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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Mr. B.J. Youngblood, Director
PWR Project Directorate No. 4

Subject: McGuire Nuclear Station
Docket Nos. 50-369 and 50-370
Radiological Aspects of RTD Bypass Removal

Dear Mr. Denton:

By letter of October 29, 1985, Duke Power Company submitted proposed changes to McGuire's Technical Specifications in support of a planned modification to remove the RTD Bypass System. On January 21, 1986, the NRC Staff requested additional information regarding the radiological aspects of the modification.

Attached are DPC's responses to the six questions raised in the Staff's letter. Please notify us if you require additional information for your review.

Very truly yours,

Hal B. Tucker

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SAG/27/jgm

Attachments

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xc: Dr. J. Nelson Grace, Regional Administrator
U.S. Nuclear Regulatory Commission - Region II
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Mr. W.T. Orders
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## Response to NRC Request for Additional Information
## Radiological Aspects of RTD Bypass Modification

1. Question:

   Describe the actual hardware changes and activities that will be made to accomplish RTD bypass piping removal. Include those construction steps which result in radiological exposure to personnel or generate radioactive waste. Identify differences, if any, in these changes and activities for the two McGuire units.

   Response:

   A summary of the RTD modification including hardware changes and construction activities follow. Please note that there is no significant difference between the work at each unit. Also, note that the work steps are not necessarily in order.

   1. Work will begin with the erection of scaffolding, temporary shielding, and the set up of temporary lighting and service lines.
   2. The RTD bypass legs will be cut at the three hot leg RTD scoops on each loop.
   3. The hot leg penetrations at each hot leg scoop will be machined and threaded.
   4. A hole will be drilled in the bottom of each hot leg scoop.
   5. An RTD well and narrow-range fast-response RTD will be installed in each hot leg scoop.
   6. The return crossover legs will be cut and capped.
   7. The cold leg RTD bypass loop piping will be cut at the cold leg nozzle.
   8. Two RTD wells and narrow-range, fast-response RTD's will be installed in each cold leg. One will be installed in the remaining part of the line to the RTD bypass manifold that is to be severed; the other RTD

will be installed in a new nozzle to be welded onto the cold leg.

9. New cables will be pulled and connected to the replacement RTD's.
10. The piping, valves, and support/restraints associated with the RTD bypass loop will be removed from containment.
11. A general clean-up of the affected areas including the removal of temporary scaffolding, etc. will be the last step in the modification.

2. Question:

Provide an estimate of the occupational radiation dose determined for the overall RTD Bypass Modification at McGuire 1 & 2. This should include the following:

a) Doses and manpower for major subtasks
b) Typical doserates expected
c) Maximum doserates expected and locations

Response:

a) The estimated occupational radiation exposure for each RTD bypass modification is shown below. The estimate is based on anticipated staytimes for each major subtask and actual area doserate measurements. Appropriate adjustments have been made to account for shielding effectiveness, and other exposure reduction techniques.

| SUBTASK | MAN-HOURS | DOSE ESTIMATE (Person-Rem) |
|---|---|---|
| 1) Preparation for RTD Bypass Modification | 33 | 1.090 |
| 2) Shielding Installation/Removal | 64 | 9.600 |
| 3) Remove/Replace pipes, hangers, manifolds, electrical interferences | 417 | 11.100 |

| | | |
|---|---|---|
| 4) Modify RTD | 120 | 12.000 |
| Total per loop | 634 | 33.790 |
| Total per unit (4 loops) | 2536 | 135.160 |

NOTE: Man-hour estimates are actual in-area estimates supplied by craft supervisors.

b) Typical general area doserates are anticipated to range from 20-100 mr/hr with an average doserate of 50 mr/hr.

c) Maximum doserates should range from 1-3 R/hr on contact and 200-400 mR/hr general area at NC valves and RTD manifolds.

3. Question:

Provide a comparison of dose incurred during task performance and dose avoided (e.g. reduced operations, maintenance, ISI for system components, seismic restraints/snubbers) over plant life by removal of the RTD bypass piping system.

Response:

Upon removal of the RTD bypass piping system a significant amount of dose associated with valve and manifold maintenance, ISI, and snubber inspection will be eliminated. As a result, over the life of the plant, 1250 person-rem will be avoided for each unit. Therefore, a net exposure savings of 1114.8 person-rem is anticipated.

4. Question:

Identify measures to be taken to assure that doses to workers during task performance will be ALARA. This should cover, for example, task planning, special training, use of mockups, area and system decontamination and airborne radioactivity, efforts to minimize numbers of workers, and application of experience from similar efforts in the industry.

Response:

ALARA preplanning will be utilized to identify potential exposure concerns during RTD bypass modification and effect solutions. Visual inspections and area photographs will assure proper tools and equipment are available for each subtask and worker knowledge of the area. Temporary shielding will be utilized whenever and wherever practical. The use of special tooling will also be evaluated and utilized when appropriate.

Job observations and constant communication between job supervisors, H. P. technicians and ALARA personnel will be used to identify additional exposure reduction methods. These techniques will ensure worker doses are maintained ALARA.

5. Question:

Identify the types and volumes of radioactive waste which are expected to be generated (e.g., piping, components, insulation) and discuss disposal plans for these wastes.

Response:

The types and volumes of radioactive waste expected are summarized below:

a) RTD Loop Material

| Description | Quantity | | Volume ($ft^3$) |
|---|---|---|---|
| Manifold | 8 | | 11.2 |
| Valves | 49 | | 30 |
| 3" Dia. Pipe | 168 ft. | | 14.3 |
| 2" Dia. Pipe | 100 ft. | | 3.9 |
| Insulation: | | | |
| 3" Pipe | 168 ft. | | 83.4 |
| 2" Pipe | 100 ft. | | 42.0 |
| | | TOTAL | 184.8 per unit |

Radiation and Contamination

.2 R/hr to 2.0 R/hr contact
30 mr/hr to 2.55 R/hr smearable

b) Hanger Materials

| Description | Quantity | Volume ($ft^3$) |
|---|---|---|
| Hangers | 90 | 56 per unit |

Contamination Levels

If reasonable measures are taken to minimize cross contamination, hanger material surfaces can probably be decontaminated to less than 1000 dpm/100 $cm^2$ .

Total Curie Content (est.) = 4.2 per unit

Currently, Duke is considering four options for disposal of the RTD waste. These are:

1) Burial at Barnwell as low-level waste.
2) On-site decontamination by Duke, sell as scrap.
3) On-site decontamination by vendor, sell as scrap.
4) Off-site decontamination by vendor.

5. Question

Identify and briefly discuss, any special radiological problems which may be associated with this task (e.g., very high doserates, very high contamination levels, high radioiodine levels, need for multiple dosimetry).

Response:

The following special problems, and resolutions, have been identified through ongoing pre-job planning.

a) Standard portaband saws, used to cut NC piping, show excessive blade wear after 2 cuts. Continued use will result in excessive exposure of workers. Carbide tip blades are being sought for portaband saws. Otherwise, standby saws will be available.

b) Manual removal and reconfiguration of RTD Scoop welds was going to result in excessive personnel exposures. Remote tooling was developed to perform the task and thus, reduce exposures to an acceptable level.