

APR 22 1982

MEMORANDUM FOR: Harold S. Bassett, Acting Director  
Office of Management and Program Analysis  
FROM: Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
SUBJECT: GREEN TICKET 11762 - OTTINGER QUESTIONS

Attached are the NRR responses to the questions posed by Representative Richard L. Ottinger and forwarded in your note of April 14, 1982.

This response was prepared by R. J. Serbu of the Radiation Protection Section, RAB, DSI, NRR.

Original Signed by  
H R. Denton

Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

Attachment:  
Response to Questions

DISTRIBUTION:

CENTRAL FILES	RJMattson
PPAS	RWHouston
NkC PDR-w/incoming	FJCongel
HRDenton	RCapra
EGCase	DMCollins
WJDircks	RJSerbu
KCornell	RAHartfield
TRehm	<i>C. Paul</i>
RMinogue	
LCunningham	
LUnderwood	
JCarter	
DEisenhut	
SHanauer	
RVollmer	
HThompson	
PSCheck	
BSnyder	

8208040347 820422  
PDR MISC PDR

*L-4-1, Pt. 20*  
*[Signature]*  
*4/20*

OFFICE	DSI:RAB	DSI:RAB	DSI:RAB	DSI:ADRP	DSI	DSI	NRR
SURNAME	RJSerbu	DMCollins	FJCongel	RWHouston	RCapra	RJMattson	HRDenton
DATE	04/19/82	04/19/82	04/20/82	04/20/82	04/20/82	04/20/82	04/22/82

7. To what do you attribute the increase in worker exposure?

The increase in occupational radiation exposure at commercial nuclear power plants results primarily from routine maintenance and special maintenance as opposed to other routine activities such as reactor operation and surveillance waste processing, and in-service inspection of equipment.

For pressurized water reactors (PWR's), the major contributors to occupational dose have been steam generator inspection, maintenance and repair, including steam generator replacement and tube resleeving efforts. Seismic hangar and snubber inspections and repairs have recently become significant source of dose. For boiling water reactors (BWR's), the major increase in occupational dose is attributable to torus modifications, repairs related to stress corrosion cracking of pipes, seismic hangar and snubber inspections and repair, and changes to upgrade fire protection systems.

These major contributors to occupational doses have resulted primarily from unanticipated premature failure of major equipment or from recognition of need for equipment improvements.

7a. Has the NRC prepared studies to determine projected levels of worker exposure?

Although we have not sponsored specific studies to project doses, there are several staff actions in which projected levels of worker doses are determined. The NRC staff requires each power reactor license applicant to provide projected worker doses in their Safety Analysis Reports which cover several work categories, including construction (i.e., on a site where a nuclear power unit is already operating), reactor operations and surveillance, routine maintenance, inservice inspection, special maintenance, waste processing, and refueling. The NRC staff reviews these submittals and prepares the Safety Evaluation Reports and Environmental Impact Statements.

Additionally, when nuclear power reactor licensees submit amendment requests which involve significant worker doses (e.g., for reactor coolant system repairs), the NRC staff evaluates the proposed task to assure that the methods and projected worker doses will be ALARA (as low as reasonably achievable).

The NRC has prepared studies to determine the sources of worker doses associated with steam generator maintenance, inspection, repair, removal, and replacement. These studies are derived from actual operations and provide dose information which is typically task-related (e.g., removal of manway covers, tube plugging, sludge lancing). The studies are intended to help in the planning of related operations. Summaries of recent studies are contained in NUREG/CR-1595, "Radiological Assessment of Steam Generator Removal and Replacement", (PNL, December 1980), and NUREG-0866, "Steam Generator Tube Experience" (February 1982).

The NRC report, NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors", a copy of which is enclosed, provides a year-to-year assessment of doses at power reactors. NUREG-0713 provides specific information which enables the Staff to assess and project doses for workers. This includes an annual determination of the average dose for all occupationally exposed workers, the average dose per worker per reactor facility, average dose per PWR and BWR worker, the number of individuals in specified exposure ranges, annual collective doses by work function and personnel type, and an annual overexposure summary.

- 7b. Assuming that steam generator tube repairs account in large part for the recent increase in worker exposure, what specific guidelines has the NRC distributed to utilities replacing or repairing steam generators to ensure the lowest reasonably achievable exposure levels?

The NRC Staff has prepared and issued NUREG-0886, "Steam Generator Tube Experience" in February of 1982. This document includes exposure reduction techniques which provide ALARA dose guidance specifically oriented to steam generator associated tasks. It additionally provides a summary of occupational radiation exposure data derived from recent pressurized water steam generator inspection and repair experience.

Other NRC guidance which has been published includes Regulatory Guide 8.8, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (June 1978), and draft NUREG-0761, "Radiation Protection Plans for Nuclear Power Reactor Licensees" (March 1981). These documents provide standards, criteria, and guidelines for integrating ALARA concepts into power reactor design and operations, including maintenance and any tasks involving occupational exposure.

- 7c. Does the NRC foresee problems of this type occurring for other repairs or retrofits?

Yes - recurring and additional problems calling for repairs and retrofits are anticipated. Steam generator tube degradation at PWR's will continue to be a problem for the immediate future. The NRC Staff is presently preparing

criteria which will increase the amount of inservice inspection (ISI) required for steam generators. Both the ISI and associated repair effort will probably cause increased total doses to workers. At BWR's, the pipe cracking problem may continue until repair efforts are complete and control measures implemented. BWR torus modifications should be generally complete in the coming year (1982).

Other modifications required as a result of the TMI accident, such as reactor vessel inventory measurement systems, will result in doses to workers in the next few years. However, we have not quantified these doses resulting from such modifications because they will vary depending on specific plant conditions.

RICHARD L. OTTINGER, N.Y., CHAIRMAN

FRANK RAY TONY LOFFICCI, CONN.	CARLOS J. MOOREHEAD, CALIF.
EDWARD J. MARKEY, MASS.	MATTHEW J. RINALDO, N.J.
AUGUST DAVIS, JR., TENN.	JAMES M. COALINE, TENN.
PHIL GRASSIE, TEX.	YOUNG CONROCKAN, ILL.
AL DUFFY, WASH.	BOB WHITTAKER, KANS.
MARKET LILAND, TEX.	THOMAS J. TAUKO, IOWA
ROBERT C. DIBLEY, ALA.	DOY RITTER, PA.
MIKE SYNAR, OKLA.	NORWOOD ROGERS, KY.
RON WYCK, ORE.	CLYDE SCHROEDT, W. VA.
BALPH H. GALE, TEX.	JAMES T. BRUYHILL, N.C.
JOHN WALKER, PA.	(EX OFFICIO)
CARDINE COLLINS, ILL.	
JOHN W. DINGELL, MICH.	
(EX OFFICIO)	

W. MICHAEL MCCABE  
STAFF DIRECTOR

U.S. HOUSE OF REPRESENTATIVES  
SUBCOMMITTEE ON ENERGY CONSERVATION  
AND POWER  
OF THE  
COMMITTEE ON ENERGY AND COMMERCE  
WASHINGTON, D.C. 20515

April 9, 1982

The Honorable Nunzio P. Madino  
Chairman  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

In its Annual Report to Congress entitled "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program for Fiscal Year 1983," the ACRS noted the rapid increase in cumulative occupational exposure associated with the operation, maintenance and modification of commercial nuclear power plants.

The report states:

"Whereas a few years ago, the generally accepted value for a single power plant was about 500 person-rem per year, the latest tabulation published by the NRC showed that the average collective dose per operating unit increased by 33 percent between 1979 and 1980 and now approximates 790 person-rem per year. Projections are that some individual plants will have collective doses of as much as 5,000 person-rem for 1982."

In view of occupational exposure increases of this magnitude and the increasing number of workers who have been and will be exposed, please respond to the following questions on or before April 29, 1982.

- RES/MPA 1. Does the NRC maintain, or require its licenses to maintain, complete exposure records for all workers in radioactive portions of a nuclear facility?
- RES/MPA 2. Does NRC maintain a "tracking" system for licensees to ensure against overexposure of individual workers who may work at more than one nuclear facility?
- RES 3. Does the NRC maintain, or require its licensees to maintain, a screening process to determine whether an

applicant has worked or been exposed at any other nuclear facility or has exceeded his or her exposure limit at the same nuclear facility?

- RES
4. Does the NRC maintain, or require its licensees to maintain, long-term health records of employees who have been radiologically exposed to determine long-term health effects of ionizing radiation?

- MPA
5. What activities does the NRC conduct in conjunction with the Transuranic Register? If none currently, have there been such activities in the past? Is the NRC considering instituting or reinstituting its participation in the Register? If not, why not?

- RES
6. Please describe in sufficient detail each program referred to and numerically identified in the following excerpt from the ACRS report previously cited.

Res

"We are encouraged to note that the NRC has recognized the importance of this problem and has completed (1) initial steps for developing a comprehensive research program for addressing the associated regulatory needs. We are encouraged also to see the (2) related research activities that have been developed to fill voids in the regulatory aspects of a wide variety of problems associated with the protection of workers at nuclear facilities."

- NRR?
- NRR
7. To what do you attribute the increase in worker exposure? Palladino

- a. Has the NRC prepared studies to determine projected levels of worker exposure? no
- b. Assuming that steam generator tube repairs account in large part for the recent increase in worker exposure, what specific guidelines has the NRC distributed to utilities replacing or repairing steam generators to ensure the lowest reasonably achievable exposure levels?
- c. Does the NRC foresee problems of this type occurring for other repairs or retrofits? no
- REG 218  
NRR 218  
2/2/82  
Palladino
- 5/4  
1982  
escape re  
0 m. l.

The Honorable Nunzio Palladino  
April 9, 1982  
Page 3

- ~~WIP~~ IE
8. Does the NRC review for completeness and accuracy the training sessions for nuclear "jumpers" conducted by licensees? Please provide the Subcommittee all policy guidance provided to licensees on this subject and a description of its review of these training programs.
- ~~WIP~~ RES
9. Does the NRC promulgate maximum cumulative exposure limits for each licensee? If not, why not? If so, what sanctions are available to the NRC in the event such limit is exceeded?

Sincerely,

*Richard Ottinger*  
Richard L. Ottinger  
Chairman

RLO:lc





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

NRC PDR

APR 22 1982

MEMORANDUM FOR: Harold S. Bassett, Acting Director  
Office of Management and Program Analysis

FROM: Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

SUBJECT: GREEN TICKET 11762 - OTTINGER QUESTIONS

Attached are the NRR responses to the questions posed by Representative Richard L. Ottinger and forwarded in your note of April 14, 1982.

This response was prepared by R. J. Serbu of the Radiation Protection Section, RAB, DSI, NRR.

A handwritten signature in cursive script, appearing to read "HR Denton".

Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

Attachment:  
Response to Questions

*dupa*

7. To what do you attribute the increase in worker exposure?

The increase in occupational radiation exposure at commercial nuclear power plants results primarily from routine maintenance and special maintenance as opposed to other routine activities such as reactor operation and surveillance waste processing, and in-service inspection of equipment.

For pressurized water reactors (PWR's), the major contributors to occupational dose have been steam generator inspection, maintenance and repair, including steam generator replacement and tube resleeving efforts. Seismic hangar and snubber inspections and repairs have recently become significant source of dose. For boiling water reactors (BWR's), the major increase in occupational dose is attributable to torus modifications, repairs related to stress corrosion cracking of pipes, seismic hangar and snubber inspections and repair, and changes to upgrade fire protection systems.

These major contributors to occupational doses have resulted primarily from unanticipated premature failure of major equipment or from recognition of need for equipment improvements.

7a. Has the NRC prepared studies to determine projected levels of worker exposure?

Although we have not sponsored specific studies to project doses, there are several staff actions in which projected levels of worker doses are determined. The NRC staff requires each power reactor license applicant to provide projected worker doses in their Safety Analysis Reports which cover several work categories, including construction (i.e., on a site where a nuclear power unit is already operating), reactor operations and surveillance, routine maintenance, inservice inspection, special maintenance, waste processing, and refueling. The NRC staff reviews these submittals and prepares the Safety Evaluation Reports and Environmental Impact Statements.

Additionally, when nuclear power reactor licensees submit amendment requests which involve significant worker doses (e.g., for reactor coolant system repairs), the NRC staff evaluates the proposed task to assure that the methods and projected worker doses will be ALARA (as low as reasonably achievable).

The NRC has prepared studies to determine the sources of worker doses associated with steam generator maintenance, inspection, repair, removal, and replacement. These studies are derived from actual operations and provide dose information which is typically task-related (e.g., removal of manway covers, tube plugging, sludge lancing). The studies are intended to help in the planning of related operations. Summaries of recent studies are contained in NUREG/CR-1595, "Radiological Assessment of Steam Generator Removal and Replacement", (PNL, December 1980), and NUREG-0866, "Steam Generator Tube Experience" (February 1982).

The NRC report, NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors", a copy of which is enclosed, provides a year-to-year assessment of doses at power reactors. NUREG-0713 provides specific information which enables the Staff to assess and project doses for workers. This includes an annual determination of the average dose for all occupationally exposed workers, the average dose per worker per reactor facility, average dose per PWR and BWR worker, the number of individuals in specified exposure ranges, annual collective doses by work function and personnel type, and an annual overexposure summary.

- 7b. Assuming that steam generator tube repairs account in large part for the recent increase in worker exposure, what specific guidelines has the NRC distributed to utilities replacing or repairing steam generators to ensure the lowest reasonably achievable exposure levels?

The NRC Staff has prepared and issued NUREG-0886, "Steam Generator Tube Experience" in February of 1982. This document includes exposure reduction techniques which provide ALARA dose guidance specifically oriented to steam generator associated tasks. It additionally provides a summary of occupational radiation exposure data derived from recent pressurized water steam generator inspection and repair experience.

Other NRC guidance which has been published includes Regulatory Guide 8.8, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable" (June 1978), and draft NUREG-0761, "Radiation Protection Plans for Nuclear Power Reactor Licensees" (March 1981). These documents provide standards, criteria, and guidelines for integrating ALARA concepts into power reactor design and operations, including maintenance and any tasks involving occupational exposure.

- 7c. Does the NRC foresee problems of this type occurring for other repairs or retrofits?

Yes - recurring and additional problems calling for repairs and retrofits are anticipated. Steam generator tube degradation at PWR's will continue to be a problem for the immediate future. The NRC Staff is presently preparing

criteria which will increase the amount of inservice inspection (ISI) required for steam generators. Both the ISI and associated repair effort will probably cause increased total doses to workers. At BWR's, the pipe cracking problem may continue until repair efforts are complete and control measures implemented. BWR torus modifications should be generally complete in the coming year (1982).

Other modifications required as a result of the TMI accident, such as reactor vessel inventory measurement systems, will result in doses to workers in the next few years. However, we have not quantified these doses resulting from such modifications because they will vary depending on specific plant conditions.

EDWARD L. STEINWART, N.Y., CHAIRMAN

CATHERINE TERRY COFFEY, CONN.	CHARLES J. MOOREHEAD, CALIF.
EDWARD J. MARKEY, MASS.	MATTHEW J. RINALDO, N.J.
ALBERT GORE, JR., TENN.	JAMES M. COLLIER, TEX.
THOMAS BRADY, TEX.	TOM CONDOGAN, ILL.
AL BENTLEY, WASH.	BOB WHITTAKER, KANS.
ROBERT LELAND, TEX.	THOMAS J. TAUBE, IOWA
EDWARD E. BUDNEY, ALL.	DOE RITTER, PA.
FRANK STOR, OHIO	RAULFO ROBERTS, KY.
WALTER TSON, OHIO	ELVIS BENEDETTI, W. VA.
FRANK M. HALL, TEX.	JAMES T. BROTHILL, N.C.
DOUG WALKER, PA.	(EX OFFICIO)
CAROLINE COLLINS, ILL.	
JOHN H. DINGELL, MICH.	
(EX OFFICIO)	

U.S. HOUSE OF REPRESENTATIVES  
SUBCOMMITTEE ON ENERGY CONSERVATION  
AND POWER  
OF THE  
COMMITTEE ON ENERGY AND COMMERCE  
WASHINGTON, D.C. 20515

W. MICHAEL MCCANE  
STAFF DIRECTOR

April 9, 1982

The Honorable Nunzio Palladino  
Chairman  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Chairman:

In its Annual Report to Congress entitled "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program for Fiscal Year 1983," the ACRS noted the rapid increase in cumulative occupational exposure associated with the operation, maintenance and modification of commercial nuclear power plants.

The report states:

"Whereas a few years ago, the generally accepted value for a single power plant was about 500 person-rem per year, the latest tabulation published by the NRC showed that the average collective dose per operating unit increased by 33 percent between 1979 and 1980 and now approximates 790 person-rem per year. Projections are that some individual plants will have collective doses of as much as 5,000 person-rem for 1982."

In view of occupational exposure increases of this magnitude and the increasing number of workers who have been and will be exposed, please respond to the following questions on or before April 29, 1982.

- RES/MPA 1. Does the NRC maintain, or require its licenses to maintain, complete exposure records for all workers in radioactive portions of a nuclear facility?
- RES/NPA 2. Does NRC maintain a "tracking" system for licensees to ensure against overexposure of individual workers who may work at more than one nuclear facility?
- RES 3. Does the NRC maintain, or require its licensees to maintain, a screening process to determine whether an

applicant has worked or been exposed at any other nuclear facility or has exceeded his or her exposure limit at the same nuclear facility?

- RES 4. Does the NRC maintain, or require its licensees to maintain, long-term health records of employees who have been radiologically exposed to determine long-term health effects of ionizing radiation?

- MPA 5. What activities does the NRC conduct in conjunction with the Transuranic Register? If none currently, have there been such activities in the past? Is the NRC considering instituting or reinstating its participation in the Register? If not, why not?

- RES 6. Please describe in sufficient detail each program referred to and numerically identified in the following excerpt from the ACRS report previously cited.

Res "We are encouraged to note that the NRC has recognized the importance of this problem and has completed (1) initial steps for developing a comprehensive research program for addressing the associated regulatory needs. We are encouraged also to see the (2) related research activities that have been developed to fill voids in the regulatory aspects of a wide variety of problems associated with the protection of workers at nuclear facilities."

- NRR? NRR 7. To what do you attribute the increase in worker exposure?

- a. Has the NRC prepared studies to determine projected levels of worker exposure?
- b. Assuming that steam generator tube repairs account in large part for the recent increase in worker exposure, what specific guidelines has the NRC distributed to utilities replacing or repairing steam generators to ensure the lowest reasonably achievable exposure levels?
- c. Does the NRC foresee problems of this type occurring for other repairs or retrofits?

The Honorable Nunzio Palladino  
April 9, 1982  
Page 3

- ~~TE~~
8. Does the NRC review for completeness and accuracy the training sessions for nuclear "jumpers" conducted by licensees? Please provide the Subcommittee all policy guidance provided to licensees on this subject and a description of its review of these training programs.
- ~~RES~~
9. Does the NRC promulgate maximum cumulative exposure limits for each licensee? If not, why not? If so, what sanctions are available to the NRC in the event such limit is exceeded?

Sincerely,

*Richard Ottinger*  
Richard L. Ottinger  
Chairman

RLO:lc