December 22, 2000

Mr. Oliver D. Kingsley, President
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Executive Towers West III
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Downers Grove, IL 60515

SUBJECT: DRESDEN, UNITS 2 AND 3 - APPROVAL OF REACTOR PRESSURE VESSEL SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE (TAC NOS. MA9593 AND MA9594)

Dear Mr. Kingsley:

By letter dated July 28, 2000, Commonwealth Edison Company (ComEd) submitted a request for Nuclear Regulatory Commission (NRC) review and approval of its proposed modification to the Dresden Nuclear Power Station reactor pressure vessel surveillance capsule withdrawal schedules. The proposed change would extend the date of withdrawal of the next surveillance capsules to the end of the next Dresden Units 2 and 3 operating cycles. Final Safety Analysis Report Table 5.3-1 would be revised to show these new dates. ComEd's submittal was made in accordance with the provision of Title 10 of the Code of Federal Regulations, Part 50, Appendix H, paragraph B.3 which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation."

The staff has completed its review of ComEd's submittal. The reactor pressure vessel surveillance capsule withdrawal schedule proposed by ComEd for Dresden Units 2 and 3 is approved. The enclosed safety evaluation provides the details of the staff's evaluation of this issue. This completes our efforts for TAC Nos. MA9593 and MA9594.

Sincerely,

/RA/

Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosure: Safety Evaluation

cc w/encl: See next page

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The staff has completed its review of ComEd's submittal. The reactor pressure vessel surveillance capsule withdrawal schedule proposed by ComEd for Dresden Units 2 and 3 is approved. The enclosed safety evaluation provides the details of the staff's evaluation of this issue. This completes our efforts for TAC Nos. MA9593 and MA9594.

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*Concurred by SE dated 10/12/00, no significant changes made **See previous concurrence

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO REVISE THE FACILITY'S REACTOR PRESSURE

VESSEL SURVEILLANCE CAPSULE WITHDRAWAL SCHEDULE

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

By letter dated July 28, 2000, (Reference 1) Commonwealth Edison Company (ComEd, the licensee) submitted a request for Nuclear Regulatory Commission (NRC) review and approval of its proposed modification to the Dresden Nuclear Power Station reactor pressure vessel (RPV) surveillance capsule withdrawal schedules. The proposed change would modify the date of withdrawal of the next surveillance capsules in Final Safety Analysis Report Table 5.3-1 from calendar dates equivalent to approximately 17.5 effective full-power years (EFPY) of operation to the end of the next Dresden Unit 2 (October 2001, 19.35 EFPY) and Unit 3 (September 2002, 19.62 EFPY) operating cycles. ComEd's submittal was made in accordance with the provision of Title 10 of the Code of Federal Regulations, Part 50, Appendix H, paragraph B.3 which specifies that "[a] proposed withdrawal schedule must be submitted with a technical justification as specified in [10 CFR 50.4]. The proposed schedule must be approved prior to implementation."

2.0 REGULATORY REQUIREMENTS AND STAFF POSITIONS

Nuclear power plant licensees are required by Title 10 of the Code of Federal Regulations, Part 50, Appendix H (10 CFR 50, Appendix H) to implement RPV surveillance programs to "monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment." Regarding RPV surveillance program design and specimen testing, 10 CFR 50, Appendix H incorporates by reference the editions of the American Society for Testing and Materials (ASTM) Standard Practice E 185, "Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels," through the 1982 edition. Under 10 CFR 50, Appendix H, the licensee's RPV surveillance program design and withdrawal schedule is required to meet the requirements of the edition of ASTM E 185 that is current on the issue date of the American Society of Mechanical Engineers (ASME) Code to which the RPV was

purchased, although later editions may be used, up to and including the 1982 edition. The test procedures and reporting requirements must however meet the requirements of the 1982 edition of ASTM E185, to the extent practical for the configuration of the specimens in the capsules.

The edition of ASTM E 185 to which the Dresden Unit 2 and Unit 3 RPV surveillance programs were designed, was the 1962 edition (ASTM E 185-62). However, no specific recommendations were given in ASTM E 185-62 regarding withdrawal schedules. In the following edition, ASTM E 185-66, Paragraph 4.6 addresses the withdrawal schedule as follows, "[i]t is recommended that sets of specimens be withdrawn at three or more separate times. One of the data points obtained shall correspond to the neutron exposure of the component near the end of its design life." Hence, no specific guidance or significant constraint was incorporated into design of the Dresden Unit 2 and Unit 3 surveillance programs with regard to capsule withdrawal dates.

However, additional NRC staff guidance has been published regarding licensee requests to obtain one cycle capsule withdrawal deferrals to support the Integrated Surveillance Program (ISP) proposed by the Boiling Water Reactor Vessel and Internals Project (BWRVIP). The ISP proposed by the BWRVIP was designed to integrate and share data from the surveillance programs from all existing boiling water reactors (BWRs) in the United States. The BWRVIP noted that, for some licensees, it would be necessary to obtain at least one cycle capsule deferrals to support obtaining high quality data from some existing surveillance capsules. In addition, since some existing surveillance capsules would not need to be tested if the ISP were approved by the staff, licensees having such capsules desired to seek deferral of their removal and testing to reduce monetary expenditures and personnel exposure. The NRC staff has noted its general support for the ISP proposal, and, by letter to the BWRVIP, dated May 16, 2000, identified criteria to be addressed by licensees requesting one cycle capsule deferrals to support the ISP.

The first criterion addressed in the staff's May 16, 2000, letter, requested that licensees explain how their deferral request is consistent with the ISP plan submitted in topical report BWRVIP-78. Principally, this requested that licensees examine how their surveillance capsules would be used (or not used) under the proposed ISP and confirm that their request for a one cycle deferral would not affect the ability of the ISP to meet its objectives. The second criterion requested that licensees provide a justification as to why the materials property data to be acquired from the capsule in question was not necessary to support safe operation of the facility over the period of the deferral. Several options were given in the staff's letter regarding possible responses to this criterion. Finally, the staff's third and final criterion requested that licensees explain why the dosimetry data to be acquired from the capsule in question was not necessary to support safe operation of the facility over the period of the deferral.

3.0 LICENSEE'S DETERMINATION

In its July 28, 2000, submittal, ComEd stated that their reason for requesting this deferral of the next Dresden Unit 2 and Unit 3 surveillance capsules was to support their involvement in the ISP. ComEd then addressed, as described below, the three criteria cited in the NRC staff's May 16, 2000, letter.

Regarding the first criterion, ComEd noted that according to the scope of the ISP discussed in the BWRVIP-78 report, the surveillance capsules for Dresden Unit 2 were not to be included in the ISP. Hence, deferral of the Dresden Unit 2 capsule for one cycle (or potentially indefinitely) would not affect the ISP. The Dresden Unit 3 surveillance capsules were, however, included within the scope of the ISP documented in the BWRVIP-78 report. In addition, the ISP schedule in the BWRVIP-78 report suggested that the next Dresden Unit 3 capsule should be withdrawn in accordance with the current withdrawal schedule. In subsequent discussions with NRC staff, BWRVIP representatives noted that the ISP withdrawal schedule in the BWRVIP-78 report had not been "optimized" and was rather simply based on the current individual plant withdrawal schedules. In their July 28, 2000, submittal, ComEd reported that through their discussions with Electric Power Research Institute and General Electric Nuclear Energy personnel responsible for the development of the BWRVIP-78 report, it was concluded that the ISP withdrawal schedule would be amended to allow the Dresden Unit 3 capsules to accumulate additional neutron fluence before being removed. Thus, the licensee concluded that deferral of the Dresden Unit 3 capsule would be consistent with the intent of the BWRVIP's proposed ISP.

To address the second criterion, ComEd noted that the materials property data from the capsules to be deferred was not necessary to ensure continued safe operation of the Dresden RPVs for two reasons. First, the current Dresden Unit 2 and Unit 3 pressure-temperature (P-T) limit curves were noted to have been approved by the staff for operation through 22 EFPY of operation. In addition, the licensee indicated that they had already submitted a license amendment to extend the curves to 32 EFPY and that neither of these sets of curves required the data from the next surveillance capsule withdrawals. The licensee's second reason was that based on the chemical compositions of the surveillance materials and the projected capsule fluences, the surveillance materials were not expected to exhibit sufficient transition temperature shift to have the results be distinguishable from surveillance data scatter. Hence, the data acquired would not be very valuable for either ensuring the integrity of the Dresden RPVs or for adding data to further the general state of knowledge regarding power reactor embrittlement behavior.

Finally, regarding the third criterion, ComEd concluded that the dosimetry information from the capsules to be deferred was not necessary to ensure continued safe operation of the Dresden RPVs. The licensee noted that the operating times for the Dresden RPVs at the end of the proposed deferral period will be 19.35 EFPY for Unit 2 and 19.62 EFPY for Unit 3. Since the current Dresden P-T limits were approved through 22 EFPY, this indicates that the units will still be at less than 90 percent of the P-T limit boundary exposure level at the end of the deferral period.

ComEd concluded that this provided sufficient margin to ensure that the current 22 EFPY fluence projection would not be exceeded during the deferral period.

For these reasons, ComEd concluded that their request to defer withdrawal of the next Dresden Unit 2 and Unit 3 surveillance capsules was justified and consistent with their intent to support the BWRVIP ISP.

4.0 STAFF EVALUATION

The NRC staff reviewed the information supplied by the licensee and the regulatory requirements and guidance stated in Section 2.0 above. Regarding the requirements of ASTM E185-62, the staff concluded that the licensee's requested modifications to their surveillance capsule withdrawal schedules would be acceptable. The staff's conclusions on the technical justifications provided in response to the three criteria given in the NRC staff's May 16, 2000, letter, are given below.

First, the staff accepts that deferral of the next Dresden Unit 2 and Unit 3 capsules is consistent with the BWRVIP ISP plan. Based on the NRC staff's discussions with the BWRVIP, some modifications to the withdrawal schedule proposed as part of the ISP are expected. In addition, the ISP is intended to improve the quality of data acquired to assess the embrittlement of BWR RPVs. If the capsules were not deferred, the Charpy shifts obtained from the surveillance materials would not be distinguishable from data scatter. Therefore, the staff would expect that a deferral of these capsules would be, in fact, necessary to support the ISP.

Since the licensee's rationale to address the second and third criterion depends on an evaluation of the Dresden Unit 2 and Unit 3 P-T limits, some discussion of the most recently approved Dresden P-T limits is provided here. By letter dated September 19, 2000, (Reference 2) the NRC approved new P-T limit curves for Dresden Unit 2 and Unit 3. These P-T limit curves were submitted by the licensee with the intent that they be approved for up to 32 EFPY of operation. However, the NRC staff identified significant issues with the fluence analysis performed to support use of these curves out to 32 EFPY. The staff's main concern was that the licensee's fluence evaluation utilized an older, potentially non-conservative methodology. As a result of these staff concerns, ComEd agreed to a license condition specifying that the P-T limit curves could only be used until November 30, 2001, for Dresden Unit 2, and only until October 30, 2002, for Dresden Unit 3, unless approval to extend their use was obtained from the NRC. These dates approve use of the P-T limit curves to approximately 20 EFPY of operation for each unit. The NRC staff concluded (Reference 2) that, based on several considerations addressed in the P-T limit safety evaluation, use of these P-T limit curves would ensure safe plant operation at least through approximately 20 EFPY.

The period of the requested surveillance capsule deferral is, therefore, less than the period over which the most recently approved P-T limits remain valid. Hence, the staff has concluded that, through the period of the requested capsule deferral, the most recently approved Dresden P-T limits will continue to ensure that the integrity of the RPV will be maintained for heatup, cooldown, normal power operation, and leak rate testing. Further, the additional materials test data from the capsules to be deferred would not be expected to lead to significant modification of the Dresden P-T limit curves if the capsules were tested in accordance with the current withdrawal schedule since the data obtained would likely not be differentiable from data scatter. The additional dosimetry data would also only be of significance when an updated fluence methodology is employed by the licensee to address NRC staff concerns regarding their current fluence methodology. Therefore, in this case, no additional material test (i.e, Charpy impact test) data or dosimetry data is required to ensure, nor would be expected to contribute to the evaluation of, the integrity of the Dresden RPVs through the period of the deferral.

5.0 CONCLUSION

The NRC staff has concluded that deferral of the withdrawal of the next Dresden Unit 2 and Unit 3 surveillance capsules for one cycle is acceptable. These approved changes modify the dates of withdrawal of the next surveillance capsules until the end of the current operating cycles for Dresden Units 2 and 3. The licensee should modify the withdrawal schedule given in final safety analysis report (FSAR) Table 5.3-1 to reflect these changes.

6.0 REFERENCES

1. P. Swafford [ComEd] to U.S. Nuclear Regulatory Commission Document Control Desk, "Revision to Reactor Vessel Material Specimen Removal Schedule," July 28, 2000.

2. L.W. Rossbach [USNRC] to O.D. Kingsley [ComEd], "Dresden - Issuance of Amendments - Revised Pressure-Temperature Limits (TAC NOS. MA8346 and MA8347)," September 19, 2000.

Principal Contributor: M. A. Mitchell, EMCB

Date: December 22, 2000