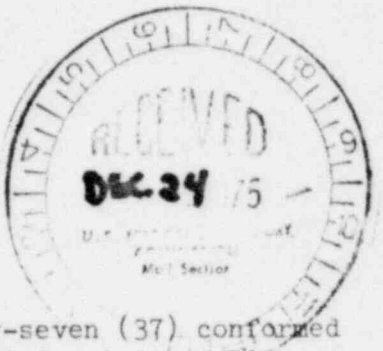
Regulatory Docket File

Consumers Power Company

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

December 18, 1975



Director of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-155, LICENSE DPR-6

Transmitted herewith are three (3) executed and thirty-seven (37) conformed copies of a Request for a Change to the Technical Specifications of License DPR-6, Docket 50-155, issued to Consumers Power Company on May 1, 1964 for the Big Rock Point Plant.

This proposed change provides operability and surveillance requirements for the modified fuel dry sipping system that is presently being installed at the Big Rock Point Plant. Fuel dry sipping has been routinely performed at the Big Rock Point Plant since the mid-1960s. Modifications to the fuel dry sipping system have been made as a result of reevaluations of this system over the past year. These modifications have been made to improve the operability and safeguards features associated with this system. The first use of the modified system is presently scheduled to occur about January 12, 1976 during the refueling outage.

Ralph B. Sewell
Nuclear Licensing Administrator

CC: JGKeppler, USNRC
File

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8101100164

CONSUMERS POWER COMPANY

12-18-75

Docket No 50-155

Request for Changes to the Technical Specifications

License No DPR-6

For the reasons hereinafter set forth, the following addition to the Technical Specifications of License DPR-6, issued to Consumers Power Company on May 1, 1964 is requested.

I. Add new Sections 10.3.4.4* and 10.4.4.4* as follows:

"10.3.4.4*

Fuel Sipping Equipment

Applicability

Applies to the operating status of the fuel sipping equipment when fuel sipping operations are in progress.

Objective

To assure the operability of the fuel sipping system during fuel sipping operations.

Specification

A. During fuel sipping operations, the controls associated with the sipping can in use shall be operable except as specified in "B" below, or fuel sipping shall be terminated and the sipping can reflooded.

B. (1) Two of three thermocouples shall be operable.

10.4.4.4*

Fuel Sipping Equipment

Applicability

Applies to the periodic testing requirements of the Fuel Dry Sipping System (FDSS).

Objective

To verify operability of FDSS components.

Specification

A. Prior to the commencement of fuel sipping operations, active mechanical and electrical components shall be tested to ensure operability.

*If the draft Technical Specifications submitted March 11, 1975, as subsequently amended, have been approved prior to approval of the change, the number "10" should be deleted.

"(2) The vacuum pump, bubble vent system and temperature recorder need not be operable.

Basis

The purpose of the FDSS is to detect fuel efficiently that is unsuitable for reuse in the reactor such that off-gas release rates can be maintained as low as reasonably achievable during subsequent power operation.

Fuel that is unsuitable for reuse is identified by isotopic analysis of a gas sample drawn from the fuel sipping can following a mild fuel heatup. This heatup is initiated by the displacement of water from the sipping can by the influx of air when a fuel bundle is contained therein.

Automatic controls are provided to ensure that the fuel does not overheat resulting in additional clad perforation. These controls are designed such that no single failure of a component will result in fuel overheating. Periodic testing is performed to assure the operability of these controls."

II. Design Features

The purpose for the FDSS is to detect efficiently failed fuel. Efficient detection of failed fuel will result in low off-gas release rates during power operation and is, therefore, an application of ALAP criteria to sound fuel management. Experience at Big Rock Point highly favors the dry sipping method as the most efficient means to detect failed fuel.

Dry sipping is achieved by inserting a fuel assembly in a can located in the bottom of the spent fuel pool and expelling the water from the can with air pressure. After allowing the fuel assembly to undergo a mild fuel heatup, a gas sample is obtained and the can reflooded. The fuel is appropriately classified based on the results of the analysis of the gas sample.

The primary criterion used in developing the new FDSS has been that no single failure of a single component shall lead to a fuel assembly overheat.

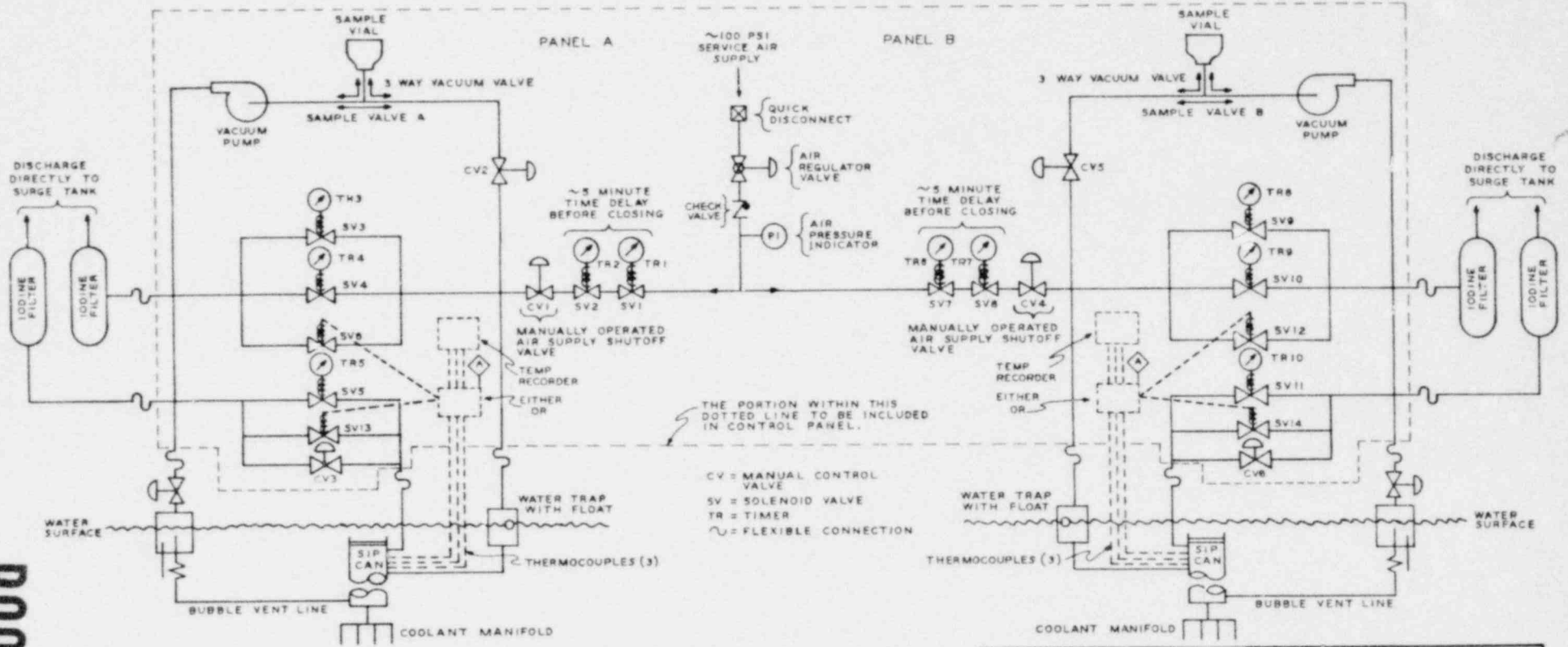
The design features are as follows (refer to Figures 1 and 2 attached):

1. The FDSS depends upon the water pressure differential (static head) between the fuel pool surface and the sipping can air/water interface level to provide the driving force for displacing the air from the sipping can at the conclusion of a sipping cycle (ie, when any or all of the valves SV-3, SV-4, SV-5, SV-6, SV-13, or CV-3 for Panel A are open or similarly for these valves' counterparts in Panel B).

   The FDSS uses multiple orifices at the lower level of the sipping can for water outlet when air is forced into the sipping can at the beginning of a sipping cycle. These same orifices provide water inlets when any one of the above valves is opened allowing reflooding of the can interior. These orifices provide a direct connection between the sipping can interior and the spent fuel pool. The possibility of a single inlet/outlet orifice becoming plugged by debris in the spent fuel pool, and subsequently preventing the desired flow of water, has been identified as a potential cause of abnormal fuel bundle heatup. Providing multiple (ie, redundant) inlet/outlet orifices, dispersed from each other to prevent a single piece of debris from blocking all orifices, is to prevent this incident. Periodic inspections of the inlets/outlets plus the good control of debris in the pool, combined with elevation of these orifices above the pool floor (the pool floor can be considered the ultimate receptacle for pool debris), make the probability of the simultaneous blockage of each of the water inlet/outlet ports for a sipping can negligible.

2. The possibility of the single air supply and air removal line on the sipping can becoming plugged, thus preventing removal of the air from the sipping can at the end of a cycle, has been identified as a problem that could possibly lead to fuel bundle overheat. To avoid the possibility of a single failure of this type causing an accident, a redundant line has been provided. Schematically, the two lines are in parallel and each line has its own primary iodine filter.

   There is an unrestricted, continuously open crosstie between the two iodine filters. This crosstie shall allow flow to be automatically diverted from one iodine filter to the other as resistance to flow through either filter increases.



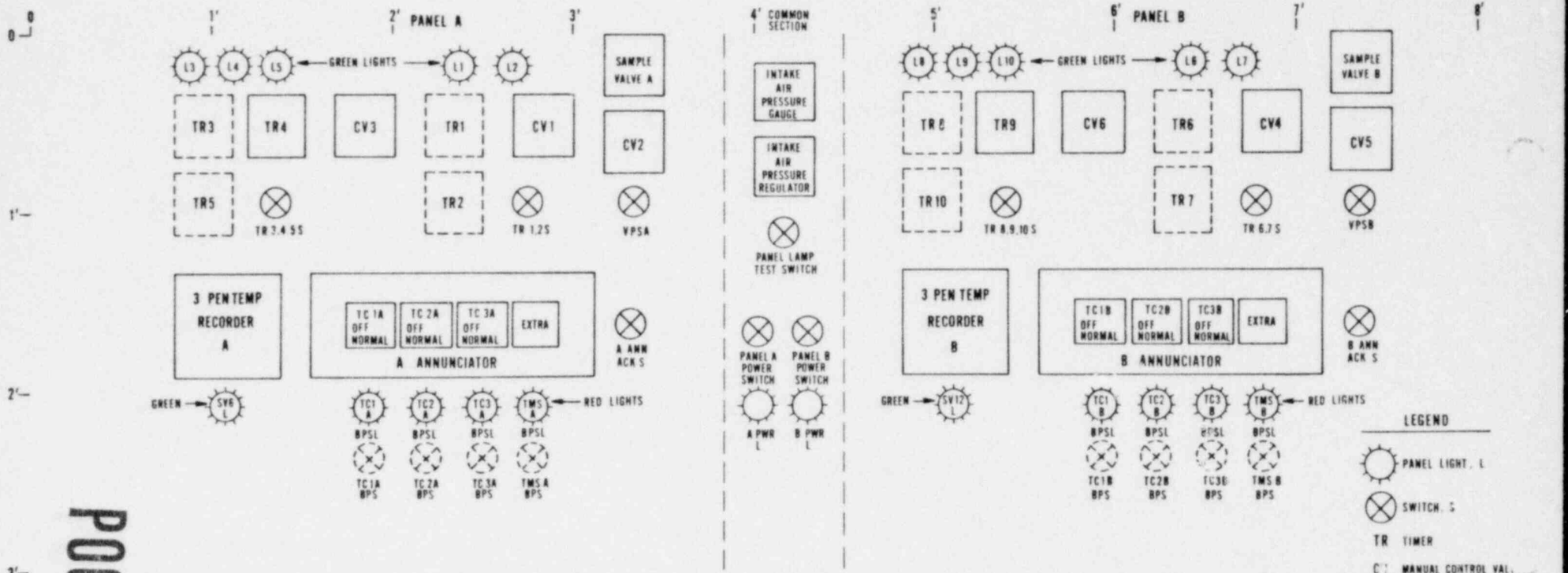
Rev A replaces Rev KEO Nov 18, 1975
Added air inlet line check valve and changed title format KEO 12/11/75

DATE 12/15/75 APP

BIG ROCK POINT PLANT

FUEL DRY SIPPING SYSTEM PIPING SCHEMATICS

CPCo DWG NO: FDSS-PIPSCH-1, Rev A



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Rev A replaces Rev Oct 8, 1975 KEO
minor changes in title format

KEO 12/11/75

DATE 12/11/75 APP

BIG ROCK POINT PLANT

FUEL DRY SIPPING SYSTEM CONTROL PANEL LAYOUT

CPCo DWG NO: FDSS-CPFL-1, Rev A

3. The FDSS will have solid piping within the control panel and beneath the water. This will avoid confusion as to line function, avoid the possibility of kinking one of the lines, avoid tripping over lines by personnel which is a potential personnel hazard, avoid accidentally jerking lines loose from their fittings and condense the space within the pool and on the pool deck occupied by the system. The underwater piping segments will connect to the side of the can directly below the can lid, avoiding interference between the piping and either fuel handling or sipping can lid handling.

   There will be flexible tubing in the system, but the flexible segments will be short and will simply provide the connection between the control panel and the solid piping leading from beneath the water.

4. The FDSS shall have three thermocouples per can. These thermocouples will be located 90° apart at a common plane in the can. These will be located axially near the top elevation of the fuel bundles in the sipping can. The thermocouples will measure air temperature. This will obviously be lower than the cladding temperature. The high temperature alarm set point will be administratively set, based on calculations and previous experience. A high temperature on any one of the thermocouples will actuate visual alarms, plus will actuate valves (eg, SV-6 and SV-13 on Panel A) allowing the can to be reflooded. The redundancy in thermocouples, plus the physical action taken within the system (ie, valve opening) independent of operator action, gives protection from bundle overheat.

   Developing a system which assures that the measuring junction of a thermocouple is directly on the fuel cladding, thus assuring that the measurement being taken is cladding temperature, is difficult. In addition, for various conceptual designs, as the confidence increases that a specific conceptual design will assure contact between the cladding and the measuring junction, so does the probability increase that the conceptual design may cause damage to the fuel bundle or, vice versa, that the fuel bundle may damage the temperature measuring system. Because of the difficulties identified with the concept of assuring fuel cladding to thermocouple contact, the idea of directly measuring clad temperature in the system has been discarded.

5. For protection against operator error relative to reflooding the can at the end of a given sipping cycle, timer actuated valves have been placed on the parallel reflood lines. The primary reflood timer (eg, TR-4 on Panel A) will be set at a time calculated specifically for each fuel bundle. The other two reflood timers (eg, TR-3 and TR-5 on Panel A) provide redundancy and additional protection against accidental overheat of a fuel bundle and will be set relatively conservatively for all bundles potentially available for sipping on at least a daily basis.

   Loss of power to these electric timers assures loss of power to the solenoid valves to which they are connected. These valves fail-open upon loss of power. At the completion of a timing cycle, the timers cut off the power to the valves. These timers do not automatically reset upon loss of power. Upon resumption of power after a power outage during a timing cycle, these timers simply start at the point in the timing cycle where they were interrupted and continue to completion of the cycle.

6. Protection against continual blowdown of the sipping can has been provided in the FDSS. Two timer actuated solenoid valves have been added in series on the air inlet line (eg, TR-1/SV-1 and TR-2/SV-2 on Panel A). This is to avoid possible overheat in the event the operator fails to isolate the sipping can from the inlet air. These timers operate the same as the timers in 5. above, relative to loss of power and cycle completion. These valves fail-closed upon loss of power.

III. Safety Evaluations

A fuel bundle in the dry sipping system is purposefully placed in a dry condition. However, there is no single failure which will allow that fuel bundle to overheat to a point where clad perforation occurs and significant fission products are released to the sipping system. In fact, it takes a combination of five single active component failures plus a failure of an operator to respond to get abnormal heatup. If one assumes that gap activity has been released by abnormal heatup, a positive operator action is required to release the gap activity to the environment.

As the proper operation of this system is dependent on the proper functioning of mechanical equipment, a comprehensive testing schedule is being developed regarding the automatically actuated components in this system. To ensure the testing is performed, the major elements of this testing program are requested to be incorporated in the Technical Specifications.

IV. Conclusion

Based on the foregoing, the Big Rock Point Plant Review Committee and the Safety and Audit Review Board have concluded that this change does not increase the risk to the health and safety of the public.

CONSUMERS POWER COMPANY

By R. A. Lamley
R. A. Lamley, Vice President

Sworn and subscribed to before me this 18th day of December 1975.

Sylvia B Ball
Sylvia B. Ball
Notary Public, Jackson County, Michigan
My commission expires May 18, 1976

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(TEMPORARY FORM)

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DESCRIPTION: Ltr trans the following:

ENCLOSURES: Request for Changes to the Tech Specs Lic. DPR-6 notarized 12-18-75provide operability & surveillance requirements fo the modified fuel dry sipping system....

(3 Orig & 37 CC rec'd)

ACKNOWLEDGED

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