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November 4, 1994

PGHLTR 94-0001

Mr. John B. Martin
Region III Administrator
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Subject: Dresden Nuclear Power Station Unit 1
Deviation from Technical Specification Requirements
NRC Docket No. 50-010

This is a special report submitted in accordance with Dresden Unit 1 Possession Only License DPR-2, Docket Number 50-010, Technical Specification 3.10.F.2. The attachment to this letter discusses a chemistry excursion in the Unit 1 Spent Fuel Pool in which conductivity exceeded the Technical Specification Limit.

If you have any questions concerning this submittal, please call Charles Allen, at (815) 942-2920 x 2857.

Sincerely,

Peter G. Holland

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Regulatory Assurance Supervisor
Dresden Station

PGH/CA:cfq

cc: P.B. Erickson, Dresden 1 Project Manager
C.D. Pederson, Region III
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ATTACHMENT

A. ABSTRACT

Unit 1 Fuel Storage Pool conductivity exceeded the 10 micro-mho/cm Technical Specification limit on October 6, 1994 and was returned within specifications on October 10, 1994. Cause of the transient is believed to be decomposition of biological micro-organisms in the Fuel Storage Pool while the temporary demineralizer was not in operation allowing pool stratification. Although conductivity was measured during the period the temporary demineralizer was shutdown, it is believed that the conductivity increased in the lower sections of the pool and due to stratification, was not seen by the installed instrumentation or periodic dip samples. When the pool recirculation was reestablished by operating the temporary demineralizer, the pool conductivity was observed to rapidly spike to a value of 18.1. The temporary demineralizer was operated with a combination of resin and charcoal and the conductivity was returned to 7.6 micro-mhos/cm, October 10, 1994.

B. DESCRIPTION OF EVENT:

Unit 1 Fuel Storage Pool conductivity exceeded the 10 micro-mho/cm Technical Specification limit on October 6, 1994 and was returned to within specifications on October 10, 1994. Cause of the transient is believed to be decomposition of biological micro-organisms in the Fuel Storage Pool while the temporary demineralizer was not in operation allowing pool stratification. Fuel pool conductivity is measured by a continuous monitor which samples the upper six inches of the pool and by dip samples taken by Dresden Chemistry Department.

A precursor to this event was an event in which pool visibility decreased due to a rapid buildup of biological micro-organisms in the pool water in mid August. This buildup led to a decrease of visibility in both the Spent Fuel Pool and the Fuel Transfer Pool and floating foam on the pool surfaces. The cause of the biological growth has not been determined although the conditions in the pool with warm temperatures and no circulation encouraged rapid growth once started. Both pools were affected due to communication around the installed fuel pool separation gates. Samples of biological micro-organisms measured a count of between 10E4 and 10E6 per milliliter of sample on August 19th. Spent Fuel Pool chemistry was being maintained by a temporary demineralizer until a permanent demineralizer could be placed into operation in October of this year. The temporary demineralizer resin was exhausted as indicated by the decontamination factor between the influent and effluent. In addition a significant increase in silica was observed in the temporary demineralizer effluent.

ATTACHMENT (CONT)

A management decision was made August 19th to flush out the exhausted resins from the temporary demineralizer and to not reload the temporary demineralizer. This decision was made based on a linear extrapolation of conductivity increase not reaching the Technical Specification limit until after the end of October. Also considered was the desire to minimize generation of additional radioactive waste. Since the new permanent demineralizer was scheduled to be placed in operation in late October it was felt that the fuel pool chemistry would remain in specification without demineralization until that time.

To treat this biological growth, hydrogen peroxide was added to both the Spent Fuel Pool and to the Transfer Pool. Use of hydrogen peroxide was recommended by a chemistry consultant in the late 1980's when this condition occurred previously and was carried out successfully at that time. Approximately 25 gallons of 50 percent hydrogen peroxide solution was added to the Spent Fuel Pool and 30 gallons added to the Fuel Transfer Pool on September 7th and 8th, respectively. The hydrogen peroxide addition resulted in a bubbling, foaming action initially, that stirred up the pool water and resulted in a muddy appearance of the pool. The temporary demineralizer was operated with no resin in the demineralizer beds to help circulate the pool water and to also kill any biological micro-organisms in the demineralizer piping and vessels. The count of biological micro-organisms dropped to a range of 10 to 100 per milliliter which was determined to be acceptable by the Dresden Chemistry Department. The temporary demineralizer was shutdown. Based on conductivity extrapolation, it was believed that the conductivity would remain in specification until the permanent demineralizer could be placed in service and there was no need to generate additional radiological wastes from the operation of the temporary demineralizer.

Although conductivity was continuously measured during the period the temporary demineralizer was shutdown, it is believed that the conductivity increased in the lower sections of the pool due to stratification and was not seen by the installed instrumentation. When the pool clarity degenerated, a decision was made to load the temporary demineralizer with a bed of resin and restart the system. After several days of very limited water processing in the Transfer Pool beginning September 29, 1994, using resins only, the temporary demineralizer was realigned to the Spent Fuel Pool. The second vessel was charged with charcoal and processing of Spent Fuel Pool water commenced on October 6, 1994. Pool conductivity was observed to almost immediately spike to a value of 18.1 umho/cm. Chemistry dip samples taken following the spike showed both pools to be nearly identical near the 18 umho/cm. Through operation of the temporary demineralizer, the conductivity was returned to within the Technical Specification limit of 10 umho/cm on October 10, 1994, when it reached 7.6 umho/cm.

ATTACHMENT (CONT)

C. CAUSE OF EVENT:

The conductivity increase is believed to have been caused by the decomposition of the biological materials which settled to the bottom of the pools. This conductivity buildup in the pool bottoms was not detected during the time the temporary demineralizer was not running. Contributing to this event was a management decision to not replace resin in the temporary demineralizer and allow the pool to sit un-circulated until the permanent demineralizer was placed into operation.

D. SAFETY ANALYSIS:

This event has no safety impact. The fuel in the Fuel Storage Pool will never be exposed to an active reactor core and was exposed to adverse conditions for less than a four day period. This fuel is awaiting disposal in a federal repository.

E. CORRECTIVE ACTIONS:

The temporary demineralizer was restarted with resin in one bed and charcoal in the other bed with the beds operating to the pool in series. In addition the permanent demineralizer was made operational October 31, 1994. It is presently being run, filtering both the Spent Fuel Pool and the Transfer Pool. The permanent demineralizer is loaded with resin with a small charge of charcoal in each bed. The beds are run in parallel to polish the water from the pools. Additionally, prior to obtaining pool water samples, the pool demineralizer system will be in operation or in the recirculation mode to provide improved pool mixing. In the event of stagnant pool conditions, in which the demineralizer is inoperable, efforts will be made to obtain the best possible representative samples.

F. PREVIOUS OCCURRENCES:

A search was made of the Dresden data base for similar occurrences. No other reported occurrence was found of this specific type of event. The growth of biological micro-organisms is similar to an event that occurred in the 1980's. The event was not reportable at that time. Fuel pool chemistry limits were initially placed into the technical Specifications in Revision 37, issued September 3, 1993.