

THE TOLEDO EDISON COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
EMERGENCY PLAN SUPPORTING PROCEDURES
REVISION INDEX

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Revision 172
March, 1983

Davis-Besse Nuclear Power Station

Unit No. 1

Health Physics Procedure HP 1602.01

External Personnel Radiation Exposure Monitoring

NUCLEAR SAFETY RELATED

Record of Approval and Changes

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Revision	SRB	QA	Sta. Supt.
No.	Recommendation	Approved	Approval
	Date	Date	Date
12	D. W. Briden 2/8/83	N/A	T. Munnay 3/10/83

1. PURPOSE

- 1.1 This procedure describes the monitoring and recording of external personnel radiation exposure and the monitoring for personnel contamination.

2. REFERENCES

- 2.1 Health Physics Procedures - Guides and Limits for Radiation Exposure, HP 1601.01.
- 2.2 Title 10 CFR Part 20 (Standards for Protection Against Radiation).
- 2.3 FSAR, Section 12.3 (Health Physics).
- (TS) 2.4 Technical Specifications Section 6.10.2 (Station Operating Records).
- 2.5 American National Standards INSI N13.6 - 1966 (R1972), Practice for Occupational Radiation Exposure Records System.
- 2.6 AD 1808.08 Access Control
- 2.7 HP 1601.03 Radiation Exposure Permits
- 11 | 2.8 NRC Regulatory Guide 8-14, Personnel Neutron Dosimeters

3. EQUIPMENT REQUIRED

- 3.1 Thermoluminescent dosimeters (TLD's)
- 3.2 Self-reading pocket dosimeters
- 3.3 Dosimeter chargers
- 3.4 Neutron sensitive dosimeters
- 3.5 Health physics personnel contamination monitoring equipment
- 3.5.1 Portal monitors
- 3.5.2 Hand and foot counters
- 3.5.3 Hand-held friskers

4. DATA SHEETS REQUIRED

- 4.1 NRC Form 4 (Attachment 1)

- 4.2 NRC Form 5 (Attachment 2)
- 4.3 Radiation Exposure Record, ED 6458 (Attachment 3)
- 4.4 Dosimeter Record, ED 6547 (Attachment 4)
- 4.5 Visitors TLD Log (Attachment 5)
- 4.6 Temporary TLD Exposure Record (Attachment 6)
- 4.7 Extremity Badge Log (Attachment 7)
- 4.8 Toledo Edison Temporary TLD Issue (Attachment 8)
- 4.9 Current Radiation Exposure Record (Attachment 9)
- 4.10 Dosimeter Record for Neutron Calculation (Attachment 10)

5. PRECAUTIONS AND SAFETY

- 5.1 TLD's and self-reading dosimeters must be protected against loss or damage. Report any loss or damage to the Chemistry and Health Physics Section immediately. Badges and dosimeters must not be removed from the site.
- 5.2 Care should be exercised not to jar, or drop pocket dosimeters as false readings may be obtained. Dropping a dosimeter discharges the electroscope which may give an off scale reading indicative of a high exposure dose. Return a pocket dosimeter to the Health Physics Monitor Room immediately when an offscale reading is observed. An estimate of the dose received will be made and the dosimeter rezeroed.

6. PROCEDURE

- 6.1 Thermoluminescent Dosimeter Badges (for beta and gamma dosimetry)

NOTE:

For neutron dosimetry, see Section 6.1.5.

- 6.1.1 Personnel assigned to the station and any person likely to receive a dose in any calendar quarter in excess of 25 percent of the quarterly dose limit for whole body, extremities, or skin of whole body shall be given a "permanent" or a "temporary" TLD Badge.

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- 1. Any individual likely to receive an exposure to his extremities in excess of 5 times his whole body exposure, his extremities shall be monitored if a significant dose is expected.

- 12 |
2. Special attention must be given to nonuniform radiation fields so that the region of body (head, chest, or gonadal area) is monitored, whichever receives the highest exposure.
 3. Personnel with "permanent" TLD badges will pick up their badges at the gate office upon entering the station and return them to the gate office when leaving the station. Badges are supplied by the Chemistry and Health Physics Section.
 4. Personnel with "temporary" TLD badges normally pick up their badges at the PPF and return them to the PPF exit whenever leaving the Station. Temporary TLD's are issued by Chemistry and Health Physics personnel at the beginning of each month or whenever needed.

NOTE:

Visitors will turn their "temporary" TLD's in at the exit to RACA.

NOTE:

A self-reading dosimeter or an alternate means of estimating personnel exposure approved by the Chemist & Health Physicist or his designee may be substituted for a TLD.

5. For personnel issued permanent TLD's, the following must be done by Chemistry & Health Physics personnel.
 - (1) An NRC Form 4 (Attachment 1) must be completed as instructed on the form.
 - (2) Past radiation exposure records must be obtained before the quarterly whole body exposure is permitted to exceed 1.25 Rem.
 - (3) A radiation exposure record must be kept (NRC Form 5, Attachment 2). This record shall be updated quarterly from monthly TLD readouts. This record must be preserved indefinitely and the data reported annually within the first calendar quarter to the NRC as required in 10 CFR 20.401 and 20.407.

- (4) Upon termination of employment or work, or in the event of overexposure, the NRC and the individual must be furnished a report of personnel exposure as required in 10 CFR 20.405, 20.408, and 20.409. Upon request, the individual must be furnished a report of his exposure.

6.1.2 Other persons required to enter RACA shall be issued a "visitor" or "temporary" TLD badge. For these persons, the following applies:

1. Continuing visitors, contractors, and other utility personnel not assigned to DBNPS who will be entering known radiation areas shall be issued a "temporary" TLD badge by the Chemistry and Health Physics Section. "Temporary" TLD badges are to be read monthly.
2. "Temporary" TLD's shall be issued the first time an individual enters RACA for the current calendar month. Attachment Nos. 6 and 8, "Temporary TLD Issue Log" and "Toledo Edison Temporary TLD Issue Report", shall be filled out for each Temporary TLD as it is issued. The Temporary TLD will be removed from use at the end of each month. These individuals requiring a Temporary TLD shall have Chemistry and Health Physics re-issue them a new Temporary TLD each month.
3. Attachment No. 8 shall contain all required Attachment 9 information and is to be updated from monthly TLD readouts with each individual's monthly exposure recorded. This record must be preserved indefinitely and the data reported annually within the first calendar quarter to the NRC as required in 10 CFR 20.401 and 20.407.
4. Upon termination of employment or work, or in the event of overexposure, the NRC and the individual must be furnished a report of personnel exposure as required in 10 CFR 20.405, 20.408, and 20.409. Upon request, the individual must be furnished a report of his exposure.
5. Visitors who are at DBNPS for only a few days and who will be entering RACA, shall be issued a "visitor's" TLD. The visitor's TLD will be issued at the entrance to RACA the first time the visitor enters RACA and returned to the RACA entrance when exiting.

NOTE:

Persons wearing a "VISITOR" TLD badge and have completed RCT may enter RACA unescorted. Those persons who do not have current RCT training must be escorted by an individual who has current training. This does not remove necessity for escorts for security reasons.

6. When "visitor" TLD is issued, the visitor shall supply the information requested in Attachment 5, Visitor's TLD Log. The "visitor" TLD badge may be reused by another visitor unless a radiation exposure is known or suspected. If an exposure is suspected, the "visitor's" badge is to be retained for readout (ie., a net exposure on self-reading dosimeter in excess of 20 MREM).
7. The visitor's TLD's shall be read out monthly and the dose recorded according to TLD badge number only.

CAUTION:

Individuals who have "visitor" TLD badges should receive essentially no dose; the Chemistry and Health Physics Section should be notified when visitors will be allowed to enter radiation areas to determine whether a "permanent" or "temporary" TLD badge should be issued. Under no circumstances should "visitor" badged individuals be permitted to receive a dose in any calendar quarter in excess of 25% of the quarterly dose limit for the whole body.

8. Individuals using Visitor TLD's being escorted are not required to sign in on an REP. The escort is responsible to verbally inform his visitor(s) of the conditions and health physics requirements in the area. The dosimeter readings and times are entered on the Visitor Badge Record Sheet (Attachment 5).

- 6.1.3 Personnel shall wear the TLD badge on the front of the body between the knee and head so that an accurate measurement of whole body dose can be made.

NOTE:

The whole body includes the area of the body from the top of the head to the knees. The TLD should be worn

in that region of the whole body which is likely to receive the highest dose.

- A. When worn in an area of contamination or high contamination, the TLD badge should be worn in the pocket of the coveralls so that it is protected from contamination.

NOTE:

If the work area has higher radiation levels which require checking the dosimeter frequently, place dosimetry in a plastic bag.

- B. TLD badges must be secured so that there is no chance for loss.

- 11 | 6.1.4 Extremity TLD's shall be used when specified as a requirement on a Radiation Exposure Permit (REP). They should be worn on the hand or foot which is likely to receive the highest radiation dose. They should be worn so that the TLD is not shielded by the hand or foot.

NOTE:

If extremity monitoring is to be provided then the Extremity Monitoring Log Sheet (Attachment 7) must be filled out and placed in the Temporary Badge Issue book for that month.

11 | 6.1.5 Neutron Dosimetry

1. Neutron whole body doses should be limited to 300 mrems per quarter.
2. There are three methods which can be used to assign personnel exposures from neutrons:
 - (1) Multiply the self-reading dosimeter reading times five (5); or
 - (2) Multiply the time exposed to neutrons times the neutron dose rate determined from the measurement of a Neutron Rem-Counter; or
 - (3) Use the integrated neutron dose determined with the RASCAL Neutron Rem-Counter.

3. When working in areas where there is a potential for neutron exposures, each individual is to sign in on Attachment 10 (Dosimeter Record for Neutron Calculation). Send the completed Attachment 10 to the Health Physics Supervisor to ensure that the individual's neutron exposure is added to his exposure record.

6.2 Self-Reading Dosimeters

6.2.1 The self-reading dosimeter is used as a dayby-day indication of personnel gamma exposure so that exposure guide values given in HP 1601.01 will not be inadvertently exceeded. In the event that a TLD badge is lost or damaged, the dosimeter readings are used to replace the lost TLD badge official records.

6.2.2 All personnel entering RACA shall wear a self-reading dosimeter. Personnel are to wear the dosimeter in close proximity to the TLD badge.

6.2.3 Persons requiring access to the Radiation Access Control Area (RACA) shall be issued a self-reading pocket dosimeter for which they shall be responsible.

6.2.4 Before entering the RACA, personnel may "zero" their own dosimeter by inserting it in the dosimeter charger and adjusted the control until the hairline is on zero.

NOTE:

After the dosimeter is removed from the charger, the zero position should be checked because the hairline may shift its position when the dosimeter is removed from the charger. If this happens, the dosimeter should be replaced in the charger and adjusted below zero to compensate for the shift.

6.2.5 At the end of each work day when the RACA was entered, "permanent and temporary" TLD badge wearers shall read their dosimeter and record the radiation dose received on their Radiation Exposure Record, ED 6458 (Attachment 3).

1. The Radiation Exposure Record is signed the first time an entry is made for each month.
2. An individual's daily dose is recorded in the "Daily" column next to the number corresponding to the day of the month.

3. The "Daily" dose is added to the accumulated whole-body exposure and recorded in the "Quarter" column.
4. Radiation Exposure Record cards are administered by the C&HP Section. When the monthly TLD results are received, the cards will be corrected.
 - (1) When the dose for the "running total calendar quarter" from TLD results exceeds 300 mrem, the current Radiation Exposure Record card shall be corrected to agree with the TLD record.
 - (2) Corrected entries are made on the card by Chemistry and Health Physics personnel who will initial and date any corrections.
5. The C&HP Section will provide assistance in zeroing dosimeters, readings, and recording exposures.

6.2.6 Four models of the self-reading dosimeter are used. Selected according to REP requirements.

1. 0-200 or 0-500 mR range - for normal use
2. 0-1R range - dosimeter used for entering high radiation areas
3. 0-5R range - dosimeter used when the quarterly dose is approached for a single exposure
4. 0-100R range - dosimeter for lifesaving

NOTE:

The 0-1R and higher dosimeters are used only on a planned basis.

6.2.7 Personnel zero their own dosimeters before entering the RACA when the reading is greater than 20% (40 mR for 0-200 mR, and 100 mR for 0-500) of full scale. On the Dosimeter Record ED 6547 (Attachment 4), enter the information required. The issuance and use of the Dosimeter Record is covered in HP 1601.03, Radiation Exposure Permits.

6.2.8 Personnel will periodically check the reading (exposure) on their dosimeters during the course of a day. When working in a high radiation area, personnel shall

check their dosimeter readings (exposures) before entering, during occupancy, and upon leaving the area.

- 10 | 6.2.9 If at any time during the course of a day, a 0200 or 0-500 mR range dosimeter exceeds 80% of the full scale reading (160 mR for 0-200 mR range, or 400 mR for 0-500 mR range), the wearer shall return to the Health Physics Monitor Room to have C&HP personnel record the dose, check his quarterly accumulated dose, and rezero the dosimeter before re-entering the RACA.
- 6.2.10 If at any time a personnel dosimeter is found to be off scale, a read-out of the individual's TLD Badge is required before an individual is allowed to return to RACA, unless the Chemist & HP or his designee determines that the off scale reading is not due to over exposure.
- 6.2.11 Personnel who are working in contaminated areas shall not read dosimeters by holding with contaminated gloves. Gloves shall be removed carefully or clean gloves placed on over contaminated gloves before handling personnel dosimeter. A second individual who is known to have "clean" non-contaminated gloves may read other persons' dosimeters in order to determine exposures.
- 6.2.12 Every effort should be made to prevent contamination of personal dosimeters. When it is known or suspected that they have become contaminated, they shall be delivered to C&HP Section for surveying and de-contamination if necessary.
- 6.2.13 Whenever personal dosimeters are lost or damaged, the individual shall immediately leave the RACA and notify C&HP Section. A reasonable estimate of the dose received by the lost or damaged dosimeters will be made for record purpose.

6.3 Friskers

- 10 | 6.3.1 The NRC and INPO guideline for personnel contamination is 5000 dpm/100 cm². A frisker is the only type of personnel monitor capable of detecting contamination at 5000 dpm (or 500 cpm as read from the rate meter). Anyone leaving a Contamination or High Contamination Area must frisk as described in this section before leaving RACA.

- 6.3.2 Count-rate meters (friskers) will be installed in locations in the station where monitoring for personnel contamination is deemed necessary. The monitors will be set up and the alarm point set by the Chemistry and Health Physics Section. The alarm setting and range selection switch must not be changed by personnel using the monitor. Personnel other than Chemistry & HP should use only the volume control and the reset button.
- 6.3.3 Approach to probe (detector) of the unit with the hands, but don't pick it up until the hands are moved slowly near the probe (as close to the probe as possible without touching it). If the alarm sounds, de-contaminate the hands before touching the probe.
- 6.3.4 Once hands are shown to be free from contamination, pick up the probe.
- 6.3.5 Survey the rest of the body by passing the probe slowly over the body. Make an thorough survey of the bottoms of shoes, elbows, knees, face, and rear.
- A. If no increase in the clicking rate is heard, no significant contamination is present.
 - B. If clicking rate increases, survey that area even more carefully. If the alarm does not sound, no significant contamination is present.
 - C. If the alarm sounds, contamination is present and must be removed. Put on the clean gloves or shoe covers provided if the hands or feet are contaminated. Reset the alarm. Go to the H.P. Monitor Area until clean. Seek assistance from Chemistry & HP if necessary. Restrict movements until the source of contamination is determined and cleaned up.

NOTE:

Persons must not leave the RACA with contamination on their bodies, clothing, or equipment.

6.4 Hand and Foot Monitor

- 6.4.1 A beta-gamma hand and foot monitor, located at the Radiation Access Control Area at Door 415, will provide a means of detecting the presence and general location of contamination on hands and shoes. After removing protective clothing and washing hands, the

hand and foot monitor shall be used before leaving the Radiation Access Control Area at Door 415.

- 6.4.2 To use the hand and foot monitor, stand on the front apron and place hands in the slots provided.
- 6.4.3 Wait for the time period indicated on the monitor. If there is no alarm response, the hands and shoe bottoms may be considered free of contamination.
- 6.4.4 If there is an alarm response, observe the various meters to determine which hand or foot has the high count rate. Proceed as in Part C of Section 6.3.5. Reset the alarm.
- 6.4.5 A hand-held frisker is located on the side of the unit to detect contamination on clothing and localized areas of the body. Use it as described in step 6.3.

6.5 Portal Monitor

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- 6.5.1 A portal monitor (walk-thru) provides complete head to foot monitoring for beta-gamma contamination detection. All personnel must pass through the portal monitor as they exit the RACA through Door 415 or Door 310 and as they pass through the gate office when leaving the station.
- 6.5.2 Enter the portal monitor and stand for the pre-determined count time. If at the end of the counting time, there has been no alarm response, no contamination is present.
- 6.5.3 If the alarm sounds, contamination is present. Observe the various meters to determine the general location of the contamination. Proceed as in Part C in Section 6.3.5. Reset the alarm.

ATTACHMENT 1

Form NRC-4
(3-79)
18 CFR 20

U. S. NUCLEAR REGULATORY COMMISSION

Approved by GAO
B-188225 (R0043)
Expires - 4-30-77

OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

See Instructions on the Back

IDENTIFICATION				
1. NAME (PRINT - LAST, FIRST, AND MIDDLE)			2. SOCIAL SECURITY NO.	
3. DATE OF BIRTH (MONTH, DAY, YEAR)			4. AGE IN FULL YEARS (N)	
OCCUPATIONAL EXPOSURE - PREVIOUS HISTORY				
5. PREVIOUS EMPLOYMENTS INVOLVING RADIATION EXPOSURE—LIST NAME AND ADDRESS OF EMPLOYER	6. DATES OF EMPLOYMENT (FROM—TO)	7. PERIODS OF EXPOSURE	8. WHOLE BODY (REM)	9. RECORD OR CALCULATED (INSERT ONE)
10. REMARKS		11. ACCUMULATED OCCUPATIONAL DOSE —TOTAL		

13. CALCULATIONS - PERMISSIBLE DOSE WHOLE BODY:		12. CERTIFICATION: I CERTIFY THAT THE EXPOSURE HISTORY LISTED IN COLUMNS 5, 6, AND 7 IS CORRECT AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.	
(A) PERMISSIBLE ACCUMULATED DOSE = 5(N-18)	_____ REM	EMPLOYEE'S SIGNATURE _____ DATE _____	
(B) TOTAL EXPOSURE TO DATE (FROM ITEM 11)	_____ REM		
(C) UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (A-B)	_____ REM		
		14. NAME OF LICENSEE _____	

ATTACHMENT 1

INSTRUCTIONS FOR PREPARATION OF NRC FORM 4

This form or a clear and legible record containing all the information required on this form must be prepared by each licensee of the Nuclear Regulatory Commission who, pursuant to Section 20.101, proposes to expose an individual to a radiation dose in excess of the amounts specified in Paragraph 20.101(a) of the regulations in Part 20, "Standards for Protection Against Radiation," 10 CFR. The requirement for completion of this form is contained in Section 20.102 of that regulation. The information contained in this form is used for estimating the external accumulated occupational dose of the individual for whom the form is completed. A separate Form NRC-4 shall be completed for each individual to be exposed to a radiation dose in excess of the limits specified in Paragraph 20.101(a) of Part 20 of the Commission's regulations. Listed below by item are instructions and additional information directly pertinent to completing this form:

Identification

- Item 1. Self-explanatory.
- Item 2. Self-explanatory except that, if individual has no social security number, the word "none" shall be inserted.
- Item 3. Self-explanatory.
- Item 4. Enter the age in full years. This is called "N" when used in calculating the Permissible Dose. N is equal to the number of years of age of the individual on his last birthday.

Occupational Exposure

- Item 5. List the name and address of each previous employer and the address of employment. Start with the most recent employer and work back.

Include only those periods of employment since the eighteenth birthday involving occupational exposure to radiation. For periods of self-employment, insert the word "self-employed."
- Item 6. Give the dates of each employment listed in Item 5.
- Item 7. List periods during which occupational exposure to radiation occurred.
- Item 8. List the dose recorded for each period of exposure from the records of previous occupational exposure

*This item requires the signature of the employee concerned.

of the individual as calculated under Section 20.102. Dose is to be given in rem.

"Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or lens of eye.

- Item 9. After each entry in Item 8 indicate in Item 9 whether dose is obtained from records or calculated in accordance with Section 20.102.
- Item 10. Self-explanatory.

* Total Accumulated Occupational Dose (Whole Body)

- Item 11. The total for the whole body is obtained by summation of all values in Item 8.

Certification

- Item 12. Upon completion of the report, the employee must certify that the information in Columns 5, 6, and 7 is accurate and complete to the best of his knowledge. The date is the date of his signature.

Calculations

- Item 13. The lifetime accumulated occupational dose for each individual and the permissible dose under Paragraph 20.101(b) are obtained by carrying out the following steps: The value for N should be taken from Item 4. Subtract 18 from N and multiply the difference by 5 rem. (For example, John Smith, age 32, $N = 32$, $PAD = 5(32-18) = 70$ rem.) Enter total exposure to date from Item 11. Subtract (b) from (a) and enter the difference under (c). The value in (c) represents the unused part of the permissible accumulated dose. This value for permissible dose is to be carried forward to Form NRC-5, "Current Occupational External Radiation Exposure (Whole Body)."
- Item 14. Self-explanatory.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a) (3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on Form NRC-4. 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, 52, 85, 81, 102, 104, 161(b), and 161(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2073, 2073, 2095, 2111, 2132, 2134, 2201(b), and 2201(c)). 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 permits 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 is 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 ON INDIVIDUAL OF NOT PROVIDING INFORMATION** It is voluntary that you furnish the requested information, including social security number; however, the licensee must have a completed Form NRC-4 on each individual whom the licensee proposes to expose to a radiation dose in excess of the amounts specified in 10 CFR 20.101(a). Failure to obtain the requested information before permitting such exposure may subject the licensee to enforcement action in accordance with 10 CFR 20.601. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birthdates among the large number of persons on whom data is maintained.

5. SYSTEM MANAGER(S) AND ADDRESS

Director, Office of Management Information and Program Control
U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

Page 1000
10-700
10-000

U. S. NUCLEAR REGULATORY COMMISSION

Approved by GAO,
6-187238-000001
180000 = 638.77

CURRENT OCCUPATIONAL EXTERNAL RADIATION EXPOSURE

See instructions on back

IDENTIFICATION		
1. NAME (PRINT - Last, first, and middle)	2. SOCIAL SECURITY NO.	
3. DATE OF BIRTH (**only: day, year)	4. NAME OF LICENSEE	
5. DOSE RECORDED FOR (Specify: Whole body: skin of whole body; or hands and forearms, feet and ankles.)	6. WHOLE BODY DOSE STATUS (rem)	7. METHOD OF MONITORING (e.g., Film Badge - FB; Pocket Chamber - PC; Calculations - Calc.) X OR GAMMA _____ BETA _____ NEUTRONS _____

[illegible]

LIFETIME ACCUMULATED DOSE				
16. PREVIOUS TOTAL (mrem)	16. TOTAL QUARTERLY DOSE (mrem)	16. TOTAL QUARTERLY DOSE (mrem)	17. PERM. ACC. DOSE (mrem)	18. UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE (mrem)

ATTACHMENT 2

The preparation and safekeeping of this form or a clear and legible record containing all the information required on this form is required pursuant to Section 20.401 of "Standards for Protection Against Radiation," 10 CFR 20, as a current record of occupational external radiation exposures. Such a record must be maintained for each individual for whom personnel monitoring is required under Section 20.202. Note that a separate Form NRC 5 is to be used for recording external exposure to (1) the whole body; (2) skin of whole body; (3) hands and forearms; or (4) feet and ankles, as provided by item 5 below.

Listed below by item are instructions and additional information directly pertinent to completing this form.

Identification

- Item 1. Self-explanatory.
- Item 2. Self-explanatory except that, if individual has no social security number, the word "none" shall be inserted.
- Item 3. Self-explanatory.
- Item 4. Self-explanatory.

Occupational Exposure

- Item 5. "Dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active blood-forming organs, head and trunk, or left of eye. Unless the lenses of the eyes are protected with eye shields, dose recorded as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 300 mg/cm² or less. When the lenses of the eyes are protected with eye shields having a tissue equivalent thickness of at least 700 mg/cm², dose recorded as whole body dose should include the dose delivered through a tissue equivalent absorber having a thickness of 1,000 mg/cm² or less.

Dose recorded as dose to the skin of the whole body, hands and forearms, or feet and ankles should include the dose delivered through a tissue equivalent absorber having a thickness of 7 mg/cm² or less. The dose to the skin of the whole body, hands and forearms, or feet and ankles should be recorded on separate forms unless the dose to those parts of the body has been included as dose to the whole body on a form maintained for recording whole body exposure.

- Item 6. This item need be completed only when the sheet is used to record whole body exposures and the licensee is exposing the individual under the provisions of Paragraph 20.101(b) which allows up to 3 rems per quarter to the whole body. Enter in this item the unused part of anymissible accumulated dose taken from previous records of exposure, i.e., item 18 of the preceding Form AEC 5 or NRC 5 or item 13 of Form AEC 4 or NRC 4 if the individual's exposure during employment with the licensee begins with this record.
- Item 7. Indicate the method used for monitoring the individual's exposure to each type of radiation to which he is exposed in the course of his duties. Abbreviations may be used.
- Item 8. Doses received over a period of less than a calendar quarter need not be separately entered on the form provided that the licensee maintains a current record of the doses received by the individual which have not as yet been entered on the form. The period of exposure should specify the day the measurement of that exposure was initiated and the day on which it was terminated. For example, if only quarterly doses are entered, the period of exposure for the first calendar quarter of 1962 might be taken as running from Monday, January 1, 1962, through Friday, March 30, 1962, and would be indicated in this item as Jan. 1, 1962-Mar. 30, 1962. If weekly doses are entered, a film badge issued Monday morning, January 1, 1962, and picked up Friday, January 5, 1962, would be indicated as Jan. 1, 1962-Jan. 5, 1962.

- Items 9, 10 and 11. Self-explanatory. The values are to be given in rem. All measurements are to be interpreted in the best method known and in accordance with Paragraph 20.41(c). Where calculations are made to determine dose, a copy of such calculations is to be maintained in conjunction with this record. In any case where the dose for a calendar quarter is less than 10%, or the value specified in Paragraph 20.101(a), the phrase "less than 10%" may be entered in lieu of a numerical value.
- Item 12. Add the values under items 9, 10 and 11 for each period of exposure and record the total. In calculating the "Total" any entry "less than 10%" may be disregarded.
- Item 13. The running total is to be maintained on the basis of calendar quarters. Paragraph 20.31(a) defines calendar quarter. No entry need be made in this item if only calendar quarter radiation doses are recorded in items 9, 10, 11 and 12.

Lifetime Accumulated Dose (Whole Body)

NOTE: If the licensee chooses to keep the individual's exposure below that permitted in Paragraph 20.101(a), items 14 through 18 need not be completed. However, in that case the total whole body dose for each calendar quarter recorded in item 13 for item 12 if quarterly doses are entered in item 12) should not exceed 1 1/4 rem.

If an individual is exposed under the provisions of Paragraph 20.101(b), complete items 14 through 18 at the end of each calendar quarter and when the sheet is filled. Values in item 13, when in the middle of a calendar quarter, and values in item 18, must be brought forward to next sheet for each individual.

- Item 14. Enter the previous total accumulated dose from previous dose records for the individual (e.g., from item 18 of Form AEC 5 or NRC 5 or item 11 of Form AEC 4 or NRC 4). The total occupational radiation dose received by the individual must be entered in this item including any occupational dose received from sources of radiation not licensed by the Commission. If the individual was exposed to sources of radiation not licensed by the Commission during any calendar quarter after completing Form AEC 4 or NRC 4 and personnel monitoring equipment was not worn by the individual, it should be assumed that the individual received a dose of 1 1/4 rems during each such calendar quarter.
- Item 15. Enter the total calendar quarter dose from item 12 (or from item 12 if quarterly doses are entered in item 12) and the date designating the end of the calendar quarter in which the dose was received (e.g., March 30, 1962).
- Item 16. Add item 14 and item 15 and enter that sum.
- Item 17. Obtain the Permissible Accumulated Dose (PAD) in rem for the WHOLE BODY "N" as equal to the number of years of age of the individual on his last birthday. Subtract 18 from N and multiply the difference by 5 rem (e.g., John Smith, age 32; N = 32; PAD = 5(32-18) = 70 rem.)
- Item 18. Determine the unused part of the PAD by subtracting item 16 from item 17. The unused part of the PAD is that portion of the Lifetime Accumulated Dose for the individual remaining at the end of the period covered by this sheet.

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552(a)(13), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on Form NRC 5. This information is maintained in a system of records designated as NRC 27 and described at 48 Federal Register 45344 (October 1, 1975).

1. **AUTHORITY** Sections 53, 63, 65, 81, 103, 104, 161(b), and 161(c) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2033, 2035, 2039, 2111, 2133, 2134, 2201(b), and 2201(c)). 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 licensee. The data permits 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 is available to you upon your 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 ON INDIVIDUAL OF NOT PROVIDING INFORMATION** It is voluntary that you furnish the requested information, including social security number; however, the licensee must complete Form NRC 5 on each individual for whom personnel monitoring is required under 10 CFR 20.202. Failure to do so may subject the licensee to enforcement action in accordance with 10 CFR 20.601. The social security number is used to assure that NRC has an accurate identifier not subject to the coincidence of similar names or birthdates among the large number of persons on whom data is maintained.
5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Office of Management Information and Program Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

ATTACHMENT 3

RADIATION EXPOSURE RECORD			
ED 6488			
NAME .		TLD BADGE NO.	
SOCIAL SEC. NO.	MONTH	YEAR	
SUPERVISOR	TLD <input type="checkbox"/> 1st. Mo. <input type="checkbox"/> 2nd. Mo. <input type="checkbox"/> 3rd. Mo.		
DAY	TOTAL EST. WHOLE BODY EXPOSURE (in MREM)		
	Daily	Quarter Accumulation	
Accumulated Quarter Dose			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

(Over)

DAY	TOTAL EST. WHOLE BODY EXPOSURE (in MREM)	
	Daily	Quarter Accumulation
Total From Front		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		

Notify Health Physics when 900, 1200, and 2500 MREM for the quarter has been reached.

EMPLOYEE SIGNATURE _____

Front

DAVIS-BESSE NUCLEAR POWER STATION
DOSIMETER RECORD

ED 6547-1

PAGE NO.

UNIT NO.

☐☐☐

REP NO.

DESCRIPTION

[illegible]

REMARKS

DAVIS BESSE NUCLEAR POWER STATION
VISITOR BADGE RECORD

[illegible]

ATTACHMENT 8

TOLEDO EDISON TEMPORARY TLD ISSUE RECORD

NAME _____
(Last, First, Middle)

S.S. No. _____

Birth Date _____

Home Mailing _____
Address _____

Company _____

Date of GOT-2 Completion _____

Current Quarterly Exposure _____ mREM (actual or estimated)

Lifetime Exposure _____ mREM (actual or estimated)

Security Badge Number _____

I hereby certify the above information is correct and accurate to the best of my knowledge.

Signature _____ Date _____

Temporary TLD Issued # _____ Issued By _____

**CURRENT RADIATION EXPOSURE RECORD
ATTACHMENT 9**

9

1. NAME (PRINT - Last, first, and middle)	2. SOCIAL SECURITY NO.
3. DATE OF BIRTH (Month, day, year)	4. NAME OF LICENSEE

Address	City	State	Zip
---------	------	-------	-----

5. DOSE RECORDED FOR (Specify: whole body; part of whole body; or hands and forearms, feet and ankles.) Whole Body	6. WHOLE BODY DOSE STATUS (rem)	7. METHOD OF MONITORING (e.g., Film badge - FB; Pocket Chamber - PC; Calculations - Calc.) X OR GAMMA <u>TLD</u> BETA <u>TLD</u> NEUTRONS <u>Calculation</u>
---	---------------------------------	--

8. PERIOD OF EXPOSURE (From - To)	TLD No.	DOSE FOR THE PERIOD (rem)				13. RUNNING TOTAL FOR CALENDAR QUARTER (rem)
		9. X OR GAMMA	10. BETA	11. NEUTRON	12. TOTAL	
1/1/ to 1/31/						
2/1/ to 2/28/						
3/1/ to 3/31/						
4/1/ to 4/30/						
5/1/ to 5/31/						
6/1/ to 6/30/						
7/1/ to 7/31/						
8/1/ to 8/31/						
9/1/ to 9/30/						
10/1/ to 10/31/						
11/1/ to 11/30/						
12/1/ to 12/31/						

Remarks (Record Extremity Monitoring Here)

LIFETIME ACCUMULATED DOSE				
14. PREVIOUS TOTAL DOSE	15. TOTAL QUARTERLY DOSE	16. TOTAL ACCUMULATED DOSE	17. PERM. ACC. DOSE SIN-181 NORM	18. UNUSED PART OF PERMISSIBLE ACCUMULATED DOSE

9

PAGE NUMBER UNIT NUMBER

NEUTRON MULTIPLIER

10 6883

DESCRIPTION

[illegible]

REMARKS

CALCULATED BY		REVIEWED BY		ENTERED ON RECORDS	
INITIAL	DATE	C&HP SUPERVISION	DATE	C&HP FOREMAN	DATE

END