Distribution licenses are issued to individuals or organizations for the distribution of prepared radiopharmaceuticals containing byproduct material to persons who have been issued a specific license under 10 CFR 35.11 for the possession and medical use of byproduct material specified in Section 35.100, 35.200, or 35.300.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 3.
- Of the number of license files reviewed, inspectors' field notes show 1, or 33.3% as discharging radioactive materials to sanitary sewers, which projects to 1 license of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensee of this code with such plans.

Typical radionuclides of use in this code are:

AGR1XITC, AGR4XI131, CR51, I125, I131, Mo99, NPA, P32, Re186, Tc99m.

Medical Product Distribution-32.73 Generators And Kits

Program Code 02512

Medical Product Distribution licenses are issued to individuals or organizations for the distribution of generators or reagent kits for preparation of radiopharmaceuticals containing byproduct material to persons who have been issued a specific license under 10 CFR 35.14 for the possession and medical use of byproduct material specified in 10 CFR 35.200. "Medical approvals" authorize the distribution of reagent kits that do not contain byproduct material to the same category of licensees.

- The number of licenses in the list of 26 August 1994 is 7.
- The number of licenses available for review was 6.
- Of the number of license files reviewed, inspectors' field notes show 3, or 50% as discharging radioactive materials to sanitary sewers, which projects to 4 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

*This looks like there
bad in fact,
nothing wrong.*

Typical radionuclides of use in this code are:

NPA, Tc99m.

Medical Product Distribution-32.74 Sources and Devices

Program Code 02513

Medical Product Distribution licenses are issued to individuals or organizations for the distribution of sources and devices containing byproduct material to persons who have been issued a specific license under 10 CFR 35.11 to use a calibration or reference source or for the possession and medical use of byproduct material specified in 10 CFR 35.400 or 35.500.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 1, or 25% as discharging radioactive materials to sanitary sewers, which projects to 1 license of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is NPA.

2.2.1.4 Well Logging Licenses

Well logging licenses are issued to firms for the possession and use of radionuclides for subsurface surveying to obtain geological information. These testing procedures are primarily used in oil, gas, and mineral exploration to identify subsurface geologic formations.

Well Logging Byproduct or SNM Tracer and Sealed Sources

Program Code 03110

Well Logging Byproduct or Special Nuclear Material Tracer and Sealed Sources licenses are issued for the possession and use of both sealed and unsealed sources in connection with the exploration for oil, gas, or minerals in wells.

- The number of licenses in the list of 26 August 1994 is 23.
- The number of licenses available for review was 22.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

Au198, Br82, Co60, I131, Ir192, Ir192, Na24, Sb124, Sc46, Th228, Zr95.

Well Logging ByProduct Only-Tracers Only

Program Code 03112

Well Logging Byproduct Only-Tracers Only licenses are issued for the possession and use of only unsealed byproduct material to be used in connection with the exploration for oil, gas, or minerals in wells.

- The number of licenses in the list of 26 August 1994 is 6.
- The number of licenses available for review was 6.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

Au198, Br82, Cr51, I131, Ir192, Rb86, Sb124, Sc46, Xe133, Zr95.

Field Flooding Studies

Program Code 03113

Field Flooding Study licenses are issued for the injection of unsealed byproduct material into large areas for tracing oil and gas reservoirs.

- The number of licenses in the list of 26 August 1994 is 3.
- The number of licenses available for review was 0.

Typical radionuclides of use in this code are:

Ag110m, Br82, C14, Ca45, Cl36, Co58, Co60, Cr51, Fe55, Fe59, H3, I125, Na24, Ni63, S35, Sr85, Sr89, Sr90, Zn65.

2.2.1.5 Manufacturing and Distribution

Manufacturing and Distribution Broad and Manufacturing and Distribution Other licenses are issued for the manufacture and distribution of products containing byproduct material in various forms for a number of diverse purposes. The products are distributed usually to persons specifically licensed by the NRC or an Agreement State. Licensees include medical suppliers that process, package, and distribute products such as diagnostic test kits, radioactive surgical implants, and tagged radiochemicals for use in medical, academic, and industrial research, and for diagnosis and therapy. Licensees are also suppliers who, after purchasing bulk quantities of byproduct material, process, encapsulate, package, and distribute these sealed sources for use in gamma radiography, cobalt irradiation, well-logging, etc. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sources for gauges and smoke detectors and radiochemicals for non-medical research. Firms are also involved with the manufacture, assembly, and distribution of various other products that contain radionuclides. The broad licenses are issued to the larger facilities having more comprehensive radiological protection programs.

Manufacturing and Distribution Broad-Type A

Program Code 03211

Manufacturing and Distribution Broad-Type A licenses are issued to larger organizations where there is often quite a diversity in the utilization of various radionuclides. The kinds and uses of radionuclides may change frequently, even within the same organization. Broad-Type A licenses are used for programs run by a Radiation Safety Committee that designates the authorized users of the material. The Radiation Safety Committee also has a full time Radiation Safety Officer (RSO). These licenses authorize the possession and use of a wide variety of radioactive material without having each radionuclide and authorization specifically listed on the license. Quantities are usually in the multicurie range. (See also the introductory remarks and Broad-Type A description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 12.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 1, or 25% as discharging radioactive materials to sanitary sewers, which projects to 3 licensees of this code so discharging.
- Of the number of license files reviewed, 1 application for licenses, or 25%, indicated plans for potential discharge to sanitary sewers, which projects to 3 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A1X, A3, A83, Am241, C14, Cs137, H3, I125, I131, Kr85, Mo99, Ni63, P32, P33, Re186, S35, Se75, Sr90, Tc99m, Tl204, TYPB, Xe133.

Manufacturing and Distribution Broad-Type B**Program Code 03212**

Manufacturing and Distribution Broad-Type B licenses are issued for the possession and use of fewer radionuclides and in smaller quantities than Type A licenses. (See 10 CFR 33.100, Schedule A, Column I. See also the introductory remarks and Broad-Type B description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 6.
- The number of licenses available for review was 5.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharges to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, Co58, Co60, Cr51, Cs137, Er169, Fe59, Ho166, I125, Mn54, Mo99, Pd103, Pd109, Sm153, Sr89, Tc99m, Yb169, Yb175.

Manufacturing and Distribution Broad-Type C**Program Code 03213**

Manufacturing and Distribution Broad-Type C licenses are issued for the possession and use of a limited number of radionuclides and in smaller quantities than Type B licenses. (See 10 CFR 33.100, Schedule A, Column II. See also the introductory remarks and Broad-Type C description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 3.
- The number of licenses available for review was 2.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is TypC.

Manufacturing and Distribution Other**Program Code 03214**

Manufacturing and Distribution Other licenses are issued to smaller firms that require a more restrictive license.

- The number of licenses in the list of 26 August 1994 is 101.
- The number of licenses available for review was 79.

- Of the number of license files reviewed, inspectors' field notes show 12, or 15.2% as discharging radioactive materials to sanitary sewers, which projects to 15 licensees of this code so discharging.
- Of the number of license files reviewed, 11 applications for licenses, or 13.9%, indicated plans for potential discharge to sanitary sewers, which projects to 14 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A3, A3X, Am241, As76, Au198, Ba140, Br82, Cl14, Ca45, Cl36, Co57, Co58, Co60, Cr51, Cs137, Cu64, Eu159, Gd159, H3, Hg203, Ho166, I125, I129, I131, Ir192, La140, Lu177, Mo99, MoTc, Na24, Ni63, P32, P33, Pm147, Re186, Ru105, S35, Sb122, Sb124, Sc46, Sc47.

Nuclear Laundry

Program Code 03218

Nuclear laundry licenses are issued for the cleaning of protective clothing contaminated with radioactive material. Firms in this industry often provide nuclear cleaning services as part of a full line of uniform rental or health physics services.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 4, or 100% as discharging radioactive materials to sanitary sewers, which projects to 4 licensees of this code so discharging.
- Of the number of license files reviewed, 2 applications for licenses, or 50%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A83X, Pu239, SMA, U, U235.

Decontamination Services

Program Code 03219

Decontamination Service licenses authorize the cleaning and release of contaminated material, usually scrap metal, for unrestricted use.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is A1.

Leak Test and Instrument Calibration Service, Source Greater Than 100 Curies**Program Code 03224**

These Leak Test and Instrument Calibration Service licenses are issued to service organizations (those that offer their services to other licensees) for the possession and use of radioactive material for leak testing of sealed sources and for possession and use of sealed sources for instrument calibration, and one or more sources has more than 100 curies of radioactive material.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 2 applications for licenses, or 50%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

*Question
what
would be
going down then
SC?*

Typical radionuclides of use in this code are:
A, A1, A3, A83X, Am241, SMA, SNM.

Other Services**Program Code 03225**

Other Service licenses are issued to service organizations (those that offer their services to other licensees) for the possession and use of radioactive material for commercial services, such as teletherapy or industrial gauge servicing, that are not covered in the descriptions for program codes 03220-03224.

- The number of licenses in the list of 26 August 1994 is 70.
- The number of licenses available for review was 59.
- Of the number of license files reviewed, inspectors' field notes show 2, or 3.4% as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 7 applications for licenses, or 11.9%, indicated plans for potential discharge to sanitary sewers, which projects to 8 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A3, A83X, Am241, Ba133, C14, Cm244, Co60, Cs134, Cs137, Du, H3, I125, I129, I131, MoTcm, Na24, P32, Pa233, Po210, Pu, Pu239, Ru106, S35, Sr89, Sr90, Tc99, Tc99m, Th230, U, U233, U234, U235, U236, U238, Zn65.

2.2.1.6 Waste Disposal Service

Waste disposal service licenses authorize the collection, transportation and storage of radioactive wastes. These licenses authorize firms to collect packaged waste material, transport the waste and temporarily store it before

transporting the waste to an authorized burial ground. Some licenses authorize the opening of packages and treatment of the waste to reduce the volume, e.g., compaction.

Waste Disposal Service Prepackaged Only

Program Code 03232

Waste Disposal Service Prepackaged Only licenses authorize the pick-up, transportation, and storage of only already packaged wastes. This license does not authorize the opening of the packages.

- The number of licenses in the list of 26 August 1994 is 4.
- The number of licenses available for review was 3.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A3, A83X, Am241, AX, ENU, H3, Pu, Pu238, Pu239, SMA, U233, U235.

Waste Disposal Service Processing or Repackaging

Program Code 03234

Waste Disposal Service Processing or Repackaging licenses authorize the receipt of packaged wastes from other persons, opening of the packages, compacting and repackaging of wastes, and transfer to an authorized burial ground for disposal.

- The number of licenses in the list of 26 August 1994 is 9.
- The number of licenses available for review was 5.
- Of the number of license files reviewed, inspectors' field notes show 1, or 20% as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 1 applications for licenses, or 20%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A1X, A3, A83X, C14, Cr51, Cs137, DU, H3, I125, I131, P32, S35, SMA, SNM.

2.2.1.7 General License Distribution

General License Distribution licenses are issued for the distribution of byproduct material, usually sealed sources in devices, to general licensees. (Examples of such items are: gauges, luminous aircraft safety devices, calibration and

reference sources, ice detection devices, and in-vitro test kits.) The requirements for a license for distribution to general licensees are specified in various sections of 10 CFR Part 32. A general licensee does not need to submit a formal application and does not receive a formal license. The conditions of a general license are contained in 10 CFR Part 31. These licenses generally do not authorize possession/use and have a "G" suffix.

General License Distribution-32.51

Program Code 03240

General License Distribution licenses are issued to organizations for the transfer of byproduct material in sealed sources contained in devices to persons who may be general licensees under 10 CFR 31.5. (Licenses authorizing manufacture and distribution are described in program codes 03211-03214.) General licenses under 10 CFR 31.5 are issued to commercial and industrial firms and research, educational and medical institutions for possession of material in devices designed for detecting, measuring, gauging or controlling density, thickness, radiation leakage, chemical composition, or for producing light or an ionized atmosphere.

- The number of licenses in the list of 26 August 1994 is 33.
- The number of licenses available for review was 26.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:
Am241, Cm244, K85, Kr85, NPA, Sr90.

General License Distribution-32.5

Program Code 03241

General License Distribution licenses are issued to organizations for the distribution of luminous aircraft safety devices to persons who may be general licensees under 10 CFR 31.7. General licenses under section 31.7 are issued for possession and use of tritium or promethium-147 contained in luminous aircraft safety devices, where the device contains less than 10 curies of tritium or 300 millicuries of promethium-147.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is NPA.

General License Distribution-32.57

Program Code 03242

General License Distribution licenses are issued to organizations for the distribution of calibration or reference sources to persons who may be general licensees under section 31.8. General licenses under Part 31.8 are issued for possession and use of americium-241 in calibration and reference sources. A person may be a general licensee only if they already possess a specific license.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is C14.

General License Distribution-32.71

Program Code 03244

General License Distribution licenses are issued to organizations for the distribution of byproduct material to persons who may be general licensees under section 31.11. General licenses under section 31.11 are issued to physicians, hospitals, clinical laboratories or veterinarians in the practice of veterinary medicine for the possession of specified byproduct material in prepackaged units for use in certain in-vitro clinical or laboratory tests.

- The number of licenses in the list of 26 August 1994 is 13.
- The number of licenses available for review was 10.
- Of the number of license files reviewed, inspectors' field notes show 4, or 40% as discharging radioactive materials to sanitary sewers, which projects to 5 licensees of this code so discharging.
- Of the number of license files reviewed, 3 applications for licenses, or 30%, indicated plans for potential discharge to sanitary sewers, which projects to 4 licensees of this code with such plans.

Typical radionuclides of use in this code are:
31.11, C14, FB59, H3, I125, I131, NPA, Se75.

2.2.1.8 Research and Development

Research and Development licenses are issued to private organizations, universities and government agencies for the possession and use of radionuclides in research. Typical uses include: Irradiation of materials, tracers and catalysts in chemical reactions, measurement using industrial gauges, and the identification of substances in compounds. In private industry, uses are primarily in product development. In academic institutions, research and development includes training of students in the use of radioactive materials. Broad licenses are issued to larger facilities having a more comprehensive radiation protection program where the types of research being conducted may fluctuate rapidly. Typical activities include environmental analysis, food quality studies, aerospace and engineering applications, and product development.

Research and Development Broad-Type A

Program Code 03610

Research and Development Broad-Type A licenses are issued to larger organizations where there is a diversity in the utilization of various radionuclides. The kinds and uses of radionuclides may change frequently, even within the same organization. Broad-Type A licenses are used for programs run by a Radiation Safety Committee that designates the authorized users of the material. The Radiation Safety Committee also has a full time Radiation Safety Officer (RSO). These licenses are issued for the possession and use of a wide variety of radioactive material without having each radionuclide and authorized use listed on the license. Quantities are usually in the multicurie range. (See also the introductory remarks and Broad-Type A description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 108.
- The number of licenses available for review was 76.
- Of the number of license files reviewed, inspectors' field notes show 25, or 32.9% as discharging radioactive materials to sanitary sewers, which projects to 36 licensees of this code so discharging.
- Of the number of license files reviewed, 35 applications for licenses, or 46.1%, indicated plans for potential discharge to sanitary sewers, which projects to 50 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.200, 35.300, 35.400, 35.500, A, A1, A1X, A3, A3X, A83X, Ac, Ac227, Ag110m, Am, Am241, Am241, Am242, Am243, Ar37, Ar41, As73, As74, As76, Au198, Ax, Ba133, Bk249, Bk250, Br82, C14, Ca45, Ca47, Cd109, Ce141, Ce143, Ce144, Cf250, Cf252, Cl36, Cm, Cm242, Cm243, Cm244, Cm248, Co60, Cr51, Cs134, Cs137, Cu64, DU, Dy165, Er169, Eu152.

Research and Development Broad-Type B

Program Code 03611

Research and Development Broad-Type B licenses are issued for the possession and use of fewer radionuclides and smaller quantities of byproduct material than Type A licenses. (See section 33.100, Schedule A, Column I. See also the introductory remarks and Broad-Type B description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 23.
- The number of licenses available for review was 16.

- Of the number of license files reviewed, inspectors' field notes show 4, or 25% as discharging radioactive materials to sanitary sewers, which projects to 6 licensees of this code so discharging.
- Of the number of license files reviewed, 10 applications for licenses, or 62.5%, indicated plans for potential discharge to sanitary sewers, which projects to 14 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31, 11, 35.100, 35.200, 35.300, 35.400, 35.500, A, A1, A1X, A3, A3X, Am241, Br80, C14, Ca45, Ce141, Cf252, Cl36, Cr51, du, Fe55, Fe59, H3, Ho166, I125, I131, K42, Kr85, La140, Na22, Nb95, Ni63, Np237, P32, P33, Po210, Pu, Rb86, Ru103, S35, Sc46, Sm153, Sr85, Sr90, Tc99m, Th228, Th230, Th232, TypB, TypC, U, U233, U235, Y90, Yb177.

Research and Development Broad-Type C

Program Code 03612

Research and Development Broad-Type C licenses are issued for the possession and use of a limited number of radionuclides and smaller quantities of byproduct material than Type B licenses. (See section 33.100, Schedule A, Column II. See also the introductory remarks and Broad-Type C description in 10 CFR Part 33.)

- The number of licenses in the list of 26 August 1994 is 7.
- The number of licenses available for review was 5.
- Of the number of license files reviewed, inspectors' field notes show 3, or 60% as discharging radioactive materials to sanitary sewers, which projects to 4 licensees of this code so discharging.
- Of the number of license files reviewed, 4 applications for licenses, or 80%, indicated plans for potential discharge to sanitary sewers, which projects to 6 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A1, A3, A83X, AC, Am241, Ba131, C14, Ca45, Cd109, Co60, Cr51, Cs137, H3, Hg203, I125, I131, Mo99, P32, Re186, Re188, Ru106, S35, Sn113, Sr90, Tb161, Tc99m, TypC, W188, Y90.

Research and Development Broad-Multisite-Multiregional

Program Code 03613

Research and Development Broad-Multisite-Multiregional licenses are issued for the possession and use of material at fixed facilities in more than one region, e.g., the Department of the Air Force or the Department of the Navy. The exact number of users was not available in the files reviewed but these programs are considered large, i.e., in 1987, the NRC consolidated about one hundred eighty individual U.S. Navy licenses and about seventy individual U.S. Air Force licenses into this "master" license. The U.S. Department of Agriculture also has such a consolidated license. (See also the introductory remarks and R&D Broad-Type A Program Code 03610 description.)

- The number of licenses in the list of 26 August 1994 is 3.
- Because of the consolidation of the licenses, the files reviewed did not have information about discharges at specific sites.

*This needs
better
explanation.*

Typical radionuclides of use in this code are:

A, A1, Am241, C14, Cs137, H3, Kr85, Ni63, P32, Po210, SMA, SNM, Sr90.

Research and Development Other

Program Code 03620

Research and Development Other licenses are issued for the possession and use of specifically designated radionuclides in academic institutions, industrial facilities and medical institutions for non-human research.

- The number of licenses in the list of 26 August 1994 is 501.
- The number of licenses available for review was 411.
- Of the number of license files reviewed, inspectors' field notes show 128, or 31.1% as discharging radioactive materials to sanitary sewers, which projects to 156 licensees of this code so discharging.
- Of the number of license files reviewed, 215 applications for licenses, or 52.3%, indicated plans for potential discharge to sanitary sewers, which projects to 262 licensees of this code with such plans.

Typical radionuclides of use in this code are:

31.11, 35.100, 35.290 A, A1, A1X, A3, A3X, A83X, Ag110, Ag110m, Ag111, Am241, Am243, As74, As77, Au198, Au199, AX, Ba131, Ba133, Ba140, Bi207, Bk249, Br82, C14, Ca45, Ca47, Cd109, Cd113m, Cd115, Ce139, Ce141, Ce144, Cf252, Cl36, Cm242, Cm244, Co58, Co60, Cr, Cr51, Cr52, Cs134, Cs137, Cu64.

2.2.1.9 Civil Defense, Storage/Possession Only, and Decommissioning

Civil Defense

Program Code 03710

Civil Defense licenses are issued for the possession and use of sealed sources for training individuals in civil defense activities, such as calibrating and demonstrating the use of radiation survey and monitoring equipment.

- The number of licenses in the list of 26 August 1994 is 18.
- The number of licenses available for review was 17.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A3X, DU, I131, P32.

Decommissioning of Byproduct Material Facilities

Program Code 03900

For licensees that have notified the Commission of their intent to terminate all or part of their activities involving byproduct material and are authorized to decommission the facility(ies). A plan may have been submitted for decontaminating the property and equipment so that it may be released for unrestricted use. This code includes

licensees performing decontamination, decommissioning, reclamation, or site restoration in order to release a facility.

- The number of licenses in the list of 26 August 1994 is 2.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:
A, Co60, H3, Sr90.

2.2.2 Source Material Program Codes

Source materials are materials essential to the production of special nuclear materials. Source material includes: 1) uranium (and depleted uranium produced as enrichment tails) or thorium, or any combination thereof, in any physical or chemical form, or 2) ores that contain by weight 0.05% or more of uranium, thorium, or any combination thereof. (See 10 CFR 40.4 for a definition of source material.)

Source Material licenses are issued for the possession and use of refined uranium or thorium for fabrication, research, and manufacture of consumer products such as ceramics and glassware; manufacture of refractories, uranium shielding, analytical standards, and other uses not specifically classified. A smaller number of these licenses are issued to allow the possession of uranium or thorium for other uses such as distribution and storage. An even smaller number of these licenses are issued to the use of uranium in subcritical assemblies.

Mills

Program Code 11100

Mill licenses are issued for the extraction of uranium from uranium ore. In milling operations, the ore is crushed, ground to a fine mesh, and chemically treated to extract the uranium and convert it to a form called yellowcake.

- The number of licenses in the list of 26 August 1994 is 6.
- The number of licenses available for review was 0.

looks bad!

Typical radionuclides of use in this code are:
NU, U.

Source Material Other Less Than 150 Kilograms

Program Code 11200

These Source Material Other licenses are issued for the possession and use of source material for fabrication, research or manufacture of consumer products. These licenses do not allow the possession of more than one hundred and fifty kilograms of material.

- The number of licenses in the list of 26 August 1994 is 11.

- The number of licenses available for review was 7.
- Of the number of license files reviewed, inspectors' field notes show 1, or 14.3% as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 1 application for license, or 14.3%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

Typical radionuclides of use in this code are:
DU, NU, Th, U.

Source Material Military Munitions Indoor Testing

Program Code 11220

Source Material Military Munitions Indoor Testing licenses are issued for the possession, use, and testing of depleted uranium products designed for the military. The testing is done within an enclosure - the testing usually results in fragmentation of the munitions.

- The number of licenses in the list of 26 August 1994 is 8.
- The number of licenses available for review was 6.
- Of the number of license files reviewed, inspectors' field notes show 1, or 16.7% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.
- Of the number of license files reviewed, 1 application for license, or 16.7%, indicated plans for potential for discharges to sanitary sewers, which projects to 1 license of this code with such plans.

Typical radionuclides of use in this code are:
Th, U.

Source Material Military Munitions Outdoor Testing

Program Code 11221

Source Material Military Munitions Outdoor Testing licenses are issued for the possession, use and testing of depleted uranium products designed for the military.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharges to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:
DU, NU, Th.

Source Material Other Greater Than 150 Kilograms

Code 11300

These Source Material Other licenses are issued for the possession and use of source material for fabrication, research, or manufacture of consumer products. These licenses authorize the possession of more than one hundred and fifty kilograms of material.

- The number of licenses in the list of 26 August 1994 is 65.
- The number of licenses available for review was 35.
- Of the number of license files reviewed, inspectors' field notes show 2, or 5.7% as discharging radioactive materials to sanitary sewers, which projects to 4 licensees of this code so discharging.
- Of the number of license files reviewed, 2 applications for licenses, or 5.7%, indicated plans for potential discharge to sanitary sewers, which projects to 4 licensees of this code with such plans.

Typical radionuclides of use in this code are:
DU, NU, Th, Th230, Th232, U.

Uranium Hexafluoride Production Plants

Program Code 11400

Uranium Hexafluoride Production Plant licenses are issued for the possession and use of uranium to allow the conversion of yellowcake or ore concentrates to uranium hexafluoride (UF₆).

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for discharges to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:
Cs137, NU, U

Solution Mining (R&D and Commercial Plants)

Program Code 11500

Solution Mining licenses are issued for the extraction of uranium from uranium ores. The only mining operation licensed by the NRC is solution mining, which is the leaching of ore by injection of liquid chemicals into the geologic formation. (Conventional mining is not under NRC jurisdiction.)

- The number of licensees in the list of 26 August 1994 is 6.

- The number of licenses available for review was 0.

The typical radionuclide of use in this code is NU.

Heap Leach, Ore Buying Stations, and Byproduct Recovery

Program Code 11600

Heap Leach, Ore Buying Station, and Byproduct Recovery licenses are issued for the recovery of source material from low-grade uranium ores, from old tailings piles, or from a small ore body at a location distant from the mill complex. The heap leach process consists of spraying or trickling an acid solution over sections of the heap pile. Pipes or covered drains in the base of the pile collect the uranium-enriched solution after it percolates through the heap.

- The number of licenses in the list of 26 August 1994 is 3.
- The number of licenses available for review was 0.

Typical radionuclides of use in this code are:
NU, U.

Rare Earth Extraction and Processing

Program Code 11700

Rare Earth Extraction and Processing licenses are issued for the possession and use of source material for processing activities not directly related to the nuclear fuel cycle. This category includes licenses for extraction of metals, heavy metals, and rare earths. The extraction may be accomplished by a number of different methods, with the source material generally considered to be a waste product. This program category is not used for milling operations (program code 11100), licenses for uranium hexafluoride production (program code 11400), and licenses for processing and recovery of source material *in situ* or heap leaching operations (program code 11500).

- The number of licensees in the list of 26 August 1994 is 6.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 2 applications for licenses, or 50%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

Typical radionuclides of use in this code are:
NU, SMA, Th, Th232, U.

Decommissioning of Source Material Facilities

Program Code 11900

These licenses are issued to facilities that have notified the Commission of their intent to terminate all or part of their activities involving source material and the license authorizes decommissioning the facilities where the activities were performed. A plan may have been submitted for decontaminating the property and equipment so that it may be released or unrestricted use which authorize performing decontamination, decommissioning, reclamation, or site restoration in order to release a facility.

- The number of licenses in the list of 26 August 1994 is 2.
- The number of licenses available for review was 0.

Typical radionuclides of use in this code are:
DU, TH, U.

2.2.3 Special Nuclear Material Program Codes

Special nuclear materials include plutonium, uranium-233, uranium enriched in the isotopes of uranium-233 or uranium-235, and any material artificially enriched in any of these materials. (See 10 CFR 40.4 and 70.4 for a definition of special nuclear material.)

2.2.3.1 General Program Code Applications

Hot Cell Operations

Program Code 21130

Hot Cell Operation licenses are issued for the processing and fabrication of reactor fuels containing uranium or plutonium for experimental purposes. Some facilities also perform chemical operations to recover the uranium and plutonium from scrap and other off-specifications materials.

- The number of licenses in the list of 26 August 1994 is 2.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 1, or 100% as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 1 application for licenses, or 100%, indicated plans for potential discharge to sanitary sewers, which projects to 2 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, AX, C14, Cf252, Co60, Cs137, ENU, H3, I129, I131, Po210, Pu, SMA, Sr90, U235.

Decommissioning of Advanced Fuel R&D And Pilot Plants

Program Code 21135

A facility that has notified the Commission of its intent to terminate a portion or all of its activities involving special nuclear materials or has submitted to the Commission a plan and schedule for decontaminating the facilities, property, and equipment so that it may be released for unrestricted use. The program code is used only when the license authorizes the decommissioning/decontamination.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 0.

Typical radionuclides of use in this code are:
A, ENU, Pu, Th, U.

Uranium Fuel Fabrication Plants**Program Code 21210**

These licenses are issued for the possession and use of special nuclear material for the purpose of fabricating uranium fuel elements. In most uranium facilities where light water reactor fuels are processed, low-enriched uranium hexafluoride is converted to uranium dioxide pellets and inserted into zirconium tubes. The tubes are fabricated into fuel assemblies which are shipped to commercial nuclear power plants. In other facilities, high-enriched uranium is processed into naval reactor fuel and fabricated into naval reactor cores or core components. Licenses are for possession and use of five kilograms or more of uranium-235 that has been enriched to less than twenty percent.

- The number of licensees in the list of 26 August 1994 is 9.
- The number of licenses available for review was 9.
- Of the number of license files reviewed, inspectors' field notes show 3, or 33.3% as discharging radioactive materials to sanitary sewers, which projects to 3 licensees of this code so discharging.
- Of the number of license files reviewed, 1 application for licenses, or 11.1%, indicated plans for potential discharge to sanitary sewers, which projects to 1 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, A1, A3, Am241, Cf252, Co60, Cs137, ENU, H3, In114M, Np237, NU, PU.

Decommissioning of Uranium Fuel Fabrication Plants**Program Code 21215**

These licenses are issued to facilities that have notified the Commission of intent to terminate a portion or all of their activities involving special nuclear materials or have submitted to the Commission a plan and schedule for decontaminating the facilities, property, and equipment so that it may be released for unrestricted use. This program code is used only when the license authorizes the decontamination or decommissioning.

- The number of licenses in the list of 26 August 1994 is 5.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 1, or 100% as discharging radioactive materials to sanitary sewers, which projects to 5 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0% indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

DU, ENU, NU, Pu, Pu239, SMA, U235.

Uranium Fuel Research and Development and Pilot Plants**Program Code 21240**

These licenses are issued for the possession and use of enriched uranium for purposes such as academic training and in research and development activities associated with nuclear fuel other than fuel processing (program code

21210). Licenses authorize possession and use of five kilograms or more of enriched uranium-235 in unsealed form, or two kilograms or more of uranium-233 in unsealed form.

- The number of licenses in the list of 26 August 1994 is 1.
- The number of licenses available for review was 1.
- Of the number of license files reviewed, inspectors' field notes show 1, or 100% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.
- Of the number of license files reviewed, 1 applications for licenses, or 100%, indicated plans for potential discharge to sanitary sewers, which projects to 1 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A, DU, ENU, NU, PU, Pu239, Pu241, U233, U235.

Critical Mass Material Licenses

Program Codes 21310 & 21320

These licenses are issued for the possession and use of special nuclear material in quantities sufficient to form a critical mass, specifically, more than 350 grams of enriched uranium-235, more than 200 grams of uranium-233, more than 200 grams of plutonium, or any combination thereof. Program code 21310 is for universities. Program code 21320 is for all such licenses except those issued to universities.

For program code 21310:

- The number of licenses in the list of 26 August 1994 is 7.
- The number of licenses available for review was 7.
- Of the number of license files reviewed, inspectors' field notes show 1, or 14.3% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.
- Of the number of license files reviewed, 4 applications for licenses, or 57.1%, indicated plans for potential discharge to sanitary sewers, which projects to 4 licensees of this code with such plans.

Typical radionuclides of use in this code are:

Ac227, Cf, Cm244, ENU, NP237, NU, Pu, Pu238, Pu239, SMA, Th230, U233, U235.

For program code 21320:

- The number of licenses in the list of 26 August 1994 is 5.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 1, or 25% as discharging radioactive materials to sanitary sewers, which projects to 1 licensee of this code so discharging.

- Of the number of license files reviewed, 1 applications for licenses, or 25%, indicated plans for potential discharge to sanitary sewers, which projects to 1 licensee of this code with such plans.

Typical radionuclides of use in this code are:

A, Am241, Cf252, Co60, Cs137, DU, ENU, Np237, NU, Po210, Pu, Pu238, Pu239, SMA, Sr90, Th, U233, U235,

Special Nuclear Material Plutonium - Unsealed, Less Than A Critical Mass

Program Code 22110

Special Nuclear Material Plutonium Unsealed, Less Than A Critical Mass licenses are issued for the possession and use of small quantities of plutonium (less than 200 grams total) in unsealed form for purposes such as biological and chemical testing and for calibration of instruments, etc.

- The number of licenses in the list of 26 August 1994 is 9.
- The number of licenses available for review was 6.
- Of the number of license files reviewed, inspectors' field notes show 1, or 16.7% as discharging radioactive materials to sanitary sewers, which projects to 2 licensees of this code so discharging.
- Of the number of license files reviewed, 3 applications for licenses, or 50%, indicated plans for potential discharge to sanitary sewers, which projects to 5 licensees of this code with such plans.

Typical radionuclides of use in this code are:

A1, AX, CF252, ENU, H3, Np237, Np239, Pu, Pu236, Pu238, Pu239, Pu240, Pu241, Pu242, Th, U, U233, U234, U235, U237, Xe133.

Special Nuclear Material, U-235 or U-233-Unsealed, Less Than A Critical Mass

Program Code 22111

Special Nuclear Material U-235 or U-233 Unsealed, Less Than a Critical Mass licenses are issued for the possession and use of small quantities of uranium (less than 350 grams of U-235 or less than 200 grams of U-233) in unsealed form for purposes such as biological and chemical testing, calibration of instruments, etc.

- The number of licenses in the list of 26 August 1994 is 9.
- The number of licenses available for review was 4.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

Typical radionuclides of use in this code are:

ENT, ENU, PU, Pu236, Pu238, Pu239, Pu240, Pu241, Pu242, Pu244, SNM, U, U232, U233, U234, U235, U235.

2.2.3.2 Possession Only

- The number of licenses in the list of 26 August 1994 is 2.
- The number of licenses available for review was 2.
- Of the number of license files reviewed, inspectors' field notes show 0, or 0% as discharging radioactive materials to sanitary sewers, which projects to 0 licensees of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

SNM Possession Only - Other Than Reactor Fuel

Program Code 23300

SNM Possession Only - Other Than Reactor Fuel licenses authorized possession or storage of residual contamination or other special nuclear material in anticipation of removal of all licensed material and eventual termination of the license. Only packaging and shipping operations necessary to remove licensed materials from the site are authorized. No decontamination or other work involving byproduct material is authorized. This category does not include storage of fresh reactor fuel or spent reactor fuel (see program codes 23100 and 23200).

- The number of licenses in the list of 26 August 1994 is 6.
- The number of licenses available for review was 6.
- Of the number of license files reviewed, inspectors' field notes show 1, or 16.7% as discharging radioactive materials to sanitary sewers, which projects to 1 license of this code so discharging.
- Of the number of license files reviewed, 0 applications for licenses, or 0%, indicated plans for potential discharge to sanitary sewers, which projects to 0 licensees of this code with such plans.

The typical radionuclide of use in this code is ENU.

APPENDIX A

PROGRAM CODES USED IN MATERIALS
AND FUEL LICENSING - AND - INSPECTION
PROGRAMS

APPENDIX A-PROGRAM CODES USED IN MATERIALS AND FUEL LICENSING AND INSPECTION PROGRAMS

A five-digit program code number is assigned by the NRC to each license to designate the major activity or principal use authorized in the license. Table 1 contains a listing of the program codes used in this document. The regulations applicable to the various activities and uses of byproduct, source, and special nuclear materials are contained in Parts 30, 40, and 70, respectively, of Title 10 of the *Code of Federal Regulations*. A basic understanding of these regulations is a necessary prerequisite to the proper assignment of a program code to a particular activity or use. The NRC uses about 100 program codes to classify the approximately 7500 active licenses. (See Table 2 for general information on license numbers.) Some of these program codes narrowly define an activity, such as radiography, while other program codes have a more extensive scope. More than one code may apply to a given license. However, the primary code indicates the licensee's principal use of material. Additional codes may be used to indicate other significant uses.

"**BROAD**" licenses are issued to large facilities having a more comprehensive radiological protection program. These licenses authorize possession of a wide variety of radioactive materials without having each radionuclide and authorization listed on the license. There are three types of broad licenses--Type A, Type B and Type C. It should be noted that broad licensees can be authorized to use up to 100,000 curies in sealed sources for irradiation of materials (see 10 CFR 33.17). Most broad licenses are Type A. (For a clear understanding of these three types, see 10 CFR Part 33.)

Broad-Type A licenses are issued pursuant to 10 CFR 33.13 and typically authorize possession of any byproduct material with an atomic number between 1 and 83, in any chemical or physical form. The maximum possession limit is usually specified both for the individual radionuclide and for the total activity of all radionuclides. These licensees must have a radiological safety officer and a committee that acts in the place of the NRC to make day-to-day decisions about the program.

Broad-Type B licenses are issued pursuant to 10 CFR 33.14 and authorize possession of a variety of radionuclides. The maximum possession limit is specified in 10 CFR 33.100, Schedule A, Column I. Broad-Type B licensees must have a radiological safety officer and adequate administrative controls.

Broad-Type C licenses are issued pursuant to 10 CFR 33.15 and authorize possession of a variety of radionuclides. The maximum possession limit is specified in 10 CFR 33.100, Schedule A, Column II. Broad-Type C licensees must have training and experience as specified in the regulations and the licensee must have adequate administrative controls.

"**OTHER**" licenses are usually issued to smaller organizations requiring a more restrictive license. These licenses are usually more specific in identifying each radionuclide, the chemical and physical form, and the authorized activities and users.

Appendix A

APPENDIX A-Table 1

<u>Program Code*</u>	<u>Title</u>
01100*	Academic Type A Broad
01110*	Academic Type B Broad
01120*	Academic Type C Broad
01200	Academic Other (Secondary Code)
02110*	Medical Institution Broad
02120*	Medical Institution Limited
02121*	Medical Institution Custom
02100*	Medical Private Practice - Limited
02101*	Medical Private Practice - Custom
02209	Grandfathered In-Vivo General Medical Use
02210	Eye Applicators Strontium-90
02220*	Mobile Nuclear Medicine Service
02230	High Dose Rate Remote Afterloader
02231	Mobile High Dose Rate Remote Afterloader
02300	Teletherapy
02400*	Veterinary Non-Human
02410*	In-Vitro General Medical Use
02500*	Nuclear Pharmacies
02511*	Medical Product Distribution - 32.72 - Prepared Radiopharmaceuticals
02512*	Medical Product Distribution - 32.73 - Generators and Kits
02513*	Medical Product Distribution - 32.74 - Sources and Devices
03110*	Well Logging Byproduct or SNM Tracer and Sealed Sources
03111	Well Logging Byproduct or SNM Sealed Sources Only
03112*	Well Logging Byproduct Only - Tracers Only
03113*	Field Flooding Studies
03120	Measuring Systems Fixed Gauges
03121	Measuring Systems Portable Gauges
03122	Measuring Systems Analytical Instruments
03123	Measuring Systems Gas Chromatographs
03124	Measuring Systems Other
03211*	Manufacturing and Distribution Type A Broad
03212*	Manufacturing and Distribution Type B Broad
03213*	Manufacturing and Distribution Type C Broad
03214*	Manufacturing and Distribution Other
03218*	Nuclear Laundry
03219*	Decontamination Services
03220	Leak Test Service Only

Program codes indicated with an * were evaluated in this report.

Table 1- continued

<u>Program Code</u>	<u>Title</u>
03221	Instrument Calibration Service Only - Source Less Than 100 Curies
03222	Instrument Calibration Service Only - Source Greater Than 100 Curies
03223	Leak Test & Instr Calibration Service - Source Less Than 100 Curies
03224*	Leak Test & Instr Calibration Service - Source Greater Than 100 Curies
03225*	Other Services
03231	Waste Disposal (Burial)
03232*	Waste Disposal Service Prepackaged Only
03233	Waste Disposal Service Incineration
03234*	Waste Disposal Service Processing and/or Repackaging
03235	Incineration - Noncommercial (Secondary Code)
03240*	General License Distribution - 32.51
03241*	General License Distribution - 32.53
03242*	General License Distribution - 32.57
03243	General License Distribution - 32.61
03244*	General License Distribution - 32.71
03250	Exempt Distribution - 32.11 - Exempt Concentrations and Items
03251	Exempt Distribution - 32.14 - Certain Items
03252	Exempt Distribution - 32.17 - Resins
03253	Exempt Distribution - 32.18 - Small Quantities
03254	Exempt Distribution - 32.22 - Self Luminous Products
03255	Exempt Distribution - 32.26 - Smoke Detectors
03310	Industrial Radiography Fixed Location
03320	Industrial Radiography Temporary Job Sites
03510	Irradiators Self Shielded Less Than 10000 Curies
03511	Irradiators Other Less Than 10000 Curies
03520	Irradiators Self Shielded Greater Than 10000 Curies
03521	Irradiators Other Greater Than 10000 Curies
03610*	Research and Development Type A Broad
03611*	Research and Development Type B Broad
03612*	Research and Development Type C Broad
03613*	R & D Broad - Multisite-Multiregional
03620*	Research and Development Other
03710*	Civil Defense
03800	Byproduct Material Possession Only - No Operations Authorized
03900*	Decommissioning of Byproduct Material Facilities
06100	Low Level Waste Storage at Reactor Sites
06101	Low Level Waste Storage - Other
11100*	Mills
11200*	Source Material Other Less Than 150 Kilograms

Table 1- continued

<u>Program Code</u>	<u>Title</u>
11210	Source Material Shielding
11220*	Source Material Military Munitions - Indoor Testing
11221*	Source Material Military Munitions - Outdoor Testing
11230	Source Material General License Distribution - 40.34
11300*	Source Material Other Greater Than 150 Kilograms
11400*	Uranium Hexafluoride (UF ₆) Production Plants
11500*	Solution Mining (R & D and Commercial Facilities)
11600*	Heap Leach, Ore Buying Stations and Byproduct Recovery
11700*	Rare Earth Extraction and Processing
11800	Source Material Possession Only - No Operations Authorized
11900*	Decommissioning of Source Material Facilities
21130*	Hot Cell Operations
21135*	Decommissioning of Advanced Fuel R & D and Pilot Plants
21200	Uranium Enrichment Plants
21210*	Uranium Fuel Processing Plants
21215*	Decommissioning of Uranium Fuel Processing Plants
21240*	Uranium fuel R & D and Pilot Plants
21310*	Critical Mass Material - Universities
21320*	Critical Mass Material - Other Than Universities
21325	Decommissioning of Critical Mass - Other Than Fuel Fabrication
22110*	SNM Plutonium - Unsealed Less Than a Critical Mass
22111*	SNM U-235 and/or U-233 Unsealed Less Than a Critical Mass
22120	SNM Plutonium - Neutron Sources Less Than 200 Grams
22130	Power Sources With Byproduct and/or Special Nuclear Material
22140	SNM Plutonium - Sealed Sources in Devices
22150	SNM Plutonium - Sealed Sources Less Than a Critical Mass
22151	SNM U-235 and/or U-233 Sealed Sources Less Than a Critical Mass
22160	Pacemaker Byproduct or SNM - Medical Institution
22161	Pacemaker Byproduct or SNM - Individual
22162*	Pacemaker Byproduct or SNM - Manufacturing and Distribution
22170	SNM General License Distribution (70.39)
22200	Decommissioning of Other SNM Facilities - Less Than Critical Mass
23100	Fresh Fuel Storage at Reactor Sites
23200	Interim Spent Fuel Storage
23300*	SNM Possession Only - Other Than Reactor Fuel
25110	Transport - Private Carriage

APPENDIX B

COLLECTED DATA BY PROGRAM CODE

APPENDIX B - COLLECTED DATA BY PROGRAM CODE

PROGRAM CODE <i>Program Code - 2 digit - 1st digit - 2nd digit</i>	TOTAL IN CODE <i>Footnote w/ date of this number</i>	NUMBER REVIEWED	INSPECTION NOTES <i>#2</i>			APPLICATIONS			Did Not Discharge But Stated They Might	Did Discharge But Did Not State They Would
			Number that Discharged	% that Discharged <i>#1</i>	Expected Number to Discharge	Those with Intent	% with Intent	Expected Number to Discharge		
1100	48	27	12	44.4	21	11	40.7	20	3	5
1110	10	8	1	12.5	1	2	25.0	3	5	4
1120	15	13	4	30.8	5	7	53.8	8	3	0
2110	82	40	18	45.0	37	21	52.5	43	9	5
2120	1233	1078	62	5.8	71	935	86.7	1069	883	11
2121	4	4	0	0.0	0	3	75.0	3	3	0
2200	364	308	2	0.6	2	246	79.9	291	226	0
2201	32	29	1	3.4	1	8	27.6	9	7	0
2220	30	24	0	0.0	0	20	83.3	25	19	0
2400	57	33	2	6.1	3	18	54.5	31	15	0
2410	106	90	29	32.2	34	51	56.7	60	28	7
2500	66	40	7	17.5	12	20	50.0	33	16	4
2511	4	3	1	33.3	1	0	0.0	0	0	1
2512	7	6	3	50.0	4	0	0.0	0	0	3

¹An explanation of column titles is on the last page of this appendix.

B-1

Do not
agree w/
this assumption

#1 Indicate
this to go
these numbers
#2 where did this
come from - so discuss
personally on this.
except in
the appendix

These 2 cols
could be
someone's
believe
was v.
was v.
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meaningless
columns

see #2
not below

First time
this information
appears should
be discussed
earlier

of
this column
+ this column

15

APPENDIX B - COLLECTED DATA BY PROGRAM CODE(Continued)

PROGRAM CODE	TOTAL IN CODE	NUMBER REVIEWED	INSPECTION NOTES			APPLICATIONS			Did Not Discharge But Stated They Might	Did Discharge But Did Not State They Would
			Number that Discharged	% that Discharged	Expected Number to Discharge	Those with Intent	% with Intent	Expected Number to Discharge		
2513	4	4	1	25.0	1	0	0.0	0	0	1
3110	23	22	0	0.0	0	0	0.0	0	0	0
3112	6	6	0	0.0	0	0	0.0	0	0	0
3113	3	0	0	0.0	0	0	0.0	0	0	0
3211	12	4	1	25.0	3	1	25.0	3	0	0
3212	6	5	0	0.0	0	0	0.0	0	0	0
3213	3	2	0	0.0	0	0	0.0	0	0	0
3214	101	79	12	15.2	15	11	13.9	14	7	8
3218	4	4	4	100.0	4	2	50.0	2	0	1
3219	1	1	0	0.0	0	0	0.0	0	0	0
3224	4	4	0	0.0	0	2	50.0	2	2	0
3225	70	59	2	3.4	2	7	11.9	8	7	1
3232	4	3	0	0.0	0	0	0.0	0	0	0
3234	9	5	1	20.0	2	1	20.0	2	0	0
3240	33	26	0	0.0	0	0	0.0	0	0	0
3241	1	1	0	0.0	0	0	0.0	0	0	0

APPENDIX B - COLLECTED DATA BY PROGRAM CODE (Continued)

PROGRAM CODE	TOTAL IN CODE	NUMBER REVIEWED	INSPECTION NOTES			APPLICATIONS			Did Not Discharge But Stated They Might	Did Discharge But, Did Not State They Would
			Number that Discharged	% that Discharged	Expected Number to Discharge	Those with Intent	% with Intent	Expected Number to Discharge		
3242	1	1	0	0.0	0	0	0.0	0	0	0
3244	13	10	4	40.0	5	3	30.0	4	2	3
3610	108	76	25	32.9	36	35	46.1	50	16	5
3611	23	16	4	25.0	6	10	62.5	14	7	1
3612	7	5	3	60.0	4	4	80.0	6	2	1
3613	3	1	0	0.0	0	0	0.0	0	0	0
3620	501	411	128	31.1	156	215	52.3	262	105	29
3710	18	17	0	0.0	0	0	0.0	0	0	0
3900	2	1	0	0.0	0	0	0.0	0	0	0
11100	6	0	0	0.0	0	0	0.0	0	0	0
11200	11	7	1	14.3	2	1	14.3	2	0	0
11220	8	6	1	16.7	1	1	16.7	1	0	0
11221	1	1	0	0.0	0	0	0.0	0	0	0
11300	65	35	2	5.7	4	2	5.7	4	1	1
11400	1	1	0	0.0	0	0	0.0	0	0	0
11500	6	0	0	0.0	0	0	0.0	0	0	0

APPENDIX B - COLLECTED DATA BY PROGRAM CODE (Continued)

PROGRAM CODE	TOTAL IN CODE	NUMBER REVIEWED	INSPECTION NOTES			APPLICATIONS			Did Not Discharge But Stated They Might	Did Discharge But Did Not State They Would
			Number that Discharged	% that Discharged	Expected Number to Discharge	Those with Intent	% with Intent	Expected Number to Discharge		
11600	3	0	0	0.0	0	0	0.0	0	0	0
11700	6	4	0	0.0	0	2	50.0	3	2	0
11900	2	0	0	0.0	0	0	0.0	0	0	0
21130	2	1	1	100.0	2	1	100.0	2	0	0
21135	1	0	0	0.0	0	0	0.0	0	0	0
21210	9	9	3	33.3	3	1	11.1	1	0	2
21215	5	1	1	100.0	5	0	0.0	0	0	1
21240	1	1	1	100.0	1	1	100.0	1	0	0
21310	7	7	1	14.3	1	4	57.1	4	3	0
21320	5	4	1	25.0	1	1	25.0	1	0	0
22110	9	6	1	16.7	1	3	50.0	5	2	0
22111	4	4	0	0.0	0	0	0.0	0	0	0
22162	2	2	0	0.0	0	0	0.0	0	0	0
23300	3	6	1	16.7	1	0	0.0	0	0	1
TOTALS*	3183	2561	341	Not Used	449	1650	Not Used	1984	1373	95

Column Title Explanation

PROGRAM CODE: This listing is explained in detail in Appendix A, but it is from an NRC coded listing of Program Codes Used in Materials and Fuel Licensing and Inspection programs compiled as of August 26, 1994.

TOTAL IN CODE: The total number of licenses of this code in the August 26, 1994 list. - Is this number of licenses in 8-26-94?

NUMBER REVIEWED: The number of licenses available for review (not in use by others and checked out).

INSPECTION NOTES: Data collected from NRC inspectors' field notes.

Number that Discharged: The number of licensees discharging to sanitary sewer systems as recorded by NRC inspectors.

% that Discharged: The "Number that Discharged" divided by the "Number Reviewed" times 100%.

Expected Number to Discharge: The "% that Discharged" times the "Total in Code" divided by 100. - Do not agree w/ this assumption

APPLICATIONS: Data collected from NRC files maintained on applications for licenses.

Those with intent: The number of applications that contained statements indicating plans for the potential use of the sanitary sewer system for discharging of radioactive materials.

% with Intent: "Those with Intent" divided by the "Number Reviewed" times 100%. - meaningless

Expected Number to Discharge: The "% with Intent" times the "Total in Code" divided by 100. → Do not agree w/ this assumption

DID NOT DISCHARGE BUT STATED THEY MIGHT: This number represents those licensees that did not use the sewer (per the field inspection notes) but indicated plans for potential use in their license application.

DID DISCHARGE BUT DID NOT STATE THEY WOULD: This number represents those licensees that did use the sanitary sewer to discharge radioactive materials (per field inspection notes) but did not include plans for doing so in their applications.

* **TOTALS** are sums of the respective columns and the "Not Used" percentages are omitted to avoid confusion with all licensee data.

mean
info.

APPENDIX C

ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION¹

A	ANY BYPRODUCT MATERIAL
AC	ACTINIUM
AC227	ACTINIUM 227
AC228	ACTINIUM 228
AGRIXITC	ANY BYPRODUCT MATERIAL EXCEPT IODINE 131 AND TECHNETIUM 99M, LISTED IN GROUP I OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
AGR2XITC	ANY BYPRODUCT MATERIAL, EXCEPT IODINE 131 AND TECHNETIUM 99M, LISTED IN GROUP II OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
AGR4XI131	ANY BYPRODUCT MATERIAL, EXCEPT IODINE 131 LISTED IN GROUP IV OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
AGR5XI131	ANY BYPRODUCT MATERIAL, EXCEPT IODINE 131 LISTED IN GROUP V OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
AG110	SILVER 110
AGA110M	SILVER 110M
AG111	SILVER 111
AM	AMERICIUM
AM241	AMERICIUM 241
AM242	AMERICIUM 242
AM242M	AMERICIUM 242M
AM243	AMERICIUM 243
AM244	AMERICIUM 244
AM246	AMERICIUM 246
AR37	ARGON 37
AR41	ARGON 41
AS72	ARSENIC 72
AS73	ARSENIC 73
AS74	ARSENIC 74
AS76	ARSENIC 76
AS77	ARSENIC 77
AU195	GOLD 195
AU195M	GOLD 195M

¹ Descriptions such as 31.11, 35.100, etc. refer to the respective sections of 10 CFR Parts 31 and 35.

*should be
done using
normal to
abbreviate*

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

AU198	GOLD 198
AU199	GOLD 199
AX	ANY BYPRODUCT MATERIAL WITH EXCEPTIONS
A1	ANY BYPRODUCT MATERIAL BETWEEN ATOMIC NUMBERS 1 & 83.
A1X	ANY BYPRODUCT MATERIALS BETWEEN ATOMIC NUMBERS 1 & 83 WITH EXCEPTIONS.
A3	ANY BYPRODUCT MATERIAL BETWEEN ATOMIC NUMBERS 3 AND 83.
A3X	ANY BYPRODUCT MATERIAL BETWEEN ATOMIC NUMBERS 3 & 83 WITH EXCEPTIONS
A83X	ANY BYPRODUCT MATERIAL WITH ATOMIC NUMBERS > 83 WITH EXCEPTIONS.
BA131	BARIUM 131
BA133	BARIUM 133
BA137M	BARIUM 137M
BA140	BARIUM 140
BI207	BISMUTH 207
BI210	BISMUTH 210
BK247	BERKELIUM 247
BK249	BERKELIUM 249
BK250	BERKELIUM 250
BR76	BROMINE 76
BR77	BROMINE 77
BR80	BROMINE 80
BR82	BROMINE 82
C14	CARBON 14
CA	CALCIUM
CA45	CALCIUM 45
CA47	CALCIUM 47
CD109	CADMIUM 109
CD113	CADMIUM 113
CD113M	CADMIUM 113M
CD115	CADMIUM 115
CE137	CERIUM 137
CE139	CERIUM 139
CE141	CERIUM 141

APPENDIX C
ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

CE143	CERIUM 143
CE144	CERIUM 144
CF	CALIFORNIUM
CF241	CALIFORNIUM 241
CF249	CALIFORNIUM 249
CF250	CALIFORNIUM 250
CF252	CALIFORNIUM 252
CF253	CALIFORNIUM 253
CL35	CHLORINE 35
CL36	CHLORINE 36
CL38	CHLORINE 38
CM	CURIUM
CM242	CURIUM 242
CM243	CURIUM 243
CM244	CURIUM 244
CM245	CURIUM 245
CM246	CURIUM 246
CM247	CURIUM 247
CM248	CURIUM 248
CM249	CURIUM 249
CM250	CURIUM 250
CO	COBALT
CO57	COBALT 57
CO58	COBALT 58
CO60	COBALT 60
CO61	COBALT 61
CO62	COBALT 62
CO63	COBALT 63
CO64	COBALT 64
CR	CHROMIUM
CR51	CHROMIUM 51
CR52	CHROMIUM 52
CS	CESIUM
CS134	CESIUM 134
CS137	CESIUM 137
CS139	CESIUM 139

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

CU64	COPPER 64
CU67	COPPER 67
DU	URANIUM (DEPLETED IN URANIUM 235)
DY159	DYSPROSIUM 159
DY165	DYSPROSIUM 165
ENT	ENRICHED THORIUM
ENU	ENRICHED URANIUM
ER169	ERBIUM 169
EU152	EUROPIUM 152
EU152M	EUROPIUM 152M
EU154	EUROPIUM 154
EU155	EUROPIUM 155
FE55	IRON 55
FE59	IRON 59
F18	FLUORINE 18
GA67	GALLIUM 67
GA70	GALLIUM 70
GA72	GALLIUM 72
GD151	GADOLINIUM 151
GD153	GADOLINIUM 153
GD159	GADOLINIUM 159
GD162	GERMANIUM 162
GE68	GERMANIUM 68
GE77	GERMANIUM 77
GR1	ANY BYPRODUCT MATERIAL LISTED IN GROUP I OF SCHEDULE A SECTION 35.100 OF 10CFR35.
GR12	ANY BYPRODUCT MATERIAL LISTED IN GROUP I AND II OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR2	ANY BYPRODUCT MATERIAL LISTED IN GROUP II OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR3	ANY BYPRODUCT MATERIAL LISTED IN GROUP III OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR3XG	ANY REAGENT KIT LISTED IN GROUP III OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR4	ANY BYPRODUCT MATERIAL LISTED IN GROUP IV OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR5	ANY BYPRODUCT MATERIAL LISTED IN GROUP V OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
GR6	ANY BYPRODUCT MATERIAL LISTED IN GROUP VI OF SCHEDULE A, SECTION 35.100 OF 10CFR35.
HF172	HAFNIUM 172
HF180M	HAFNIUM 180M
HF181	HAFNIUM 181

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

HG195	MERCURY 195
HG197	MERCURY 197
HG203	MERCURY 203
HO166	HOLMIUM 166
HO166M	HOLMIUM 166M
H3	HYDROGEN 3 (TRITIUM)
I	IODINE
I125	IODINE 125
I126	IODINE 126
I128	IODINE 128
I129	IODINE 129
I131	IODINE 131
I132	IODINE 132
I133	IODINE 133
I135	IODINE 135
IN113	INDIUM 113
IN113M	INDIUM 113M
IN114	INDIUM 114
IN114M	INDIUM 114M
IR191M	IRIDIUM 191M
IR192	IRIDIUM 192
IR193	IRIDIUM 193
IR194	IRIDIUM 194
K40	POTASSIUM 40
K42	POTASSIUM 42
Kr79	KRYPTON 79
Kr81	KRYPTON 81
Kr83M	KRYPTON 83M
Kr84	KRYPTON 84
Kr85	KRYPTON 85
LA140	LANTHANUM 140
LU172	LUTECIUM 172
LU177	LUTECIUM 177
MG28	MAGNESIUM 28
MN54	MANGANESE 54
MN56	MANGANESE 56
MO	MOLYBDENUM
MOTC	MOLYBDENUM 99/TECHNETIUM 99
MO99	MOLYBDENUM 99
NA22	SODIUM 22
NA24	SODIUM 24
NB92M	NIOBIUM 92M
NB94	NIOBIUM 94

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

NB95	NIOBIUM 95
ND	NEODYMIUM
NI59	NICKEL 59
NI63	NICKEL 63
NFA	DISTRIBUTION ONLY, NO POSSESSION AUTHORIZED
NP234	NEPTUNIUM 234
NP235	NEPTUNIUM 235
NP237	NEPTUNIUM 237
NP239	NEPTUNIUM 239
NU	NATURAL URANIUM
ORE	BYPRODUCT MATERIAL AS DEFINED IN SECTION 40.4, 10CFR40.
OS185	OSMIUM 185
OS191	OSMIUM 191
P	PHOSPHORUS
P31	PHOSPHORUS 31
P32	PHOSPHORUS 32
P33	PHOSPHORUS 33
PA231	PROTACTINIUM 231
PA233	PROTACTINIUM 233
PA234	PROTACTINIUM 234
PB210	LEAD 210
PD109	PALLADIUM 109
PM145	PROMETHIUM 145
PM147	PROMETHIUM 147
PM148	PROMETHIUM 148
PO	POLONIUM
PO208	POLONIUM 208
PO209	POLONIUM 209
PO210	POLONIUM 210
PO218	POLONIUM 218
PR143	PRASEODYMIUM 143
PT183	PLATINUM 183
PT193	PLATINUM 193
PT195M	PLATINUM 195M
PT197	PLATINUM 197
PU	PLUTONIUM
PU236	PLUTONIUM 236
PU237	PLUTONIUM 237
PU238	PLUTONIUM 238
PU239	PLUTONIUM 239
PU240	PLUTONIUM 240
PU241	PLUTONIUM 241
PU242	PLUTONIUM 242

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

PU244	PLUTONIUM 244
RB	RUBIDIUM
RB86	RUBIDIUM 86
RE186	RHENIUM 186
RE188	RHENIUM 188
RU103	RUTHENIUM 103
RU105	RUTHENIUM 105
RU106	RUTHENIUM 106
RU97	RUTHENIUM 97
S34	SULFUR 34
S35	SULFUR 35
SB	ANTIMONY
SB122	ANTIMONY 122
SB124	ANTIMONY 124
SB125	ANTIMONY 125
SC46	SCANDIUM 46
SC47	SCANDIUM 47
SE75	SELENIUM 75
SI31	SILICON 31
SMA	SOURCE MATERIAL
SM145	SAMARIUM 145
SM151	SAMARIUM 151
SM153	SAMARIUM 153
SNM	SPECIAL NUCLEAR MATERIAL
SN113	TIN 113
SN119	TIN 119
SN121	TIN 121
SN125	TIN 125
SR	STRONTIUM
SR85	STRONTIUM 85
SR87	STRONTIUM 87
SR89	STRONTIUM 89
SR90	STRONTIUM 90
TA182	TANTALUM 182
TA183	TANTALUM 183
TB160	TEBIUM 160
TB161	TERBIUM 161
TC	TECHNETIUM
TC96	TECHNETIUM 96
TC99	TECHNETIUM 99
TC99M	TECHNETIUM 99M
TE123	TELLURIUM 123
TE123M	TELLURIUM 123M

APPENDIX C ABBREVIATIONS AND MATERIAL TYPE DESCRIPTIONS LIST

ABBREVIATION MATERIAL TYPE DESCRIPTION

TE125	TELLURIUM 125
TE125M	TELLURIUM 125M
TE129	TELLURIUM 129
TE132	TELLURIUM 132
TH225	THORIUM 225
TH227	THORIUM 227
TH228	THORIUM 228
TH229	THORIUM 229
TH230	THORIUM 330
TH231	THORIUM 231
TH232	THORIUM 232
TH233	THORIUM 233
TI44	TITANIUM 44
TL201	THALLIUM 201
TL204	THALLIUM 204
TM166	THULIUM 166
TM170	THULIUM 170
TM171	THULIUM 171
TM172	THULIUM 172
TUE	TRANSURANIC ELEMENTS
TYPB	ANY BYPRODUCT MATERIAL SPECIFIED IN 33.100, SCHEDULE A, COLUMN 1, CFR 33 (TYPE B BROAD LICENSE)
TYPC	ANY BYPRODUCT MATERIAL SPECIFIED IN 33.100, SCHEDULE A, COLUMN 2, CFR 33 (TYPE C BROAD LICENSE)
U	URANIUM
U232	URANIUM 232
U233	URANIUM 233
U234	URANIUM 234
U235	URANIUM 235 (IRRADIATED & UNIRRADIATED)
U236	URANIUM 236
U237	URANIUM 237
U239	URANIUM 239
VIT	ANY BYPRODUCT MATERIAL LISTED IN SECTION 31.11 (A) OF 10 CFR 31
V48	VANADIUM 48
V49	VANADIUM 49
W	TUNGSTEN
W181	TUNGSTEN 181
W185	TUNGSTEN 185
W187	TUNGSTEN 187