



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 23, 1985

TO ALL HOLDERS OF CONSTRUCTION PERMITS AND OPERATING LICENSES

SUBJECT: 10 CFR 20.408 TERMINATION REPORTS - FORMAT
GENERIC LETTER NO. 85-08

Pursuant to 10 CFR 20.408, licensees are required to submit to the NRC a report of each individual's exposure to radiation and radioactive material when the individual terminates employment or work assignment at their facility. These exposure reports are commonly referred to as §20.408 termination reports.

Previously, we have not specified a preferred reporting format for compliance with this regulation. However, the NRC is currently receiving approximately 100,000 termination reports each year, and this number is steadily increasing. For purposes of efficient automatic data processing, it is important to use a standard format. Processing in a more timely fashion will make the data more useful to the NRC and others in their performance of various duties (see Enclosure 1).

For future §20.408 termination reports we request that you voluntarily use the attached Standard NRC Form-439. Instructions for completing the form are attached to the form. Questions regarding these instructions should be directed to Barbara G. Brooks, Office of Nuclear Regulatory Research, Washington, D. C. 20555, (301) 427-4577.

The NRC is also conducting a pilot program for the electronic transmission of the termination data to the NRC via computer tapes or by direct linkup to the NRC's computing facility, and we would like to encourage you to consider participating. Should you desire more information about this program please contact Ms. Brooks.

The form is intended for use in connection with the information collection requirement established in Section 20.408, 10 CFR Part 20 and approved under OMB Clearance Number 3150-0014.

Hugh L. Thompson, Jr.
Hugh L. Thompson, Jr., Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure:

1. Uses of Radiation Exposure Data
2. Five copies of NRC Form 439

(With instructions)
③ List of Generic Letters

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See File Jacket

Uses of Radiation Exposure Data

A number of NRC licensees have inquired as to how occupational radiation exposure data (from reports required by the NRC) are used by the NRC staff. This is a very appropriate inquiry that may be of importance to many affected licensees. In combination with other sources of information, the principal uses of the data are to provide facts regarding routine occupational exposures to radiation and radioactive material that occur in connection with NRC-licensed activities, including individual and collective radiation doses from external sources as well as pertinent information on the inhalation of radioactive material (nuclides involved, bioassay results, exposure magnitude, etc.) These facts are used by the NRC staff as indicated below:

1. The external-dose data permit evaluation of the radiological risk associated with NRC-licensed activities, including the size of the workforce and the collective dose.
2. The data permit evaluation, from the viewpoint of trends, of the effectiveness of the overall NRC/licensee radiation protection and ALARA efforts. They also provide for the identification (and subsequent correction) of unfavorable trends.
3. The data provide for governmental monitoring of the potential transient-worker problem.
4. The data are used in the establishment of priorities for the utilization of NRC health physics resources: research, standards development, regulatory program development.
5. The data are considered in reviews of inspection frequencies that are programmed for various categories of licensees.
6. Licensing action decisions are often influenced by the data.
7. The data are used for comparative analyses of radiation protection performance: US/foreign, BWR's/PWR's, civilian/military, plant by plant, nuclear industry with other industries, etc.
8. The data permit analysis of annual dose distribution changes which can trigger investigations as to the cause.
9. The data are used for purposes of justification in the annual budget process.
10. The data provide facts for evaluating the adequacy of the current risk-limitation system (e.g., are individual lifetime dose limits, worker population collective dose limits, requirements for optimization, etc., needed).

11. The effectiveness of dose-reduction measures is evaluated using the data (e.g., methods for reducing individuals doses that may increase the collective dose).
12. The data provide facts for answering Congressional and Administration inquiries and for responding to questions raised by public interest groups, special interest groups, labor unions, etc.
13. The data permit comparisons of occupational radiation risks with potential public risks when action for additional protection of the public involves worker exposures.
14. The data provide information which can be used in the planning of epidemiological studies.

With regard to routine work-place conditions, the annual statistical summary reports required by 20.407, the termination reports required by §20.408, and the annual dose data reported by work function in accordance with Subsection 6.9.1.5 of the standard technical specifications for nuclear power plants provide the only centralized data base available to assist the staff in the performance of its duties as listed above. It is to everyone's advantage if these duties are performed by a well-informed staff in the light of factual information.

NRC FORM 439
14-85)
10 CFR §20.408

U.S. NUCLEAR REGULATORY COMMISSION

REPORT OF TERMINATING INDIVIDUAL'S
OCCUPATIONAL EXPOSURE

1. DATE OF REPORT

2. NRC LICENSE NUMBER(S)

SEE THE ATTACHED INSTRUCTIONS.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

3. NAME AND ADDRESS OF REPORTING LICENSEE		4. NAME OF INDIVIDUAL (first, middle initial, last) AND ADDRESS (optional)		
5. NAME AND ADDRESS OF EMPLOYER, IF DIFFERENT FROM ABOVE (Optional)		6. SOCIAL SECURITY NUMBER	7. DATE OF BIRTH MONTH DAY YEAR	

PART II. EXTERNAL DOSE DATA

8. PERSONNEL MONITORING FOR EXTERNAL EXPOSURE TO RADIATION WAS NOT PROVIDED.					
9. PERIOD(S) OF EXPOSURE (earliest date first)	10. WHOLE BODY DOSE (rems)				11. EXTREMITY DOSE (rems) SHALLOW (skin)
	DEEP		SHALLOW (skin)		
	b. TOTAL	b. NEUTRON	c. TOTAL	d. BETA	

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

12. PERSONNEL MONITORING FOR EXPOSURE TO RADIOACTIVE MATERIAL WAS NOT PROVIDED.								
13. PERIOD(S) OF EXPOSURE (earliest date first)	14. NUCLIDE	15. FORM (S, II)	16. BIOASSAY RESULTS		17. DOSE ESTIMATES (rems)	18. INTAKE (MPC-Hrs.)		
			a. IN VIVO (nCi)				b. URINALYSIS RESULTS (L)	
			(1) BURDEN	(2) ORGAN				
19. OTHER BIOASSAY RESULTS								
20. IF THIS REPORT IS BEING USED TO SATISFY THE NOTIFICATION REQUIREMENTS OF 10 CFR 19.13, CHECK THE FOLLOWING BOX.								
<input type="checkbox"/> YES (This report is furnished to you under the provision of the Nuclear Regulatory Commission's regulation 10 CFR Part 19. You should preserve this report for further reference)								

**INSTRUCTIONS FOR COMPLETING NRC FORM 439,
Report of Terminating Individual's Occupational Exposure**

If you are licensed by the U.S. Nuclear Regulatory Commission (NRC) as specified in §20.408(a), 10 CFR Part 20, you are required to submit termination radiation exposure reports on certain individuals to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. This information is to be taken from dose records that must be maintained under §20.401 for individuals likely to receive exposure to radiation that exceeds a certain percentage of the NRC dose standards for the whole body, skin or extremities—25% for workers of age 18 years or more, 5% for workers younger than 18. The term "individual" is used below to represent the worker for whom this report is submitted. The term "dose" as used in Form 439 and in these instructions refers to the dose in rems as defined in §20.4(a) and subsequently designated "dose equivalent" in ICRU Report II (1968). The time to be covered by this report is that period of employment, or work assignment in your facility(s), which ended with the most recent termination and was not interrupted by any previous termination during which personnel monitoring was required by §20.202(a) and/or bioassays were required by your license. "Termination" is defined in §20.3(a)(19). Parts II and III of this form reflect regulatory requirements as well as requests intended to standardize reporting methods; requests are clearly identified as such.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

This part identifies the licensee submitting the report and the terminating individual. It must be completed even if only one of the remaining Parts of this form is applicable. Enter the following data:

ITEM NUMBER

- | | |
|---|--|
| 1 | Date that the report was prepared. |
| 2 | Current NRC license number assigned to the facility(s) in which the individual received the reported dose. If more than one license is involved, enter the license number for the facility or activity under which most of the dose was incurred as the first number. If this is not practical, enter the license numbers in the order of original issuance. |
| 3 | Name and address of your facility as it appears on your NRC license. |
| 4 | The individual's first name, middle initial, and surname. (Address of the individual may be included, but it is not entered into the NRC records system.) |
| 5 | The name and address of the individual's employer, if it is different from the reporting licensee. (Optional; not entered into the NRC records system.) |
| 6 | The individual's social security number; if not available, enter the word "unknown." |
| 7 | The individual's date of birth. |

PART II. EXTERNAL DOSE DATA

For the purpose of this form, the deep dose is defined as the dose assessed at a tissue depth of 300 or 1,000 mg/cm² (or less), the shallow dose is defined as the dose to the skin of any part of the body, and the extremities are defined as hands and forearms, feet and ankles.

Item Number 8 If the individual was not monitored for external exposure to radiation, you are requested to check the box to the left and go to Part III.

COLUMN NUMBER

- | | |
|---------|--|
| 9 | Specify the reporting intervals (periods of exposure) that the individual was monitored at your facility(s) pursuant to §20.202. You are <u>requested</u> to use annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated:
ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., May 1979) and indicate the year only for subsequent annual increments;
QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date;
CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year);
Enter the following data: |
| 10a | Unless the eyes are shielded, enter the deep dose assessed at a tissue depth of 300 mg/cm ² (lens depth) or less. If the eyes are protected by shielding which has a tissue equivalent thickness of 700 mg/cm ² or more, the deep dose may be assessed at 1000 mg/cm ² (gonad depth) or less. Enter the total dose of record, i.e., the highest dose received at the selected depth, from all types of external radiation sources, at any location on the body except the skin and the extremities (hands and forearms, feet and ankles). |
| 10c | For all skin areas, except that of the extremities, enter in column 10c the shallow dose of record. Record the total dose to the skin, i.e., the highest dose delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm ² or less, averaged over 1 cm ² , is acceptable. If Column 10c is left blank, it will be assumed that the entry in 10a is applicable also for the shallow dose. Therefore, an entry for shallow dose is required only if it exceeds the deep dose. |
| 10b & d | You are <u>requested</u> to enter in column 10b the contribution made by neutron radiation to the dose reported in Column 10a, and to enter in Column 10d the contribution made by beta radiation to the dose reported in Column 10c. Enter XXX if it is known that there was no exposure to radiation of the type specified in the column heading. Enter UNK if a detectable exposure is reported in 10a or 10c which could have included a beta or neutron contribution of unknown magnitude. |
| 10 & 11 | You are <u>requested</u> to enter m or zero (in each column of 10, or in 11) if the dose was undetectable, i.e., the radiation to which the worker's dosimeter was exposed produced a response that you considered to be statistically indistinguishable from the response caused by inherent variabilities of the dosimeter system. Note: It is sometimes required to add m (or its equivalent) to a real number; although NRC regulations do not specify a summation procedure, the NRC staff arbitrarily assigns 10 mrems to be a value of m (assuming 0.5 L < 10 < L, where L is the detection limit) for the purposes of statistical analyses. |
| 11 | Reporting of the extremity dose is required. You are <u>requested</u> to comply in the following manner. Enter the dose of record, i.e., the highest dose, averaged over any area of 1 cm ² , determined for the skin of the hands and forearms or feet and ankles during the reported period. It is unnecessary to specify the extremity that received the dose; doses to different extremities should not be added together. The dose is to include that delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm ² or less is acceptable. If Column 11 is left blank, it will be assumed that the entry in 10c is applicable also for the extremity dose; an entry in Column 11 is required only if the shallow dose exceeded the deep dose. |

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

If you are licensed by the NRC as specified in §20.408(a), 10 CFR Part 20, and if your license requires bioassay services for workers at your facility, you are required to submit termination reports on personnel exposures to radioactive material, containing information that you have obtained in compliance with the license and recorded in compliance with §20.401. You are requested to include in each termination report information that you have obtained in compliance with §20.103(a)(3) and 20.103(c)(2) and recorded in compliance with §20.401. This part provides for the reporting of internal monitoring procedures in terms of bioassay results, dose estimates, or intake. Any one (or more) of these reporting methods may be used. The term "individual" is used below to represent the worker for whom this report is submitted. The term "exposures to radioactive material" is used in connection with these termination reports to represent the entry of radioactive material into the body.

Item Number 12 If the individual was not monitored for exposure to radioactive material, you are requested to check the box to the left; otherwise, enter the following data:

Column Number 13 If bioassay results are reported (Column 16), you are requested to use the following format. Summarize by year, separately listing the number of measurements which indicated quantities or concentrations that were undetectable, i.e., in the detection system used, the radionuclide present (if any) produced a response that you considered to be statistically indistinguishable from its background. In Column 13 enter each year bioassay was performed, including the year of termination. In Columns 14 through 16, use two lines for each year, as in the example shown below, the upper line for detectable results and the lower line for those undetectable. In 16a and/or 16b: upper line, enter the number (including zero) of detectable measurements followed in parenthesis by the highest verified result, if any; lower line, enter the number (including zero) of measurements indicating undetectable amounts.

INSTRUCTIONS FOR COMPLETING NRC FORM 439 (Continued)

COLUMN NUMBER

13 (Continued)	Column 13	Column 14	Column 15	Column 16		
				16a(1)	16a(2)	16b (pCi/L)
	1982	U-nat	..I..	0	lung	2(1)
	1983	U-nat(Th 234)	..I..	2 1(7)	lung lung	10 4(6)
	1984	U-nat(Th 234)	..I..	1 2(14) 0	lung lung lung	3 12(13) 0

Units for the numbers in parentheses shown in Column 16b are to be specified in the heading for Column 16b. If Columns 17 or 18 are completed, notations in Column 16 are unnecessary.

If the dose commitment (50-year integrated dose) is reported, indicate in Column 13 by beginning and ending dates (month, day, year) the period during which the associated radioactive material was taken into the body.

If annual doses are reported, enter in Column 13 the calendar year over which each dose was integrated, including the first and any succeeding years of this employment or work assignment and the year following the termination date.

For entries in Column 18 (intake), specify the reporting intervals (periods of exposure) during which the individual was exposed to concentrations of radioactive material, using annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated. The periods of exposure for intakes should appear as follows:

ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., June 1983) and indicate the year only for subsequent annual increments.

QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date.

CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year).

Reported intakes which include only the quantities required to be assessed in accordance with §20.103(a)(3) are acceptable.

14 Identify the symbol used in 10 CFR Part 20, Appendix B, for the radionuclide or mixture of radionuclides for which in vivo and/or urinalysis measurements were performed (e.g., Co 60, U 235). If the measured quantity of activity for one radionuclide is also used to estimate other radionuclide quantities, identify the radionuclide actually measured in parentheses immediately after the radionuclide listed in Column 14. See the example given in the directions for Column 13 where U-nat(Th 234) is entered in Column 14 indicating that the uranium lung burden was determined from measurements of Th 234 photons.

15 Enter the form, S for soluble or I for insoluble, of the radionuclide to which the worker was exposed. If unknown, use quotes around the letter, thus indicating which concentration value in Part 20, Appendix B, Table 1, Column 1, was assumed to apply.

16, 17 & 18 These columns allow for the reporting of the results of the internal monitoring procedures in terms of bioassay results, or dose estimates, or intake. You may use one or more of these methods.

16a(1) & a(2) For each year during which in vivo measurements were performed, as shown in Column 13, enter in Column 16a(1) the number of detectable measurements followed by the highest verified result (in nanocuries) in parentheses. On the next line in this column, enter the number of measurements that indicated undetectable amounts. Specify in Column 16a(2) the organ in which the indicated radionuclide was found. See the example given in the directions for Column 13.

16b First, enter the gravimetric or radiometric unit in which the urinalysis results are reported (e.g., micrograms per liter, nanocuries per liter) in the blank space of the heading for Column 16b. In Column 16b, for each year during which urinalyses were performed, enter the number of detectable results followed by the highest numerical value of the concentration in urine of the radionuclide listed in Column 14 for the year specified in Column 13. On the next line in this column, enter the number of measurements indicating undetectable amounts. See the example given in the directions for Column 13.

17a, b, & c Specify in Column 17c the organ or tissue receiving doses estimated in Column 17a or 17b. (Note that it is not necessary to provide both the committed and annual doses.) For Columns 17a and 17b you are requested to follow the procedures below: if any alternative procedures are used, describe them on the back of this form. In 17a, enter the dose integrated from t_0 to 50 years, where t_0 is the beginning date shown in Column 13. In 17b enter the dose integrated over each calendar year shown for this purpose in Column 13. Include the first and any succeeding years of this employment or work assignment and the year following the termination date. Base dose estimates on the quantity (as a minimum) of the radionuclide, Column 14, taken into the body at your facility(s) during this employment or work-assignment period.

18 Reporting of radionuclide intakes, as determined by air sampling, is not required by 10 CFR 20.408. However, should this option be chosen, indicate the time-weighted concentrations of radioactive material (i.e., MPC-hours) to which the individual was exposed during the time periods indicated in Column 13. Refer to the last paragraph of the instructions for Column 13 for the time intervals to be used. Complete Columns 13, 14, and 15 for each entry in Column 18.

Item number 19 Any bioassay results that cannot be reported as described above should be entered here.

Item number 20 If you wish to send a copy of this report to the terminating individual to satisfy the notification requirements of 10 CFR 19.13, check the "Yes" box.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals and persons who supply information to the Nuclear Regulatory Commission on NRC Form 439. This information is maintained in a system of records designated as NRC-27 and described at 40 Federal Register 45344 (October 1, 1975).

- AUTHORITY.** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
- PRINCIPAL PURPOSE(S).** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permit a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation are available to you upon request.
- ROUTINE USES.** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
- WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT OF NOT PROVIDING INFORMATION ON INDIVIDUAL OR PERSON.** It is voluntary that you furnish the requested information, including name, date of birth, and social security number. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained. Please note, however, that the licensee must file a termination report containing certain required information, such as social security number, for each individual whose employment or work assignment has terminated and for whom personnel monitoring was required under 10 CFR 20.202. Failure of the licensee to provide the information under 10 CFR §20.202 and 20.408 may subject the licensee to enforcement action under 10 CFR 20.601.
- SYSTEM MANAGER(S) AND ADDRESS:** Director, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

**REPORT OF TERMINATING INDIVIDUAL'S
OCCUPATIONAL EXPOSURE**

SEE THE ATTACHED INSTRUCTIONS.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

3. NAME AND ADDRESS OF REPORTING LICENSEE		4. NAME OF INDIVIDUAL (first, middle initial, last) AND ADDRESS (optional)		
5. NAME AND ADDRESS OF EMPLOYER, IF DIFFERENT FROM ABOVE (Optional)		6. SOCIAL SECURITY NUMBER	7. DATE OF BIRTH	
			MONTH	DAY
			YEAR	

PART II. EXTERNAL DOSE DATA

8. PERSONNEL MONITORING FOR EXTERNAL EXPOSURE TO RADIATION WAS NOT PROVIDED.					
9. PERIOD(S) OF EXPOSURE (earliest date first)	10. WHOLE BODY DOSE (rems)				11. EXTREMITY DOSE (rems) SHALLOW (skin)
	DEEP		SHALLOW (skin)		
	a. TOTAL	b. NEUTRON	c. TOTAL	d. BETA	

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

12. PERSONNEL MONITORING FOR EXPOSURE TO RADIOACTIVE MATERIAL WAS NOT PROVIDED.									
13. PERIOD(S) OF EXPOSURE (earliest date first)	14. NUCLIDE	15. FORM (S, I)	16. BIOASSAY RESULTS			17. DOSE ESTIMATES (rems)			18. INTAKE (MPC-Hrs.)
			a. IN VIVO (nCi)		b. URINALYSIS RESULTS (L)	a. COM- MITTED DOSE	b. ANNUAL DOSE	c. ORGAN	
			(1) BURDEN	(2) ORGAN					
19. OTHER BIOASSAY RESULTS									
20. IF THIS REPORT IS BEING USED TO SATISFY THE NOTIFICATION REQUIREMENTS OF 10 CFR 19.13, CHECK THE FOLLOWING BOX.									
<input type="checkbox"/> YES (This report is furnished to you under the provision of the Nuclear Regulatory Commission's regulation 10 CFR Part 19. You should preserve this report for further reference.)									

INSTRUCTIONS FOR COMPLETING NRC FORM 439,
Report of Terminating Individual's Occupational Exposure

If you are licensed by the U.S. Nuclear Regulatory Commission (NRC) as specified in §20.408(a), 10 CFR Part 20, you are required to submit termination radiation exposure reports on certain individuals to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. This information is to be taken from dose records that must be maintained under §20.401 for individuals likely to receive exposure to radiation that exceeds a certain percentage of the NRC dose standards for the whole body, skin or extremities—25% for workers of age 18 years or more, 5% for workers younger than 18. The term "individual" is used below to represent the worker for whom this report is submitted. The term "dose" as used in Form 439 and in these instructions refers to the dose in rems as defined in §20.4(a) and subsequently designated "dose equivalent" in ICRU Report II (1968). The time to be covered by this report is that period of employment, or work assignment in your facility(s), which ended with the most recent termination and was not interrupted by any previous termination during which personnel monitoring was required by §20.202(a) and/or bioassays were required by your license. "Termination" is defined in §20.3(a)(19). Parts II and III of this form reflect regulatory requirements as well as requests intended to standardize reporting methods; requests are clearly identified as such.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

This part identifies the licensee submitting the report and the terminating individual. It must be completed even if only one of the remaining Parts of this form is applicable. Enter the following data:

ITEM NUMBER

- 1 Date that the report was prepared.
- 2 Current NRC license number assigned to the facility(s) in which the individual received the reported dose. If more than one license is involved, enter the license number for the facility or activity under which most of the dose was incurred as the first number. If this is not practical, enter the license numbers in the order of original issuance.
- 3 Name and address of your facility as it appears on your NRC license.
- 4 The individual's first name, middle initial, and surname. (Address of the individual may be included, but it is not entered into the NRC records system.)
- 5 The name and address of the individual's employer, if it is different from the reporting licensee. (Optional; not entered into the NRC records system.)
- 6 The individual's social security number; if not available, enter the word "unknown."
- 7 The individual's date of birth.

PART II. EXTERNAL DOSE DATA

For the purpose of this form, the deep dose is defined as the dose assessed at a tissue depth of 300 or 1,000 mg/cm² (or less), the shallow dose is defined as the dose to the skin of any part of the body, and the extremities are defined as hands and forearms, feet and ankles.

Item Number 8 If the individual was not monitored for external exposure to radiation, you are requested to check the box to the left and go to Part III.

COLUMN NUMBER

- 9 Specify the reporting intervals (periods of exposure) that the individual was monitored at your facility(s) pursuant to §20.202. You are requested to use annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated:
ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., May 1979) and indicate the year only for subsequent annual increments;
QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date;
CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year);
Enter the following data:
- 10a Unless the eyes are shielded, enter the deep dose assessed at a tissue depth of 300 mg/cm² (lens depth) or less. If the eyes are protected by shielding which has a tissue equivalent thickness of 700 mg/cm² or more, the deep dose may be assessed at 1000 mg/cm² (gonad depth) or less. Enter the total dose of record, i.e., the highest dose received at the selected depth, from all types of external radiation sources, at any location on the body except the skin and the extremities (hands and forearms, feet and ankles).
- 10c For all skin areas, except that of the extremities, enter in column 10c the shallow dose of record. Record the total dose to the skin, i.e., the highest dose delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less, averaged over 1 cm², is acceptable. If Column 10c is left blank, it will be assumed that the entry in 10a is applicable also for the shallow dose. Therefore, an entry for shallow dose is required only if it exceeds the deep dose.
- 10b & d You are requested to enter in column 10b the contribution made by neutron radiation to the dose reported in Column 10a, and to enter in Column 10d the contribution made by beta radiation to the dose reported in Column 10c. Enter XXX if it is known that there was no exposure to radiation of the type specified in the column heading. Enter UNK if a detectable exposure is reported in 10a or 10c which could have included a beta or neutron contribution of unknown magnitude.
- 10 & 11 You are requested to enter m or zero (in each column of 10, or in 11) if the dose was undetectable, i.e., the radiation to which the worker's dosimeter was exposed produced a response that you considered to be statistically indistinguishable from the response caused by inherent variabilities of the dosimeter system. Note: It is sometimes required to add m (or its equivalent) to a real number; although NRC regulations do not specify a summation procedure, the NRC staff arbitrarily assigns 10 mrems to be a value of m (assuming $0.5 L < 10 < L$, where L is the detection limit) for the purposes of statistical analyses.
- 11 Reporting of the extremity dose is required. You are requested to comply in the following manner. Enter the dose of record, i.e., the highest dose, averaged over any area of 1 cm², determined for the skin of the hands and forearms or feet and ankles during the reported period. It is unnecessary to specify the extremity that received the dose; doses to different extremities should not be added together. The dose is to include that delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less is acceptable. If Column 11 is left blank, it will be assumed that the entry in 10c is applicable also for the extremity dose; an entry in Column 11 is required only if the shallow dose exceeded the deep dose.

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

If you are licensed by the NRC as specified in §20.408(a), 10 CFR Part 20, and if your license requires bioassay services for workers at your facility, you are required to submit termination reports on personnel exposures to radioactive material, containing information that you have obtained in compliance with the license and recorded in compliance with §20.401. You are requested to include in each termination report information that you have obtained in compliance with §20.103(a)(3) and 20.103(c)(2) and recorded in compliance with §20.401. This part provides for the reporting of internal monitoring procedures in terms of bioassay results, dose estimates, or intake. Any one (or more) of these reporting methods may be used. The term "individual" is used below to represent the worker for whom this report is submitted. The term "exposures to radioactive material" is used in connection with these termination reports to represent the entry of radioactive material into the body.

Item Number 12 If the individual was not monitored for exposure to radioactive material, you are requested to check the box to the left; otherwise, enter the following data:

Column Number 13 If bioassay results are reported (Column 16), you are requested to use the following format. Summarize by year, separately listing the number of measurements which indicated quantities or concentrations that were undetectable, i.e., in the detection system used, the radionuclide present (if any) produced a response that you considered to be statistically indistinguishable from its background. In Column 13 enter each year bioassay was performed, including the year of termination. In Columns 14 through 16, use two lines for each year, as in the example shown below, the upper line for detectable results and the lower line for those undetectable. In 16a and/or 16b: upper line, enter the number (including zero) of detectable measurements followed in parenthesis by the highest verified result, if any; lower line, enter the number (including zero) of measurements indicating undetectable amounts.

INSTRUCTIONS FOR COMPLETING NRC FORM 439 (Continued)

COLUMN NUMBER

13 (Continued)	Column 13	Column 14	Column 15	16a(1)	Column 16	16b (pCi/L)
					16a(2)	
	1982	U-nat	"I"	0	lung	2(1)
				2	lung	10
	1983	U-nat(Th 234)	"I"	1(7)	lung	4(6)
				1	lung	8
	1984	U-nat(Th 234)	"I"	2(14)	lung	12(13)
				0	lung	0

Units for the numbers in parentheses shown in Column 16b are to be specified in the heading for Column 16b. If Columns 17 or 18 are completed, notations in Column 16 are unnecessary.

If the dose commitment (50-year integrated dose) is reported, indicate in Column 13 by beginning and ending dates (month, day, year) the period during which the associated radioactive material was taken into the body.

If annual doses are reported, enter in Column 13 the calendar year over which each dose was integrated, including the first and any succeeding years of this employment or work assignment and the year following the termination date.

For entries in Column 18 (intake), specify the reporting intervals (periods of exposure) during which the individual was exposed to concentrations of radioactive material, using annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated. The periods of exposure for intakes should appear as follows:

ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., June 1983) and indicate the year only for subsequent annual increments.

QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date.

CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year).

Reported intakes which include only the quantities required to be assessed in accordance with §20.103(a)(3) are acceptable.

- 14 Identify the symbol used in 10 CFR Part 20, Appendix B, for the radionuclide or mixture of radionuclides for which in vivo and/or urinalysis measurements were performed (e.g., Co 60, U 235). If the measured quantity of activity for one radionuclide is also used to estimate other radionuclide quantities, identify the radionuclide actually measured in parentheses immediately after the radionuclide listed in Column 14. See the example given in the directions for Column 13 where U-nat(Th 234) is entered in Column 14 indicating that the uranium lung burden was determined from measurements of Th 234 photons.
- 15 Enter the form, S for soluble or I for insoluble, of the radionuclide to which the worker was exposed. If unknown, use quotes around the letter, thus indicating which concentration value in Part 20, Appendix B, Table 1, Column 1, was assumed to apply.
- 16, 17 & 18 These columns allow for the reporting of the results of the internal monitoring procedures in terms of bioassay results, or dose estimates, or intake. You may use one or more of these methods.
- 16a(1) & a(2) For each year during which in vivo measurements were performed, as shown in Column 13, enter in Column 16a(1) the number of detectable measurements followed by the highest verified result (in nanocuries) in parentheses. On the next line in this column, enter the number of measurements that indicated undetectable amounts. Specify in Column 16a(2) the organ in which the indicated radionuclide was found. See the example given in the directions for Column 13.
- 16b First, enter the gravimetric or radiometric unit in which the urinalysis results are reported (e.g., micrograms per liter, nanocuries per liter) in the blank space of the heading for Column 16b. In Column 16b, for each year during which urinalyses were performed, enter the number of detectable results followed by the highest numerical value of the concentration in urine of the radionuclide listed in Column 14 for the year specified in Column 13. On the next line in this column, enter the number of measurements indicating undetectable amounts. See the example given in the directions for Column 13.
- 17a, b, & c Specify in Column 17c the organ or tissue receiving doses estimated in Column 17a or 17b. (Note that it is not necessary to provide both the committed and annual doses.) For Columns 17a and 17b you are requested to follow the procedures below: if any alternative procedures are used, describe them on the back of this form. In 17a, enter the dose integrated from t₁ to 50 years, where t₁ is the beginning date shown in Column 13. In 17b enter the dose integrated over each calendar year shown for this purpose in Column 13. Include the first and any succeeding years of this employment or work assignment and the year following the termination date. Base dose estimates on the quantity (as a minimum) of the radionuclide, Column 14, taken into the body at your facility(s) during this employment or work-assignment period.
- 18 Reporting of radionuclide intakes, as determined by air sampling, is not required by 10 CFR 20.408. However, should this option be chosen, indicate the time-weighted concentrations of radioactive material (i.e., MPC-hours) to which the individual was exposed during the time periods indicated in Column 13. Refer to the last paragraph of the instructions for Column 13 for the time intervals to be used. Complete Columns 13, 14, and 15 for each entry in Column 18.
- Item number 19 Any bioassay results that cannot be reported as described above should be entered here.
- Item number 20 If you wish to send a copy of this report to the terminating individual to satisfy the notification requirements of 10 CFR 19.13, check the "Yes" box.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals and persons who supply information to the Nuclear Regulatory Commission on NRC Form 439. This information is maintained in a system of records designated as NRC-27 and described at 40 Federal Register 45344 (October 1, 1975).

1. **AUTHORITY.** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
2. **PRINCIPAL PURPOSE(S).** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permit a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation are available to you upon request.
3. **ROUTINE USES.** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT OF NOT PROVIDING INFORMATION ON INDIVIDUAL OR PERSON.** It is voluntary that you furnish the requested information, including name, date of birth, and social security number. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained. Please note, however, that the licensee must file a termination report containing certain required information, such as social security number, for each individual whose employment or work assignment has terminated and for whom personnel monitoring was required under 10 CFR 20.202. Failure of the licensee to provide the information under 10 CFR §20.202 and 20.408 may subject the licensee to enforcement action under 10 CFR 20.601.
5. **SYSTEM MANAGER(S) AND ADDRESS:** Director, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

NRC FORM 439
 (4-85)
 10 CFR §20.408

U.S. NUCLEAR REGULATORY COMMISSION

1. DATE OF REPORT

REPORT OF TERMINATING INDIVIDUAL'S
 OCCUPATIONAL EXPOSURE

2. NRC LICENSE NUMBER(S)

SEE THE ATTACHED INSTRUCTIONS.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

3. NAME AND ADDRESS OF REPORTING LICENSEE		4. NAME OF INDIVIDUAL (first, middle initial, last) AND ADDRESS (optional)		
5. NAME AND ADDRESS OF EMPLOYER, IF DIFFERENT FROM ABOVE (Optional)		6. SOCIAL SECURITY NUMBER	7. DATE OF BIRTH	MONTH DAY YEAR

PART II. EXTERNAL DOSE DATA

8. PERSONNEL MONITORING FOR EXTERNAL EXPOSURE TO RADIATION WAS NOT PROVIDED.					
9. PERIOD(S) OF EXPOSURE <i>(earliest date first)</i>	10. WHOLE BODY DOSE (rems)				11. EXTREMITY DOSE (rems) SHALLOW (skin)
	DEEP		SHALLOW (skin)		
	a. TOTAL	b. NEUTRON	c. TOTAL	d. BETA	

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

12. PERSONNEL MONITORING FOR EXPOSURE TO RADIOACTIVE MATERIAL WAS NOT PROVIDED.									
13. PERIOD(S) OF EXPOSURE <i>(earliest date first)</i>	14. NUCLIDE	15. FORM (S, I)	16. BIOASSAY RESULTS			17. DOSE ESTIMATES (rems)			18. INTAKE (MPC-Hrs.)
			a. IN VIVO (nCi)		b. URINALYSIS RESULTS L	a. COM- MITTED DOSE	b. ANNUAL DOSE	c. ORGAN	
			(1) BURDEN	(2) ORGAN					
19. OTHER BIOASSAY RESULTS									
20. IF THIS REPORT IS BEING USED TO SATISFY THE NOTIFICATION REQUIREMENTS OF 10 CFR 19.13, CHECK THE FOLLOWING BOX.									
YES (This report is furnished to you under the provision of the Nuclear Regulatory Commission's regulation 10 CFR Part 19. You should preserve this report for further reference.)									

INSTRUCTIONS FOR COMPLETING NRC FORM 439,
Report of Terminating Individual's Occupational Exposure

If you are licensed by the U.S. Nuclear Regulatory Commission (NRC) as specified in §20.408(a), 10 CFR Part 20, you are required to submit termination radiation exposure reports on certain individuals to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. This information is to be taken from dose records that must be maintained under §20.401 for individuals likely to receive exposure to radiation that exceeds a certain percentage of the NRC dose standards for the whole body, skin or extremities—25% for workers of age 18 years or more, 5% for workers younger than 18. The term "individual" is used below to represent the worker for whom this report is submitted. The term "dose" as used in Form 439 and in these instructions refers to the dose in rems as defined in §20.4(a) and subsequently designated "dose equivalent" in ICRU Report II (1968). The time to be covered by this report is that period of employment, or work assignment in your facility(s), which ended with the most recent termination and was not interrupted by any previous termination during which personnel monitoring was required by §20.202(a) and/or bioassays were required by your license. "Termination" is defined in §20.3(a)(19). Parts II and III of this form reflect regulatory requirements as well as requests intended to standardize reporting methods; requests are clearly identified as such.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

This part identifies the licensee submitting the report and the terminating individual. It must be completed even if only one of the remaining Parts of this form is applicable. Enter the following data:

ITEM NUMBER

- 1 Date that the report was prepared.
- 2 Current NRC license number assigned to the facility(s) in which the individual received the reported dose. If more than one license is involved, enter the license number for the facility or activity under which most of the dose was incurred as the first number. If this is not practical, enter the license numbers in the order of original issuance.
- 3 Name and address of your facility as it appears on your NRC license.
- 4 The individual's first name, middle initial, and surname. (Address of the individual may be included, but it is not entered into the NRC records system.)
- 5 The name and address of the individual's employer, if it is different from the reporting licensee. (Optional; not entered into the NRC records system.)
- 6 The individual's social security number; if not available, enter the word "unknown."
- 7 The individual's date of birth.

PART II. EXTERNAL DOSE DATA

For the purpose of this form, the deep dose is defined as the dose assessed at a tissue depth of 300 or 1,000 mg/cm² (or less), the shallow dose is defined as the dose to the skin of any part of the body, and the extremities are defined as hands and forearms, feet and ankles.

Item Number 8 If the individual was not monitored for external exposure to radiation, you are requested to check the box to the left and go to Part III.

COLUMN NUMBER

- 9 Specify the reporting intervals (periods of exposure) that the individual was monitored at your facility(s) pursuant to §20.202. You are requested to use annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated:
ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., May 1979) and indicate the year only for subsequent annual increments;
QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date;
CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year);
Enter the following data:
- 10a Unless the eyes are shielded, enter the deep dose assessed at a tissue depth of 300 mg/cm² (lens depth) or less. If the eyes are protected by shielding which has a tissue equivalent thickness of 700 mg/cm² or more, the deep dose may be assessed at 1000 mg/cm² (gonad depth) or less. Enter the total dose of record, i.e., the highest dose received at the selected depth, from all types of external radiation sources, at any location on the body except the skin and the extremities (hands and forearms, feet and ankles).
- 10c For all skin areas, except that of the extremities, enter in column 10c the shallow dose of record. Record the total dose to the skin, i.e., the highest dose delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less, averaged over 1 cm², is acceptable. If Column 10c is left blank, it will be assumed that the entry in 10a is applicable also for the shallow dose. Therefore, an entry for shallow dose is required only if it exceeds the deep dose.
- 10b & d You are requested to enter in column 10b the contribution made by neutron radiation to the dose reported in Column 10a, and to enter in Column 10d the contribution made by beta radiation to the dose reported in Column 10c. Enter XXX if it is known that there was no exposure to radiation of the type specified in the column heading. Enter UNK if a detectable exposure is reported in 10a or 10c which could have included a beta or neutron contribution of unknown magnitude.
- 10 & 11 You are requested to enter m or zero (in each column of 10, or in 11) if the dose was undetectable, i.e., the radiation to which the worker's dosimeter was exposed produced a response that you considered to be statistically indistinguishable from the response caused by inherent variabilities of the dosimeter system. Note: It is sometimes required to add m (or its equivalent) to a real number; although NRC regulations do not specify a summation procedure, the NRC staff arbitrarily assigns 10 mrem to be a value of m (assuming $0.5 L < 10 < L$, where L is the detection limit) for the purposes of statistical analyses.
- 11 Reporting of the extremity dose is required. You are requested to comply in the following manner. Enter the dose of record, i.e., the highest dose, averaged over any area of 1 cm², determined for the skin of the hands and forearms or feet and ankles during the reported period. It is unnecessary to specify the extremity that received the dose; doses to different extremities should not be added together. The dose is to include that delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less is acceptable. If Column 11 is left blank, it will be assumed that the entry in 10c is applicable also for the extremity dose; an entry in Column 11 is required only if the shallow dose exceeded the deep dose.

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

If you are licensed by the NRC as specified in §20.408(a), 10 CFR Part 20, and if your license requires bioassay services for workers at your facility, you are required to submit termination reports on personnel exposures to radioactive material, containing information that you have obtained in compliance with the license and recorded in compliance with §20.401. You are requested to include in each termination report information that you have obtained in compliance with §20.103(a)(3) and 20.103(c)(2) and recorded in compliance with §20.401. This part provides for the reporting of internal monitoring procedures in terms of bioassay results, dose estimates, or intake. Any one (or more) of these reporting methods may be used. The term "individual" is used below to represent the worker for whom this report is submitted. The term "exposures to radioactive material" is used in connection with these termination reports to represent the entry of radioactive material into the body.

Item Number 12 If the individual was not monitored for exposure to radioactive material, you are requested to check the box to the left; otherwise, enter the following data:

Column Number 13 If bioassay results are reported (Column 16), you are requested to use the following format. Summarize by year, separately listing the number of measurements which indicated quantities or concentrations that were undetectable, i.e., in the detection system used, the radionuclide present (if any) produced a response that you considered to be statistically indistinguishable from its background. In Column 13 enter each year bioassay was performed, including the year of termination. In Columns 14 through 16, use two lines for each year, as in the example shown below, the upper line for detectable results and the lower line for those undetectable. In 16a and/or 16b: upper line, enter the number (including zero) of detectable measurements followed in parenthesis by the highest verified result, if any; lower line, enter the number (including zero) of measurements indicating undetectable amounts.

INSTRUCTIONS FOR COMPLETING NRC FORM 439 (Continued)

COLUMN NUMBER

13 (Continued)	Column 13	Column 14	Column 15	Column 16		
				16a(1)	16a(2)	16b (pCi/L)
	1982	U-nat	"1"	0 2	lung lung	2(1) 10
	1983	U-nat(Th 234)	"1"	1(7) 1	lung lung	4(6) 8
	1984	U-nat(Th 234)	"1"	2(14) 0	lung lung	12(13) 0

Units for the numbers in parentheses shown in Column 16b are to be specified in the heading for Column 16b. If Columns 17 or 18 are completed, notations in Column 16 are unnecessary.

If the dose commitment (50-year integrated dose) is reported, indicate in Column 13 by beginning and ending dates (month, day, year) the period during which the associated radioactive material was taken into the body.

If annual doses are reported, enter in Column 13 the calendar year over which each dose was integrated, including the first and any succeeding years of this employment or work assignment and the year following the termination date.

For entries in Column 18 (intake), specify the reporting intervals (periods of exposure) during which the individual was exposed to concentrations of radioactive material, using annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated. The periods of exposure for intakes should appear as follows:

ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., June 1983) and indicate the year only for subsequent annual increments.

QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date.

CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year).

Reported intakes which include only the quantities required to be assessed in accordance with §20.103(a)(3) are acceptable.

- 14 Identify the symbol used in 10 CFR Part 20, Appendix B, for the radionuclide or mixture of radionuclides for which in vivo and/or urinalysis measurements were performed (e.g., Co 60, U 235). If the measured quantity of activity for one radionuclide is also used to estimate other radionuclide quantities, identify the radionuclide actually measured in parentheses immediately after the radionuclide listed in Column 14. See the example given in the directions for Column 13 where U-nat(Th 234) is entered in Column 14 indicating that the uranium lung burden was determined from measurements of Th 234 photons.
- 15 Enter the form, S for soluble or I for insoluble, of the radionuclide to which the worker was exposed. If unknown, use quotes around the letter, thus indicating which concentration value in Part 20, Appendix B, Table I, Column 1, was assumed to apply.
- 16, 17 & 18 These columns allow for the reporting of the results of the internal monitoring procedures in terms of bioassay results, or dose estimates, or intake. You may use one or more of these methods.
- 16a(1) & a(2) For each year during which in vivo measurements were performed, as shown in Column 13, enter in Column 16a(1) the number of detectable measurements followed by the highest verified result (in nanocuries) in parentheses. On the next line in this column, enter the number of measurements that indicated undetectable amounts. Specify in Column 16a(2) the organ in which the indicated radionuclide was found. See the example given in the directions for Column 13.
- 16b First, enter the gravimetric or radiometric unit in which the urinalysis results are reported (e.g., micrograms per liter, nanocuries per liter) in the blank space of the heading for Column 16b. In Column 16b, for each year during which urinalyses were performed, enter the number of detectable results followed by the highest numerical value of the concentration in urine of the radionuclide listed in Column 14 for the year specified in Column 13. On the next line in this column, enter the number of measurements indicating undetectable amounts. See the example given in the directions for Column 13.
- 17a, b, & c Specify in Column 17c the organ or tissue receiving doses estimated in Column 17a or 17b. (Note that it is not necessary to provide both the committed and annual doses.) For Columns 17a and 17b you are requested to follow the procedures below: if any alternative procedures are used, describe them on the back of this form. In 17a, enter the dose integrated from t₁ to 50 years, where t₁ is the beginning date shown in Column 13. In 17b enter the dose integrated over each calendar year shown for this purpose in Column 13. Include the first and any succeeding years of this employment or work assignment and the year following the termination date. Base dose estimates on the quantity (as a minimum) of the radionuclide, Column 14, taken into the body at your facility(s) during this employment or work-assignment period.
- 18 Reporting of radionuclide intakes, as determined by air sampling, is not required by 10 CFR 20.408. However, should this option be chosen, indicate the time-weighted concentrations of radioactive material (i.e., MPC-hours) to which the individual was exposed during the time periods indicated in Column 13. Refer to the last paragraph of the instructions for Column 13 for the time intervals to be used. Complete Columns 13, 14, and 15 for each entry in Column 18.
- Item number 19 Any bioassay results that cannot be reported as described above should be entered here.
- Item number 20 If you wish to send a copy of this report to the terminating individual to satisfy the notification requirements of 10 CFR 19.13, check the "Yes" box.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals and persons who supply information to the Nuclear Regulatory Commission on NRC Form 439. This information is maintained in a system of records designated as NRC-27 and described at 40 Federal Register 45344 (October 1, 1975).

1. **AUTHORITY.** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
2. **PRINCIPAL PURPOSE(S).** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permit a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation are available to you upon request.
3. **ROUTINE USES.** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT OF NOT PROVIDING INFORMATION ON INDIVIDUAL OR PERSON.** It is voluntary that you furnish the requested information, including name, date of birth, and social security number. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained. Please note, however, that the licensee must file a termination report containing certain required information, such as social security number, for each individual whose employment or work assignment has terminated and for whom personnel monitoring was required under 10 CFR 20.202. Failure of the licensee to provide the information under 10 CFR 20.202 and 20.408 may subject the licensee to enforcement action under 10 CFR 20.601.
5. **SYSTEM MANAGER(S) AND ADDRESS:** Director, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

NRC FORM 439
(4-85)
10 CFR §20.408

U.S. NUCLEAR REGULATORY COMMISSION

REPORT OF TERMINATING INDIVIDUAL'S
OCCUPATIONAL EXPOSURE

1. DATE OF REPORT

2. NRC LICENSE NUMBER(S)

SEE THE ATTACHED INSTRUCTIONS.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

3. NAME AND ADDRESS OF REPORTING LICENSEE		4. NAME OF INDIVIDUAL (first, middle initial, last) AND ADDRESS (optional)		
5. NAME AND ADDRESS OF EMPLOYER, IF DIFFERENT FROM ABOVE (Optional)		6. SOCIAL SECURITY NUMBER	7. DATE OF BIRTH	MONTH DAY YEAR

PART II. EXTERNAL DOSE DATA

8. PERSONNEL MONITORING FOR EXTERNAL EXPOSURE TO RADIATION WAS NOT PROVIDED.					
9. PERIOD(S) OF EXPOSURE (earliest date first)	10. WHOLE BODY DOSE (rema)				11. EXTREMITY DOSE (rema)
	DEEP		SHALLOW (skin)		
	a. TOTAL	b. NEUTRON	c. TOTAL	d. BETA	
					SHALLOW (skin)

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

12. PERSONNEL MONITORING FOR EXPOSURE TO RADIOACTIVE MATERIAL WAS NOT PROVIDED.									
13. PERIOD(S) OF EXPOSURE (earliest date first)	14. NUCLIDE	15. FORM (S, I)	16. BIOASSAY RESULTS		17. DOSE ESTIMATES (rema)			18. INTAKE (MPC-Hrs.)	
			a. IN VIVO (mCi)		b. URINALYSIS RESULTS (L)	a. COM- MITTED DOSE	b. ANNUAL DOSE		c. ORGAN
			(1) BURDEN	(2) ORGAN					
19. OTHER BIOASSAY RESULTS									
20. IF THIS REPORT IS BEING USED TO SATISFY THE NOTIFICATION REQUIREMENTS OF 10 CFR 19.13, CHECK THE FOLLOWING BOX.									
<input type="checkbox"/> YES (This report is furnished to you under the provision of the Nuclear Regulatory Commission's regulation 10 CFR Part 19. You should preserve this report for further reference.)									

**INSTRUCTIONS FOR COMPLETING NRC FORM 439,
Report of Terminating Individual's Occupational Exposure**

If you are licensed by the U.S. Nuclear Regulatory Commission (NRC) as specified in §20.408(a), 10 CFR Part 20, you are required to submit termination radiation exposure reports on certain individuals to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. This information is to be taken from dose records that must be maintained under §20.401 for individuals likely to receive exposure to radiation that exceeds a certain percentage of the NRC dose standards for the whole body, skin or extremities—25% for workers of age 18 years or more, 5% for workers younger than 18. The term "individual" is used below to represent the worker for whom this report is submitted. The term "dose" as used in Form 439 and in these instructions refers to the dose in rems as defined in §20.4(a) and subsequently designated "dose equivalent" in ICRU Report II (1968). The time to be covered by this report is that period of employment, or work assignment in your facility(s), which ended with the most recent termination and was not interrupted by any previous termination during which personnel monitoring was required by §20.202(a) and/or bioassays were required by your license. "Termination" is defined in §20.3(a)(19). Parts II and III of this form reflect regulatory requirements as well as requests intended to standardize reporting methods; requests are clearly identified as such.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

This part identifies the licensee submitting the report and the terminating individual. It must be completed even if only one of the remaining Parts of this form is applicable. Enter the following data:

ITEM NUMBER

- 1 Date that the report was prepared.
- 2 Current NRC license number assigned to the facility(s) in which the individual received the reported dose. If more than one license is involved, enter the license number for the facility or activity under which most of the dose was incurred as the first number. If this is not practical, enter the license numbers in the order of original issuance.
- 3 Name and address of your facility as it appears on your NRC license.
- 4 The individual's first name, middle initial, and surname. (Address of the individual may be included, but it is not entered into the NRC records system.)
- 5 The name and address of the individual's employer, if it is different from the reporting licensee. (Optional; not entered into the NRC records system.)
- 6 The individual's social security number; if not available, enter the word "unknown."
- 7 The individual's date of birth.

PART II. EXTERNAL DOSE DATA

For the purpose of this form, the deep dose is defined as the dose assessed at a tissue depth of 300 or 1,000 mg/cm² (or less), the shallow dose is defined as the dose to the skin of any part of the body, and the extremities are defined as hands and forearms, feet and ankles.

Item Number 8 If the individual was not monitored for external exposure to radiation, you are requested to check the box to the left and go to Part III.

COLUMN NUMBER

- 9 Specify the reporting intervals (periods of exposure) that the individual was monitored at your facility(s) pursuant to §20.202. You are requested to use annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated:
ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., May 1979) and indicate the year only for subsequent annual increments;
QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date;
CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year);
Enter the following data:
- 10a Unless the eyes are shielded, enter the deep dose assessed at a tissue depth of 300 mg/cm² (lens depth) or less. If the eyes are protected by shielding which has a tissue equivalent thickness of 700 mg/cm² or more, the deep dose may be assessed at 1000 mg/cm² (gonad depth) or less. Enter the total dose of record, i.e., the highest dose received at the selected depth, from all types of external radiation sources, at any location on the body except the skin and the extremities (hands and forearms, feet and ankles).
- 10c For all skin areas, except that of the extremities, enter in column 10c the shallow dose of record. Record the total dose to the skin, i.e., the highest dose delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less, averaged over 1 cm², is acceptable. If Column 10c is left blank, it will be assumed that the entry in 10a is applicable also for the shallow dose. Therefore, an entry for shallow dose is required only if it exceeds the deep dose.
- 10b & d You are requested to enter in column 10b the contribution made by neutron radiation to the dose reported in Column 10a, and to enter in Column 10d the contribution made by beta radiation to the dose reported in Column 10c. Enter XXX if it is known that there was no exposure to radiation of the type specified in the column heading. Enter UNK if a detectable exposure is reported in 10a or 10c which could have included a beta or neutron contribution of unknown magnitude.
- 10 & 11 You are requested to enter m or zero (in each column of 10, or in 11) if the dose was undetectable, i.e., the radiation to which the worker's dosimeter was exposed produced a response that you considered to be statistically indistinguishable from the response caused by inherent variabilities of the dosimeter system. Note: It is sometimes required to add m (or its equivalent) to a real number; although NRC regulations do not specify a summation procedure, the NRC staff arbitrarily assigns 10 mrems to be a value of m (assuming $0.5 L < 10 < L$, where L is the detection limit) for the purposes of statistical analyses.
- 11 Reporting of the extremity dose is required. You are requested to comply in the following manner. Enter the dose of record, i.e., the highest dose, averaged over any area of 1 cm², determined for the skin of the hands and forearms or feet and ankles during the reported period. It is unnecessary to specify the extremity that received the dose; doses to different extremities should not be added together. The dose is to include that delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less is acceptable. If Column 11 is left blank, it will be assumed that the entry in 10c is applicable also for the extremity dose; an entry in Column 11 is required only if the shallow dose exceeded the deep dose.

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

If you are licensed by the NRC as specified in §20.408(a), 10 CFR Part 20, and if your license requires bioassay services for workers at your facility, you are required to submit termination reports on personnel exposures to radioactive material, containing information that you have obtained in compliance with the license and recorded in compliance with §20.401. You are requested to include in each termination report information that you have obtained in compliance with §20.103(a)(3) and 20.103(c)(2) and recorded in compliance with §20.401. This part provides for the reporting of internal monitoring procedures in terms of bioassay results, dose estimates, or intake. Any one (or more) of these reporting methods may be used. The term "individual" is used below to represent the worker for whom this report is submitted. The term "exposures to radioactive material" is used in connection with these termination reports to represent the entry of radioactive material into the body.

Item Number 12 If the individual was not monitored for exposure to radioactive material, you are requested to check the box to the left; otherwise, enter the following data:

Column Number 13 If bioassay results are reported (Column 16), you are requested to use the following format. Summarize by year, separately listing the number of measurements which indicated quantities or concentrations that were undetectable, i.e., in the detection system used, the radionuclide present (if any) produced a response that you considered to be statistically indistinguishable from its background. In Column 13 enter each year bioassay was performed, including the year of termination. In Columns 14 through 16, use two lines for each year, as in the example shown below, the upper line for detectable results and the lower line for those undetectable. In 16a and/or 16b: upper line, enter the number (including zero) of detectable measurements followed in parenthesis by the highest verified result, if any; lower line, enter the number (including zero) of measurements indicating undetectable amounts.

INSTRUCTIONS FOR COMPLETING NRC FORM 439 (Continued)

COLUMN NUMBER

13 (Continued)	Column 13	Column 14	Column 15	Column 16		
				16a(1)	16a(2)	16b (pCi/L)
	1982	U-nat	"1"	0	lung	2(1)
	1983	U-nat(Th 234)	"1"	2 1(7)	lung lung	10 4(6)
	1984	U-nat(Th 234)	"1"	1 2(14) 0	lung lung lung	8 12(13) 0

Units for the numbers in parentheses shown in Column 16b are to be specified in the heading for Column 16b. If Columns 17 or 18 are completed, notations in Column 16 are unnecessary.

If the dose commitment (50-year integrated dose) is reported, indicate in Column 13 by beginning and ending dates (month, day, year) the period during which the associated radioactive material was taken into the body.

If annual doses are reported, enter in Column 13 the calendar year over which each dose was integrated, including the first and any succeeding years of this employment or work assignment and the year following the termination date.

For entries in Column 18 (intake), specify the reporting intervals (periods of exposure) during which the individual was exposed to concentrations of radioactive material, using annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated. The periods of exposure for intakes should appear as follows:

ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., June 1983) and indicate the year only for subsequent annual increments.

QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date.

CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year).

Reported intakes which include only the quantities required to be assessed in accordance with §20.103(a)(3) are acceptable.

- 14 Identify the symbol used in 10 CFR Part 20, Appendix B, for the radionuclide or mixture of radionuclides for which in vivo and/or urinalysis measurements were performed (e.g., Co 60, U 235). If the measured quantity of activity for one radionuclide is also used to estimate other radionuclide quantities, identify the radionuclide actually measured in parentheses immediately after the radionuclide listed in Column 14. See the example given in the directions for Column 13 where U-nat(Th 234) is entered in Column 14 indicating that the uranium lung burden was determined from measurements of Th 234 photons.
- 15 Enter the form, S for soluble or I for insoluble, of the radionuclide to which the worker was exposed. If unknown, use quotes around the letter, thus indicating which concentration value in Part 20, Appendix B, Table 1, Column 1, was assumed to apply.
- 16, 17 & 18 These columns allow for the reporting of the results of the internal monitoring procedures in terms of bioassay results, or dose estimates, or intake. You may use one or more of these methods.
- 16a(1) & a(2) For each year during which in vivo measurements were performed, as shown in Column 13, enter in Column 16a(1) the number of detectable measurements followed by the highest verified result (in nanocuries) in parentheses. On the next line in this column, enter the number of measurements that indicated undetectable amounts. Specify in Column 16a(2) the organ in which the indicated radionuclide was found. See the example given in the directions for Column 13.
- 16b First, enter the gravimetric or radiometric unit in which the urinalysis results are reported (e.g., micrograms per liter, nanocuries per liter) in the blank space of the heading for Column 16b. In Column 16b, for each year during which urinalyses were performed, enter the number of detectable results followed by the highest numerical value of the concentration in urine of the radionuclide listed in Column 14 for the year specified in Column 13. On the next line in this column, enter the number of measurements indicating undetectable amounts. See the example given in the directions for Column 13.
- 17a, b, & c Specify in Column 17c the organ or tissue receiving doses estimated in Column 17a or 17b. (Note that it is not necessary to provide both the committed and annual doses.) For Columns 17a and 17b you are requested to follow the procedures below; if any alternative procedures are used, describe them on the back of this form. In 17a, enter the dose integrated from 1 to 50 years, where 1 is the beginning date shown in Column 13. In 17b enter the dose integrated over each calendar year shown for this purpose in Column 13. Include the first and any succeeding years of this employment or work assignment and the year following the termination date. Base dose estimates on the quantity (as a minimum) of the radionuclide, Column 14, taken into the body at your facility(s) during this employment or work-assignment period.
- 18 Reporting of radionuclide intakes, as determined by air sampling, is not required by 10 CFR 20.408. However, should this option be chosen, indicate the time-weighted concentrations of radioactive material (i.e., MPC-hours) to which the individual was exposed during the time periods indicated in Column 13. Refer to the last paragraph of the instructions for Column 13 for the time intervals to be used. Complete Columns 13, 14, and 15 for each entry in Column 18.
- Item number 19 Any bioassay results that cannot be reported as described above should be entered here.
- Item number 20 If you wish to send a copy of this report to the terminating individual to satisfy the notification requirements of 10 CFR 19.13, check the "Yes" box.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals and persons who supply information to the Nuclear Regulatory Commission on NRC Form 439. This information is maintained in a system of records designated as NRC-27 and described at 40 Federal Register 45344 (October 1, 1975).

1. **AUTHORITY.** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
2. **PRINCIPAL PURPOSE(S).** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permit a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation are available to you upon request.
3. **ROUTINE USES.** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT OF NOT PROVIDING INFORMATION ON INDIVIDUAL OR PERSON.** It is voluntary that you furnish the requested information, including name, date of birth, and social security number. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained. Please note, however, that the licensee must file a termination report containing certain required information, such as social security number, for each individual whose employment or work assignment has terminated and for whom personnel monitoring was required under 10 CFR 20.202. Failure of the licensee to provide the information under 10 CFR §20.202 and 20.408 may subject the licensee to enforcement action under 10 CFR 20.601.
5. **SYSTEM MANAGER(S) AND ADDRESS:** Director, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

REPORT OF TERMINATING INDIVIDUAL'S
 OCCUPATIONAL EXPOSURE

1. DATE OF REPORT

2. NRC LICENSE NUMBER(S)

SEE THE ATTACHED INSTRUCTIONS.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

3. NAME AND ADDRESS OF REPORTING LICENSEE

4. NAME OF INDIVIDUAL (first, middle initial, last) AND ADDRESS (optional)

5. NAME AND ADDRESS OF EMPLOYER, IF DIFFERENT FROM ABOVE (Optional)

6. SOCIAL SECURITY NUMBER

7. DATE OF BIRTH

MONTH DAY YEAR

PART II. EXTERNAL DOSE DATA

8. PERSONNEL MONITORING FOR EXTERNAL EXPOSURE TO RADIATION WAS NOT PROVIDED.

9. PERIOD(S) OF EXPOSURE
 (earliest date first)

10. WHOLE BODY DOSE (rema)

11. EXTREMITY DOSE (rema)

9. PERIOD(S) OF EXPOSURE (earliest date first)	10. WHOLE BODY DOSE (rema)				11. EXTREMITY DOSE (rema) SHALLOW (skin)
	DEEP		SHALLOW (skin)		
	a. TOTAL	b. NEUTRON	c. TOTAL	d. BETA	

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

12. PERSONNEL MONITORING FOR EXPOSURE TO RADIOACTIVE MATERIAL WAS NOT PROVIDED.

13. PERIOD(S) OF EXPOSURE
 (earliest date first)

14. NUCLIDE

15. FORM
 (S, I)

16. BIOASSAY RESULTS

17. DOSE ESTIMATES (rema)

18. INTAKE
 (MPC-Hrs.)

13. PERIOD(S) OF EXPOSURE (earliest date first)	14. NUCLIDE	15. FORM (S, I)	16. BIOASSAY RESULTS		17. DOSE ESTIMATES (rema)	18. INTAKE (MPC-Hrs.)	
			a. IN VIVO (nCi)				b. URINALYSIS RESULTS (L)
			(1) BURDEN	(2) ORGAN			

19. OTHER BIOASSAY RESULTS

20. IF THIS REPORT IS BEING USED TO SATISFY THE NOTIFICATION REQUIREMENTS OF 10 CFR 19.13, CHECK THE FOLLOWING BOX.

YES (This report is furnished to you under the provision of the Nuclear Regulatory Commission's regulation 10 CFR Part 19. You should preserve this report for further reference.)

INSTRUCTIONS FOR COMPLETING NRC FORM 439,
Report of Terminating Individual's Occupational Exposure

If you are licensed by the U.S. Nuclear Regulatory Commission (NRC) as specified in §20.408(a), 10 CFR Part 20, you are required to submit termination radiation exposure reports on certain individuals to the Director, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. This information is to be taken from dose records that must be maintained under §20.401 for individuals likely to receive exposure to radiation that exceeds a certain percentage of the NRC dose standards for the whole body, skin or extremities—25% for workers of age 18 years or more, 5% for workers younger than 18. The term "individual" is used below to represent the worker for whom this report is submitted. The term "dose" as used in Form 439 and in these instructions refers to the dose in rems as defined in §20.4(a) and subsequently designated "dose equivalent" in ICRU Report II (1968). The time to be covered by this report is that period of employment, or work assignment in your facility(s), which ended with the most recent termination and was not interrupted by any previous termination during which personnel monitoring was required by §20.202(a) and/or bioassays were required by your license. "Termination" is defined in §20.3(a)(19). Parts II and III of this form reflect regulatory requirements as well as requests intended to standardize reporting methods; requests are clearly identified as such.

PART I. LICENSEE AND INDIVIDUAL IDENTIFICATION DATA

This part identifies the licensee submitting the report and the terminating individual. It must be completed even if only one of the remaining Parts of this form is applicable. Enter the following data:

ITEM NUMBER

- 1 Date that the report was prepared.
- 2 Current NRC license number assigned to the facility(s) in which the individual received the reported dose. If more than one license is involved, enter the license number for the facility or activity under which most of the dose was incurred as the first number. If this is not practical, enter the license numbers in the order of original issuance.
- 3 Name and address of your facility as it appears on your NRC license.
- 4 The individual's first name, middle initial, and surname. (Address of the individual may be included, but it is not entered into the NRC records system.)
- 5 The name and address of the individual's employer, if it is different from the reporting licensee. (Optional; not entered into the NRC records system.)
- 6 The individual's social security number; if not available, enter the word "unknown."
- 7 The individual's date of birth.

PART II. EXTERNAL DOSE DATA

For the purpose of this form, the deep dose is defined as the dose assessed at a tissue depth of 300 or 1,000 mg/cm² (or less), the shallow dose is defined as the dose to the skin of any part of the body, and the extremities as hands and forearms, feet and ankles.

Item Number 8 If the individual was not monitored for external exposure to radiation, you are requested to check the box to the left and go to Part III.

COLUMN NUMBER

- 9 Specify the reporting intervals (periods of exposure) that the individual was monitored at your facility(s) pursuant to §20.202. You are requested to use annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated:
ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., May 1979) and indicate the year only for subsequent annual increments;
QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date;
CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year);
Enter the following data:
- 10a Unless the eyes are shielded, enter the deep dose assessed at a tissue depth of 300 mg/cm² (lens depth) or less. If the eyes are protected by shielding which has a tissue equivalent thickness of 700 mg/cm² or more, the deep dose may be assessed at 1000 mg/cm² (gonad depth) or less. Enter the total dose of record, i.e., the highest dose received at the selected depth, from all types of external radiation sources, at any location on the body except the skin and the extremities (hands and forearms, feet and ankles).
- 10c For all skin areas, except that of the extremities, enter in column 10c the shallow dose of record. Record the total dose to the skin, i.e., the highest dose delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less, averaged over 1 cm², is acceptable. If Column 10c is left blank, it will be assumed that the entry in 10a is applicable also for the shallow dose. Therefore, an entry for shallow dose is required only if it exceeds the deep dose.
- 10b & d You are requested to enter in column 10b the contribution made by neutron radiation to the dose reported in Column 10a, and to enter in Column 10d the contribution made by beta radiation to the dose reported in Column 10c. Enter XXX if it is known that there was no exposure to radiation of the type specified in the column heading. Enter UNK if a detectable exposure is reported in 10a or 10c which could have included a beta or neutron contribution of unknown magnitude.
- 10 & 11 You are requested to enter m or zero (in each column of 10, or in 11) if the dose was undetectable, i.e., the radiation to which the worker's dosimeter was exposed produced a response that you considered to be statistically indistinguishable from the response caused by inherent variabilities of the dosimeter system. Note: It is sometimes required to add m (or its equivalent) to a real number; although NRC regulations do not specify a summation procedure, the NRC staff arbitrarily assigns 10 mrem to be a value of m (assuming $0.5 L < 10 < L$, where L is the detection limit) for the purposes of statistical analyses.
- 11 Reporting of the extremity dose is required. You are requested to comply in the following manner. Enter the dose of record, i.e., the highest dose, averaged over any area of 1 cm², determined for the skin of the hands and forearms or feet and ankles during the reported period. It is unnecessary to specify the extremity that received the dose; doses to different extremities should not be added together. The dose is to include that delivered by all radiation incident on the skin, including non-trivial doses from skin contamination, which penetrates to the depth at which the shallow dose is determined. The dose at a depth of 7 mg/cm² or less is acceptable. If Column 11 is left blank, it will be assumed that the entry in 10c is applicable also for the extremity dose; an entry in Column 11 is required only if the shallow dose exceeded the deep dose.

PART III. INTERNAL EXPOSURES TO RADIOACTIVE MATERIAL

If you are licensed by the NRC as specified in §20.408(a), 10 CFR Part 20, and if your license requires bioassay services for workers at your facility, you are required to submit termination reports on personnel exposures to radioactive material, containing information that you have obtained in compliance with the license and recorded in compliance with §20.401. You are requested to include in each termination report information that you have obtained in compliance with §20.103(a)(3) and 20.103(c)(2) and recorded in compliance with §20.401. This part provides for the reporting of internal monitoring procedures in terms of bioassay results, dose estimates, or intake. Any one (or more) of these reporting methods may be used. The term "individual" is used below to represent the worker for whom this report is submitted. The term "exposures to radioactive material" is used in connection with these termination reports to represent the entry of radioactive material into the body.

- Item Number 12 If the individual was not monitored for exposure to radioactive material, you are requested to check the box to the left; otherwise, enter the following data:
- Column Number 13 If bioassay results are reported (Column 16), you are requested to use the following format. Summarize by year, separately listing the number of measurements which indicated quantities or concentrations that were undetectable, i.e., in the detection system used, the radionuclide present (if any) produced a response that you considered to be statistically indistinguishable from its background. In Column 13 enter each year bioassay was performed, including the year of termination. In Columns 14 through 16, use two lines for each year, as in the example shown below, the upper line for detectable results and the lower line for those undetectable. In 16a and/or 16b: upper line, enter the number (including zero) of detectable measurements followed in parenthesis by the highest verified result, if any; lower line, enter the number (including zero) of measurements indicating undetectable amounts.

INSTRUCTIONS FOR COMPLETING NRC FORM 439 (Continued)

COLUMN NUMBER

13 (Continued)	Column 13	Column 14	Column 15	Column 16		
				16a(1)	16a(2)	16b (pCi/L)
	1982	U-nat	..I..	0	lung	2(1)
	1983	U-nat(Th 234)	..I..	2 1(7)	lung lung	10 4(6)
	1984	U-nat(Th 234)	..I..	1 2(14) 0	lung lung lung	8 12(13) 0

Units for the numbers in parentheses shown in Column 16b are to be specified in the heading for Column 16b. If Columns 17 or 18 are completed, notations in Column 16 are unnecessary.

If the dose commitment (50-year integrated dose) is reported, indicate in Column 13 by beginning and ending dates (month, day, year) the period during which the associated radioactive material was taken into the body.

If annual doses are reported, enter in Column 13 the calendar year over which each dose was integrated, including the first and any succeeding years of this employment or work assignment and the year following the termination date.

For entries in Column 18 (intake), specify the reporting intervals (periods of exposure) during which the individual was exposed to concentrations of radioactive material, using annual increments up to the year of termination and increments not to exceed one quarter for the year in which the individual terminated. The periods of exposure for intakes should appear as follows:

ANNUAL: Indicate the month and year of the beginning date of exposure when showing annual increments (e.g., June 1983) and indicate the year only for subsequent annual increments.

QUARTER: For each completed quarter of the year of termination, indicate the quarter and year by date.

CURRENT QUARTER: Specify the beginning and ending dates of the actual exposure period (month, day, year).

Reported intakes which include only the quantities required to be assessed in accordance with §20.103(a)(3) are acceptable.

14 Identify the symbol used in 10 CFR Part 20, Appendix B, for the radionuclide or mixture of radionuclides for which in vivo and/or urinalysis measurements were performed (e.g., Co 60, U 235). If the measured quantity of activity for one radionuclide is also used to estimate other radionuclide quantities, identify the radionuclide actually measured in parentheses immediately after the radionuclide listed in Column 14. See the example given in the directions for Column 13 where U-nat(Th 234) is entered in Column 14 indicating that the uranium lung burden was determined from measurements of Th 234 photons.

15 Enter the form, S for soluble or I for insoluble, of the radionuclide to which the worker was exposed. If unknown, use quotes around the letter, thus indicating which concentration value in Part 20, Appendix B, Table 1, Column 1, was assumed to apply.

16, 17 & 18 These columns allow for the reporting of the results of the internal monitoring procedures in terms of bioassay results, or dose estimates, or intake. You may use one or more of these methods.

16a(1) & a(2) For each year during which in vivo measurements were performed, as shown in Column 13, enter in Column 16a(1) the number of detectable measurements followed by the highest verified result (in nanocuries) in parentheses. On the next line in this column, enter the number of measurements that indicated undetectable amounts. Specify in Column 16a(2) the organ in which the indicated radionuclide was found. See the example given in the directions for Column 13.

16b First, enter the gravimetric or radiometric unit in which the urinalysis results are reported (e.g., micrograms per liter, nanocuries per liter) in the blank space of the heading for Column 16b. In Column 16b, for each year during which urinalyses were performed, enter the number of detectable results followed by the highest numerical value of the concentration in urine of the radionuclide listed in Column 14 for the year specified in Column 13. On the next line in this column, enter the number of measurements indicating undetectable amounts. See the example given in the directions for Column 13.

17a, b, & c Specify in Column 17c the organ or tissue receiving doses estimated in Column 17a or 17b. (Note that it is not necessary to provide both the committed and annual doses.) For Columns 17a and 17b you are requested to follow the procedures below: if any alternative procedures are used, describe them on the back of this form. In 17a, enter the dose integrated from t_1 to 50 years, where t_1 is the beginning date shown in Column 13. In 17b enter the dose integrated over each calendar year shown for this purpose in Column 13. Include the first and any succeeding years of this employment or work assignment and the year following the termination date. Base dose estimates on the quantity (as a minimum) of the radionuclide, Column 14, taken into the body at your facility(s) during this employment or work-assignment period.

18 Reporting of radionuclide intakes, as determined by air sampling, is not required by 10 CFR 20.408. However, should this option be chosen, indicate the time-weighted concentrations of radioactive material (i.e., MPC-hours) to which the individual was exposed during the time periods indicated in Column 13. Refer to the last paragraph of the instructions for Column 13 for the time intervals to be used. Complete Columns 13, 14, and 15 for each entry in Column 18.

Item number 19 Any bioassay results that cannot be reported as described above should be entered here.

Item number 20 If you wish to send a copy of this report to the terminating individual to satisfy the notification requirements of 10 CFR 19.13, check the "Yes" box.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals and persons who supply information to the Nuclear Regulatory Commission on NRC Form 439. This information is maintained in a system of records designated as NRC-27 and described at 40 Federal Register 45344 (October 1, 1975).

- AUTHORITY.** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(o) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201(b), and 2201(o)). The authority for soliciting the social security number is 10 CFR Part 20.
- PRINCIPAL PURPOSE(S).** The information is used by the NRC in its evaluation of the risk of radiation exposure associated with the licensed activity and in exercising its statutory responsibility to monitor and regulate the safety and health practices of its licensees. The data permit a meaningful comparison of both current and long-term exposure experience among types of licensees and among licensees within each type. Data on your exposure to radiation are available to you upon request.
- ROUTINE USES.** The information may be used to provide data to other Federal and State agencies involved in monitoring and/or evaluating radiation exposure received by individuals employed as radiation workers on a permanent or temporary basis and exposure received by monitored visitors. The information may also be disclosed to an appropriate Federal, State, or local agency in the event the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding.
- WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT OF NOT PROVIDING INFORMATION ON INDIVIDUAL OR PERSON.** It is voluntary that you furnish the requested information, including name, date of birth, and social security number. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birth dates among the large number of persons on whom data is maintained. Please note, however, that the licensee must file a termination report containing certain required information, such as social security number, for each individual whose employment or work assignment has terminated and for whom personnel monitoring was required under 10 CFR 20.202. Failure of the licensee to provide the information under 10 CFR 20.202 and 20.408 may subject the licensee to enforcement action under 10 CFR 20.601.

5. SYSTEM MANAGER(S) AND ADDRESS: Director, Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

LIST OF RECENTLY ISSUED GENERIC LETTERS

<u>GENERIC LETTER NO.</u>	<u>SUBJECT</u>	<u>DATE</u>
84-20	Scheduling Guidance for Licensee Submittals of Reloads that Involve Unreviewed Safety Questions	8/20/84
84-21	Long Term Low Power Operation in PWR's	10/16/84
84-22	Not used	
84-23	Reactor Vessel Water Level Instrumentation in BWRs	10/26/84
84-24	Clarification of Compliance to 10 CFR 50.49 Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants	12/27/84
85-01	Fire Protection Policy Steering Committee Report	1/9/85
85-02	Staff Recommended Actions Stemming From NRC Integrated Program for the Resolution of Unresolved Safety Issues Regarding Steam Generator Tube Integrity	4/15/85
85-03	Clarification of Equivalent Control Capacity For Standby Liquid Control Systems	1/28/85
85-04	Operator Licensing Examinations	1/29/85
85-05	Inadvertent Boron Dilution Events	1/31/85
85-06	Quality Assurance Guidance for ATWS Equipment that is not Safety-Related	4/16/85
85-07	Implementation of Integrated Schedules for Plant Modifications	5/02/85
85-08	10 CFR 20.408 Termination Reports - Format	5/23/85
85-09	Technical Specifications for Generic Letter 83-28, Item 4.3	5/23/85
85-10	Technical Specifications for Generic Letter 83-28, Items 4.3 and 4.4	5/23/85