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July 22, 1991
Fort St. Vrain
Unit No. 1
P-91236

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Docket No. 50-267

SUBJECT: 10 CFR 50.59 ANNUAL REPORT SUBMITTAL

REFERENCE: Facility Operating License No. DPR-34

Gentlemen:

This letter transmits the Annual Report of Changes, Tests, and Experiments affecting the Fort St. Vrain Nuclear Generating Station pursuant to Part 50.59(b) of Title 10, Code of Federal Regulations. This report covers the period of January 23, 1990 through January 22, 1991.

If you have any questions concerning this report, please contact Mr. M. H. Holmes at (303) 480-6960.

Very truly yours,

Lawrence Brey

H. L. Brey, Manager
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HLB/DLF/lmb

Attachment

cc: Regional Administrator, Region IV

Mr. J. B. Baird
Senior Resident Inspector
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PUBLIC SERVICE COMPANY OF COLORADO

FORT SAINT VRAIN NUCLEAR GENERATING STATION

ANNUAL REPORT OF CHANGES, TESTS, AND EXPERIMENTS NOT REQUIRING PRIOR COMMISSION APPROVAL PURSUANT TO 10 CFR 50.59

January 23, 1990 through January 22, 1991

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INTRODUCTION

This report is submitted to comply with the requirements of Part 50.59(b) Title 10, Code of Federal Regulations, as they apply to Fort St. Vrain Nuclear Generating Station, Unit No. 1. It includes the period of January 23, 1990 through January 22, 1991.

The following defines certain activities contained in this report:

Change Notice (CN) - A document containing installation, inspection and testing requirements, design background information, and design document updating requirements which specify the design control requirements applicable to a plant modification and authorizes changes to "as-built" plant design documentation.

Document Change Notice (DCN) - A document which authorizes a change to design documents. As a minimum, it contains a design input statement, a design analysis statement, a document update list and the document update information.

Setpoint Change Report (SCR) - A document which authorizes setpoint changes which do not constitute an alteration to the design of the affected equipment.

T-Tests - Special tests proposed and conducted by Public Service Company of Colorado.

The following is a list of abbreviations used in this report:

AC - Alternating Current

ACM - Alternate Cooling Method

CA-AR - Corrective Action Report

CRD - Control Rod Drive

DCCF - Document Change Coordination Form

EMF - Electro Motive Force

EQ - Environmental Qualification

FHM - Fuel Handling Machine

FPPP - Fire Protection Program Plan

FSAR - Final Safety Analysis Report

FSV - Fort St. Vrain

HELB - High Energy Line Break

HVAC - Heating, Ventilating, and Air Conditioning

LCO - Limiting Condition for Operation

LER - Licensee Event Report

LTA - Low Temperature Adsorber

MCC - Motor Control Center

P&I - Piping and Instrument Drawing

PCRV - Prestressed Concrete Reactor Vessel

PPS - Plant Protective System

RERP - Radiological Emergency Response Plan

SOP - System Operating Procedure

SR - Surveillance Requirement

The following defines terms used in safety evaluation summaries contained in this report:

Enhanced Quality

Items for which quality program requirements have been identified, but which are not safety related. This includes non-safety related fire protection (System 45, excluding safety related portions), portions of the Independent Spent Fuel Storage Installation (ISFSI), Security (System 78, excluding Gai-Tronics), and packaging and transportation of radioactive materials.

Safety Related

Those plant systems, structures, equipment and components which are identified by the FSAR and as detailed and supplemented by applicable P&I drawings, "IB" and "IC" diagrams, "E" and "E-1203" schematic diagrams, the Cable Tab, SR-6-2 and SR-6-8 lists to include the following:

a) Class I per the FSAR, Table 1.4-1

b) Safe shutdown components per the FSAR, Table 1.4-2

c) Alternate Cooling Method (ACM) system

EXCEPTION: The ACM system is exempt from requirements for seismic and environmental qualification.

Safety Significant

Changes to the facility, systems, components, or structures as described in the FSAR that may do any one of the following:

a) affect their capability to prevent or mitigate the consequences of accidents described in the FSAR;

b) could result in exposures to plant personnel in excess of occupational limits.

Changes in the safety related systems which involve the addition, deletion, or repair of components, structures, equipment, or systems such that the original design intent is changed (i.e., changes in redundancy, performance characteristics, separation, circuitry logic, control, margins of safety, safe shutdown, accident analysis) or any change that would result in an unreviewed safety question or require a Technical Specification change.

Unreviewed Safety Question

Any plant modification or activity that is deemed to involve an unreviewed safety question as defined in 10 CFR 50.59:

a) if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the FSAR may be increased; or

b) if the possibility for an accident or malfunction of a different type than any evaluated previously in the FSAR may be created; or

c) if the margin of safety as defined in the basis for any Technical Specification is reduced.

Background:

The following is a brief discussion of the changes, tests, and experiments affecting the Fort St. Vrain Nuclear Generating Station Final Safety Analysis Report or Fire Protection Program Plan in the time period from January 23, 1990 to January 22, 1991 that have not been previously reported to the Nuclear Regulatory Commission (NRC). It should be noted that many of the activities discussed in this report are directly related to the permanent shutdown condition of the FSV reactor and the eventual defueling and decommissioning of the plant.

1.0 CHANGE NOTICES (CN)

CN-2093

System 62/Radioactive Liquid Waste System
System 72/Reactor Building
System 75/Turbine Building

CN-2093 was initiated to identify open drains in the Reactor Building and appropriately mark each drain as to its destination, i.e., the Liquid Waste Sump or the Reactor Building Sump. This activity had no physical effect on any plant system. Personnel awareness and understanding of drain destinations was enhanced.

FSAR Figure 11.1-1 was updated to show the identified drains. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-2154

System 48/Alternate Cooling Method
System 92/Accessory Electrical Equipment

CN-2154 installed number tags on certain circuit breakers, protective relays and the Main Power Transformer. Neither the design function nor the operation of the equipment was affected and no physical changes were made to the equipment. Field identification of the electrical equipment was enhanced.

FSAR Figures 8.2-5 and 8.2-7 were revised to provide correct nomenclature only. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2374B

System 70/Structures-General

CN-2374 and CN-2374A installed pinlock lugs at the west end of the Reactor Building Crane runway girder and pinlock systems to restrain the crane bridge and trolley against maximum tornadic wind. The pinlock supports on the crane were also modified to withstand a maximum tornadic wind. These modifications were reported in the 10 CFR 50.59 Annual Report submittal in July, 1990. FSAR Section 9.2.1.3 was also revised to address the modifications.

CN-2374B was issued to revise the Safety Evaluation (SE) only. The SE identified and justified a condition stated in CN-2374A. The condition requires pinlocking the crane at the West end of the Reactor Building (RB) during tornado warnings, or when there is no qualified RB crane operator on site, only during the months of May through September. The occurrence of tornadic wind speeds greater than 202 mph during the remaining months was not considered to be credible.

FSAR Section 9.2.1.3 has been revised to indicate the condition stated above. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2686A

System 42/Service Water System
System 52/Turbine Steam
System 84/Auxiliary Boiler System

CN-2686A installed a steam sampling station on the steam outlet of the Auxiliary Boilers. Installation of the sampling point was intended to enhance the chemistry control program and reduce chemistry related problems caused by Auxiliary Boiler steam. This activity did not directly affect any safety functions, but the ability to provide contaminant free steam to various systems/components without concern over unexpected material failures is important.

FSAR Section 10.2.4 has been revised to indicate that steam sources are sampled. FSAR Section 10.2.6 has been revised to indicate that the steam supply header to the 150 psig steam header is sampled. This activity was not safety related or safety significant, and did not involve an unreviewed safety question

CN-2704 and CN-2704A

System 44/Domestic Water System
System 62/Radioactive Liquid Waste System

CN-2704 permanently installed ultrasonic cleaning equipment in a room adjacent to the laundry facility on Level 3 of the Reactor Building. The Domestic Water System was modified to include hot and cold water capability to the facility. The cleaning system is used primarily for decontamination of such items as tools, valves and other plant equipment.

CN-2704A was issued to update applicable documents and place the O&M manuals in the Records Center.

FSAR Figure 1.2-9 was revised to show the location of the new ultrasonic cleaning equipment. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2721 and CN-2721A

System 11/Prestressed Concrete Reactor Vessel
System 23/Helium Purification System

CN-2721 permanently installed cable, terminal blocks and an E/I (Voltage to Current) converter in Control Room Cabinet I-03 to change the controlling signal to FV-2339 (Helium Purification System Flow) during depressurized reactor operations. Output of PDT-1156 (Reactor Pressure Low Range) is then used to maintain subatmospheric conditions in the PCRV.

CN-2721 provided a helium flowpath for maintaining subatmospheric conditions in the PCRV following equalization and pumpdown of the PCRV using the helium purification and storage systems. The primary function of this configuration is to maintain PCRV pressure at or below atmospheric conditions during PCRV internal maintenance and during fuel handling inside the PCRV. The PCRV is maintained at subatmospheric conditions to prevent the outleakage of primary coolant and potential release of activity.

CN-2721A was issued to correctly mark the Safety Evaluation as a safety related modification. The original issue of the CN contained appropriate safety related design analyses.

FSAR Section 9.4 has been revised to identify the new mode of operation to maintain PCRV pressure at or below atmospheric. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2888

System 70/Structures-General

CN-2888 provided the mechanical work to install a new platform and double door, and modify the access stairs on the refueling floor. This new door, Door 106, replaced an existing single door on the "J" Wall between the Reactor Building and Turbine Building. The new door provides improved access to a maintenance storage area on the Turbine Building side of the Wall. The FSV Security Department controls the key that will unlock Door 106 and magnetic switches are used to alarm the door. LCO 4.5.1 requirements to maintain Reactor Building integrity continue to be met.

FSAR Figure 1.2-5 has been revised indicating the location of the double door. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2935

System 92/Accessory Electrical Equipment

CN-2935 installed the necessary hardware, instrumentation and control, and protective relaying circuits to support the installation of a new 230 kv transmission line to the switchyard south of the FSV plant. The addition of this new 230 kv line (Ault Line) provides FSV with a total of six separate offsite power sources.

FSAR Sections 1.2.2.9, 8.2.1.1, 8.2.1.2, 8.2.3, 8.2.5.2, 10.3.1, Criterion 39, and FSAR Figures 1.2-4, 8.2-2, and 8.2-3 have been updated to address the addition of the new 230 kv offsite source. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2939

System 11/Prestressed Concrete Reactor Vessel
System 13/Fuel Handling Equipment
System 23/Helium Purification System Water System
System 46/Reactor Plant Cooling Water System
System 62/Radioactive Liquid Waste System
System 73/Reactor Plant Ventilation System

CN-2939 installed equipment, piping, instrumentation, and controls to enhance PCRV pressure control and expedite reactor defueling efforts. Generally, the changes were as follows:

1. Addition of a pressure differential controller in the Control Room for PCRV pressure control.

2. Addition of equipment/piping needed to allow draining of the System 23 Front End Coolers (FECs) at PCRV pressures of near atmospheric or below. The FECs will be utilized for primary coolant moisture removal if moisture content is in excess of approximately 45°F dewpoint.

3. Provide a flow path for the FHM vacuum pump discharge directly to System 73. This decreases the time required to pump down the Fuel Handling Machine (FHM) or Auxiliary Transfer Cask during the defueling process. The normal discharge path to System 63 Radioactive Gas Waste System remains an option.

4. Provide chilled water from existing chiller units to the FHM vacuum pumps. Vacuum pump reliability is improved by reduction/elimination of high temperature trips.

5. Utilization of existing electrical cables previously used in conjunction with the Helium Circulator Nitrogen Pressurization System (NPS). NPS components are no longer used or needed.

6. Finally, CN-2939 was used to make permanent a temporary configuration. Electrical jumpers which allow continuous operation of a chiller unit during low heat load situations were made permanent. Also, due to low heat loads, an electrical lead was lifted to disable one stage of the chiller unit compressor.

Refer to CN-2983 for additional modifications related to the new pressure control system.

FSAR Sections 9.1, 9.4, 9.7, 11.1, and Figures 9.1-8 and 9.7-2 and 11.1-1 were revised to discuss the modifications and indicate process flows. A new Figure 9.4-3 was created to show the overall process flow for PCRV pressure control during defueling. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2953

System 23/Helium Purification System

CN-2953 provided for the structural modification of the System 23 regeneration pit to support the Fuel Handling Machine (FHM) during seismic and tornado events. The modification also resulted in a facility that can function as a FHM defueling element loading port and a spent fuel shipping cask (SFSC) loading port.

FSAR Sections 1.2.2.1, 9.1, 9.4 and 9.2.11.3.3 were revised to indicate the new functions the regeneration pit can be used for during defueling. Also, the handling of Reactor Isolation Valves and SFSCs over the regeneration pit has been addressed. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2959

System 16/Auxiliary Equipment

CN-2959 installed a system to receive defueling elements (DFEs) in the System 23 regeneration pit and then move the DFEs via conveyor to a position where they can be loaded into the Fuel Handling Machine (FHM). The FHM is then used to load DFEs in reactor core regions which have been defueled. Use of the system will reduce personnel exposure to radioactive contamination which may be present in the area.

FSAR Sections 9.1, 9.2, and 9.4 have been revised to reflect the use of the regeneration pit for the benefit of the defueling process. FPPP Section FP.3.1.4 has been updated to indicate the changes to the regeneration pit. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2963

System 48/Alternate Cooling Method

CN-2963 replaced the backup reactor plant exhaust monitor (PING-1) with an upgraded unit (PING-1A). The PING-1 is no longer manufactured and spare parts are very difficult to acquire. The PING-1A is used only as a backup to the normal exhaust stack monitors. The PING-1A is a beta particulate, iodine and a noble gas monitor.

FSAR Sections 7.3.5.2, 8.2.8.3, Tables 7.3-2 and 8.2-9, and Figure 7.3-16 have been updated to reflect the new PING-1A monitor. Section 7.3.5.2 was revised to delete reference to a precise sample volume of 250 cc. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-2969

System 24/Helium Storage System
System 29/Gas Charging Facility

CN-2969 modified System 29 such that the existing Helium Compressor, C-2901, and associated suction and discharge piping could be utilized to pump down helium tube trailers and maintain helium inventory requirements in the helium storage tanks and helium supply tanks. Also, the helium tube trailer connection was relocated to the east side of the Reactor Building Chiller Building. The connection was on the east side of the Helium Storage Building. The modification allows pumping down helium tube trailers to a lower pressure and reduces congestion in the area between the Helium Storage and Reactor Building Chiller Buildings.

FSAR Section 9.5 and figure 9.5-1 have been revised to reflect the modification. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2971

System 16/Auxiliary Equipment

CN-2971 modified the Hot Service Facility (HSF) concrete cover slab to support the Fuel Handling Machine (FHM) during seismic events while not attached to the Reactor Building Crane (RBC). Also, the HSF was modified to accept and support a Spent Fuel Shipping Cask (SFSC). This modification allows the HSF to be used as an alternate SFSC loading port and would free up the RBC to handle other loads. This allows more efficient use of time and resources during defueling.

FSAR Sections 1.2.2.1, 9.1, 9.2.11.3.3, and 9.4 have been updated to discuss the HSF modifications as they relate to the defueling process, and handling of heavy loads over the HSF. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-2979

System 19/Special Tools And Equipment

CN-2979 constructed an alternate shielding device, designated a Mini-Auxiliary Transfer Cask (MATC), and a Fuel Shipping Cask (FSC) inner lid inspection and cleaning device (ICD). The MATC and ICD are used to perform the same functions previously performed by the Auxiliary Transfer Cask (i.e., preparing a FSC for spent fuel loading and shipping by removing/installing the FSC inner lid and cleaning the cask sealing surface).

The MATC is used on the existing spent fuel loading port and the two new alternate spent fuel loading ports located in the regeneration pit and the Hot Service facility (reference CN-2953 and CN-2971 in this report). The MATC is handled by either of two jib cranes installed by CN-2975 (1990 10 CFR 50.59 Report). The jib cranes relieve the Reactor Building Crane from repeated handling of equipment for FSC loading.

Existing Reactor Isolation Valves (RIVs) are utilized to support the MATC. The MATC and RIVs provide radiation shielding for workers using them.

FSAR Sections 9.1.2.2.4 and 9.1.3 have been revised to discuss the use of the MATC and ICD. New FSAR Figures 9.1-13 and 9.1-14 have been created to show the new equipment. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-2983, 2983A, 2983B

System 24/Helium Storage System

CN-2983 and CN-2983A installed a new building on the West wall of the Helium Storage Building, and two skid mounted compressor/dryer units for the pressure control and conditioning of primary coolant helium during defueling. The helium can be recycled to System 24 to minimize helium makeup requirements. The installation interfaces with several other systems for air, water drainage, service water, and electrical supplies. Lighting was added for security considerations. Space heaters, ventilation fans and fire protection components were also added.

CN-2983B replaced pressure switches on the skid mounted units with an improved model compatible with expected conditions. Miscellaneous documents were also updated.

FSAR Sections 9.4 and 9.5 were updated to describe operation of the new equipment/system, indicate elimination of System 23 interlocks, indicate the Helium Transfer Compressor (HTC) is no longer in operation, change transfer capacity and system pressures, and provide a system description. Section 14.8 was changed to update discussions on interlocks, leakage potential and valve operation. FSAR Figures 1.2-2, 1.2-8, and 1.2-4 were revised to indicate the location of the new building. Figure 9.4-2 was created to indicate a change in a tie valve normal position.

Figure 9.5-1 was revised to show the new system/components and indicate that the HTC is no longer operational. Figure 11.1-2 and 11.1-3 were revised to indicate new and revised gas waste flow paths.

FPPP Section FP.3.26 was created and Table FP.2.8-1 was revised and a new Figure FP.2.8-53 added to describe the new fire area in the Fire Hazards Analysis, add the new building to the Fire Area Summary Evaluation and show the building and contents on a diagram, respectively. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-3006

System 84/Auxiliary Boiler System

CN-3006 derated the Auxiliary Boiler, S-8401, to approximately 15,000 lbm/hr from 45,000 lbm/hr. This activity was undertaken as a result of an evaluation of the applicability of the requirements of 10 CFR 50.49 (environmental qualification) during defueling. The evaluation concluded that no harsh environments will exist during defueling, provided the auxiliary steam system is modified to limit steam flow to 15,000 lbm/hr and steam temperature to less than 650°F. Environmental qualification of plant instruments in accordance with 10 CFR 50.49 is no longer required since there are no accidents that will result in harsh environments during defueling of FSV.

Redundant pressure switches were installed to monitor feedwater flow and temperature switches were installed to monitor boiler outlet temperature. Upon actuation of a switch, the boiler fuel oil pumps are tripped and the boiler shut down. This ensures that analyzed steam conditions of 650°F and 15,000 lbm/hr cannot be exceeded.

FSAR Section 10.2.6 was revised to indicate the derated auxiliary boiler conditions. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-3011

System 13/Fuel Handling Equipment

CN-3011 changed the Z-drive (vertical) hydraulic oil servo valve on the FHM. The old valve was unreliable and a discontinued model. The CN also added two oil reservoirs to ensure a continuous oil supply to the servo valves and servo pumps.

FPPP Section FP.3.1.13 was revised to include the additional fire loading due to the installation of the hydraulic oil reservoir. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-3017

System 13/Fuel Handling Equipment

CN-3017 modified the FHM mast camera cooling circuit to allow camera cooling at any FHM location. The FHM mast camera provides a means of monitoring remote fuel handling operations or visual inspections without personnel exposure to radiation. The coolant medium, helium, allows extended operation without compromising the camera, mirror, or lights.

FSAR Sections 9.2.4.2 and 9.2.4.3 were revised to address the changes in cooling system control interlocks. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-3018

System 14/Fuel Storage Facility

CN-3018 modified Fuel Storage Well (FSW) cooling water fixed flow switches to alarm at a minimum of 7 gpm instead of approximately 6 gpm. Amendment No. 75 to the FSV Technical Specifications established the new minimum cooling water flow requirement of 7 gpm. This modification ensures compliance with FSAR analyses in Sections 14.6.3.2 and 9.1.2.3 and the Technical Specification Amendment.

FSAR Criterion 67 has been revised to indicate the increased flow rate. This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

CN-3019

System 42/Service Water System

CN-3019 was issued to replace the System 42 chlorinator and chlorine storage cylinders with a halocide tablet feeder system. This eliminated the need for chlorine gas monitors, Technical Specifications and associated emergency response plans. Personnel safety is improved and compliance with NUREG-0737, Item III.D.3.4 is maintained.

FPPP Section FP.3.25 (previously Section FP.3.26) and Figure FP.2.8-52 have been revised to delete references to chlorine and add discussion on the halocide system. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-3026

System 25/Nitrogen System

CN-3026 was a result of the Engineering Evaluation (EE) for removing System 25 from operational service, EE-25-0001. This CN removed the outside LN2 tanks (T-2507/08) from the site and returned them to Liquid Air Corporation, from whom they were leased. Associated outside LN2 piping was cut to accommodate the removal. Piping which delivered nitrogen to equipment inside the Reactor Building (RB) was cut and capped inside the building. Return piping was cut and isolation valves locked closed to maintain RB integrity.

FSAR Section 9.6 has been updated to discuss the purpose and operational status of System 25. FSAR Figure 9.6-2 has been updated to indicate valve/piping configurations. This activity was safety related, but did not involve an unreviewed safety question.

EE-25-0001 determined that removal from operational service of System 25 was safety significant due to the effects on the primary coolant dewpoint moisture monitors and their ability to initiate plant protective system actions. FSAR Section 7.3.2.2 provides a detailed discussion of the dewpoint moisture monitoring system.

CN-3030

System 22/Secondary Coolant System
System 31/Feedwater and Condensate
System 41/Circulating Water System
System 52/Turbine Steam
System 75/Turbine Building

CN-3030 positively isolated certain lines into the main condenser to assure a dry lay-up of the main condenser and enhance preservation. Following the permanent shutdown of the FSV reactor, the decay heat removal exchanger (E-4202) is capable of removing heat from the secondary coolant system. The main condenser is no longer required. Lines from the steam generator reheaters, turbine water drain tank, helium circulator emergency bearing water accumulators, main turbine steam system, and the two small condensate pump discharge vents have been isolated.

FSAR Sections 4.2.4 and 10.2 have been revised to reflect the line isolations listed above. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

CN-3033

System 93/Controls and Instrumentation

CN-3033 modified the control rod drive test panels such that control rod drive brakes cannot be energized without the insertion of a modified test plug into an individual rod's test jack. Only two test plugs were modified to ensure that only two rod pairs may be withdrawn at any time. Rod scram capability was not affected.

FSAR Sections 3.8.1.1.1 and 3.11.2.3 were revised to describe the new control rod drive circuitry modifications. This activity was classified safety related and safety significant, but did not involve an unreviewed safety question. The activity was safety significant due to the change in the rod control circuitry.

CN-3034

System 72/Reactor Building

CN-3034 removed one and five micron filters from the Reactor Building Sump discharge line. The filters were originally installed by CN-2313 as reported in the 1988 10 CFR 50.59 Annual Report submittal. The filters were installed for an in-line Beta monitoring system. After evaluation by PSC, both PSC and the NRC agreed that the system was not feasible. The one and five micron filters were first removed by Temporary Configuration Reports, TCR 88-07-11 and TCR 88-07-11-A, respectively. This CN-3034 returned the system to its original configuration.

FSAR Section 11.1.2.2 was revised to remove references to these filters. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

2.0 DOCUMENT CHANGE NOTICES

DCN-171

System 21/Primary Coolant System

DCN-171 was issued to update various documents associated with setpoint changes and in at least one case, a change in control parameters from pressure to temperature. Helium circulator steam/water drain automatic backpressure control is now controlled with feedback from circulator lower bearing housing temperature sensing elements.

FSAR Section 4.2.2.3.5 and Figure 4.2-12 have been revised to reflect the change in control parameters. This DCN was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

DCN-294

System 92/Accessory Electrical Equipment

DCN-294 revised the cable tab data base for consistency with the text of the cable tab (I-9301-700) and to correct and update other errors in the text.

FSAR Section 8.2.7 was changed to remove "separated" from the list separation classifications and add "segregated" to that list. This DCN was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

DCN-334

System 13/Fuel Handling Equipment

DCN-334 updated documents associated with various setpoint changes. CN-1822 added a pressure switch and alarm function to indicate when pressure in the Fuel Handling Machine (FHM) reached approximately 5 psig. The FHM is designed for a maximum of approximately 8 psig. This DCN adds the new setpoint to appropriate documents.

FSAR Section 9.1.1.2.1 has been revised to indicate the FHM pressure switch setpoint. This DCN was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

3.0 SETPOINT CHANGE REPORTS (SCR)

SCR 90-016

System 24/Helium Storage System

SCR 90-016 lowered the setpoints of the High Pressure Helium Supply Tank (T-2402) pressure switch. The purposes of the switch are to alert Operations personnel of high pressure when filling the tank or low pressure when helium is being used from the tank. Primary usage during power operation was as a reserve supply of high pressure helium for the helium circulators' buffer system on loss of the normal buffer helium supply. The primary user during defueling will be the Fuel Handling Machine. The pressure switch provides alarm function only. With the FSV reactor permanently shutdown and depressurized, helium supply requirements are significantly reduced.

FSAR Sections 4.2.2.3.2, 9.5.2, and 9.5.5 have been revised in accordance with the new setpoints. This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

4.0 SPECIAL TESTS (T-TESTS)

T-310

System 11/Prestressed Concrete Reactor Vessel

Purpose: T-310 was initiated to determine the affects on moisture of helium purge flow through helium circulator and steam generator penetration interspaces. A purified helium source supplies the penetration interspaces. A bleed line and moisture indicator/transmitter were installed on the appropriate interspace(s). On a regular basis, helium flow rate and moisture content were recorded for analysis.

Results: There was a strong correlation between purge flow through the penetration interspaces and the detected moisture in these interspaces. Relative flow rates were less consequential than "flow versus no-flow" comparisons. In other words, compared to no-flow (stagnant) conditions, minimal flow through the interspaces caused the moisture to drop significantly, but flow rates above the minimum had little additional benefit.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-394

System 21/Primary Coolant System

Purpose: T-394 was initiated to functionally test the controls of the Loop 1 and Loop 2 Helium Circulator steam turbine bypass valves and as many instruments as possible associated with feedwater flow and the circulator bypass valves. The test required the plant to be shut down and associated instrument availability evaluated. The test introduced various signals and monitored instrument outputs and/or bypass valve movements to verify correct operation.

Results: T-394 was performed on Loop 2, but was not completed on Loop I prior to permanent shutdown of the plant in August, 1989. Since the circulator bypass valve control system is required for steam operation and generally used above 30% reactor power, the test has been closed out and placed in the Records Center.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-437

System 33/Water Treatment

Purpose: T-437 was performed to determine the appropriate pressure setting for a relief valve on the discharge of the ammonia supply pumps. The relief valve lifted prematurely preventing the addition of ammonia to the water treatment anion tank.

Results: The data collected showed that the operating pressure is dependent on the flow rate and pressure of the ammonia dilution water. At a flow rate of 50 gpm and 80 psi the discharge pressure of the ammonia pumps was 40 psi. The test was concluded after taking three data points because the practice of converting the polisher resin to the ammonia form was discontinued.

This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

T-442

System 13/Fuel Handling Equipment

Purpose: T-442 was to install two oil reservoirs, one connected to each of the vertical (Z) drive hydraulic pumps on top of the Fuel Handling Machine (FHM) and to verify that they will act as expansion reservoirs. The problem to be addressed was system leakage due to hydraulic fluid expansion with increased temperature, and subsequent pump cavitation due to air in the system.

Results: The vented hydraulic oil expansion reservoirs greatly improved the operation and reliability of the FHM Z drive pumps, which increased the reliability of the FHM. The reservoirs were permanently installed via CN-3011, also documented in this report.

This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

T-443

System 13/Fuel Handling Equipmont

Purpose: The Theta (T) drive of the Fuel Handling Machine (FHM) has exhibited overshoot and runaway problems which may have resulted from the speed at which the T drive operated. T-443 installed larger capacitors which slowed the T movement. Data was collected before and after the new capacitors were installed.

Results: The slower T movement eliminated the runaway and overshoot problems which was the primary goal of the test.

This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

T-444

System 11/Prestressed Concrete Reactor Vessel
System 21/Primary Coolant System
System 31/Feedwater and Condensate

Purpose: T-444 collected data related to pressure of the condensate system at various points, reactor pressure, helium circulator inlet temperature, helium circulator pelton nozzle pressure, and helium circulator RPM.

Results: The data permitted determination of pelton water piping flow loss coefficients, the consequences of which allowed accurate pelton performance evaluatiors based upon Emergency Water Booster Pump discharge pressure indications. The resultant helium circulator speed was within two percent of the actual speed, as expected.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-445

System 18/Core-Fuel

Purpose: T-445 was issued to determine the neutron source strength and specific location required of an external neutron source to maintain adequate Startup Channel count rate during defueling of the last nine regions of the FSV reactor core.

T-445 inserted a test source near each startup channel detector (one at a time) at varying distances from the detectors, and monitored the responses of the Startup Channel instrumentation. The test sources were removed following the collection of data. The data was recorded and used as a guide in determining source size.

Results: It was determined that two small neutron sources will be needed when the FSV reactor has reached a configuration with only nine fueled regions remaining. Equipment should be des gned/fabricated to provide for insertion of the sources i to each check source guide tube.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-446

System 13/Fuel Handling Equipment

Purpose: T-446 was initiated to verify the design and performance of a new interface between the Fuel Handling Machine (FHM) analog controls and the FHM control computer and grapple head displays. The Raytheon Miniverter was the obsolete system being used. A modern analog to digital converter design for the FHM was proposed.

Results: The test confirmed that the new design was acceptable and the performance was very good. CN-3021 has been initiated to complete the design modification.

This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

T-447

System 23/Helium Purification System

Purpose: T-447 was performed to verify that the helium purification system regeneration pit modification (CN-2953) would accommodate the loading of spent fuel into a spent fuel shipping cask (SFSC) and to verify proper fit-up of the SFSC bottom support socket.

Results: The completion of T-447 provided verification that the regeneration pit as modified by CN-2953 will provide an additional SFSC loading port. T-447 satisfactorily verified that the new regeneration pit loading port will adequately accept the installation of a SFSC, the installation of a Reactor Isolation Valve, the removal of the SFSC inner lid using the Auxiliary Transfer Cask, and the loading and unloading of a dummy fuel element within the SFSC utilizing the Fuel Handling Machine.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-448

System 11/Prestressed Concrete Reactor Vessel

Purpose: This test compared the indications of two individual manometers which monitor PCRV pressure during defueling conditions. One pressure tap was from an instrument penetration on level 5 1/2 (approximately 4805 ft.) of the Reactor Building and the other on the Refueling Floor, elevation 4881. The purpose of the comparison was to verify that the pressure readings were the same for the different tap locations.

Results: Comparison of the two manometer readings was generally very consistent. However, due to flow through the piping, the upper manometer was considered unreliable for a reactor pressure reading. The lower manometer was more consistent throughout all normal operations of reactor pressure control equipment. The tap on level 5 1/2 was recommended for the tap location for local PCRV pressure indication.

This activity was not safety related or safety significant, and did not involve an unreviewed safety question.

T-449

System 93/Controls and Instrumentation

Purpose: T-449 pre-tested a proposed modification to the control rod drive brake circuitry. The circuitry was modified so as to maintain a selected rod pair drive brake deenergized at all times. A modified test plug was installed in the selected region's jack on the rod drop panel.

Results: Following successful completion of the test, CN-3033 permanently installed the modification.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-450

System 15/Fuel and Reflector Elements

Purpose: This test verified that average fuel temperatures could be maintained between 80 degrees F and 220 degrees F when forced circulation was provided with all defueled regions' orifice valves fully open. Primary and secondary coolant flows were maintained during the test. These temperature limits were committed to in PSC Letter, Crawford to Weiss, dated October 9, 1990 (P-90310).

Results: The test demonstrated that the fuel temperatures could be easily controlled by circulator speed and feedwater flow with defueled regions' orifice valves fully open. The cooling capability is adequate to allow complete control rod orifice valve removal if desired.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

T-451

System 92/Accessory Electrical Equipment

Purpose: T-451 tested FSV Site underground diesel storage tanks T-8401, T-8402 and T-9201. The test was designed to verify compliance with EPA and State of Colorado underground storage tank regulations.

Results: The test results provided by a testing contractor indicated that the three tanks and associated underground piping were leak free and comply with EPA and State of Colorado underground storage tank tightness regulations.

This activity was classified safety related, but was not safety significant and did not involve an unreviewed safety question.

5.0 PROCEDURES

AOP-F, Issue 1

System 92 Accessory Electrical Equipment

Abnormal Operating Procedure (AOP) -F, Restoration of Essential Electric Power, replaces Emergency Operating Procedure (EOP) -6. With the permanent shutdown and depressurization of the FSV reactor in August, 1989, it is no longer warranted to enter an emergency situation due to an Interruption of Forced Circulation (IOFC). The EOPs were based on full power operation. The remaining revised EOPs are based on the permanent shutdown condition of the plant and cover the critical safety functions of Reactivity (EOP-1) and Radioactive Release (EOP-5). AOP-F provides the instructional steps to restore electric power to the 480 VAC essential buses.

FSAR Sections 8.2.8.4 and 12.3.2.6 have been revised to discuss the procedural changes for accomplishing PCRV liner cooling and ACM backfeed, and the new EOP set.

This activity was classified safety related and safety significant, but did not involve an unreviewed safety question.

This procedure is considered to be safety significant since its use affects the capability to prevent or mitigate the consequences of accidents described in the FSAR.

AOP-V, Issue 1

System 11/Prestressed Concrete Reactor Vessel

AOP-V, Restoration of PCRV Integrity, replaces EOP-4. A challenge to the integrity of the PCRV is considered an abnormal situation for the shutdown conditions of the plant and does not pose an immediate threat to the health and safety of the public. As such, PCRV integrity is not defined as a critical safety function. This procedure provides the instructional steps to restore the PCRV integrity to acceptable limits following a challenge. FSV Technical Specification LCO 4.7.1 requires PCRV pressure to be maintained less than 1 (one) psig given the PCRV conditions during defueling. This, combined with the extremely low radioactivity levels in the primary coolant, allow the postulated loss of PCRV integrity to be downgraded to an abnormal occurrence versus an emergency situation.

FSAR Section 12.3 discusses the FSV procedure infrastructure and has been updated to discuss the new set of EOPs.

This activity was classified safety related and safety significant, but did not involve an unreviewed safety question.

This procedure is considered to be safety significant since its use affects the capability to prevent or mitigate the consequences of accidents described in the FSAR.

EOP-2, Issue 4

System 22/Secondary Coolant System

EOP-3, Issue 4

System 21/Primary Coolant System

EOP-4, Issue 4

System 11/Prestressed Concrete Reactor Vessel

In accordance with Administrative Procedure G-2, EOP-2 "Restoration of Secondary Coolant Critical Safety Function", EOP-3 "Restoration of Primary Coolant Critical Safety Function", and EOP-4 "Restoration of PCRV Integrity Critical Safety Function" have been processed to an "Issue Last" status. It is recognized that removal of decay heat from the fuel continues to be important. However, due to the low levels of decay heat generation, loss of decay heat removal no longer constitutes an emergency condition. Technical Specification LCO 4.0.4 permit planned interruptions of forced circulation for up to 21 days with existing decay heat levels. Likewise, maintaining containment of helium surrounding the fuel continues to be important. However, a breach of this containment no longer constitutes an emergency condition due to the extremely low levels of radioactivity in the helium, containment of long-lived fission products in the fuel particles, and the fact that loss of primary coolant does not have the potential to drastically reduce decay heat removal capability, as was the case when the reactor was operating at power.

Relying only on PCRV liner cooling (System 46), reactor coolant boundary components can be maintained at safe temperatures and EOP-2 and EOP-3 may be placed in Issue Last status. It is no longer necessary to establish secondary and primary cooling to the reactor to assure nuclear safety.

EOP-4 has been replaced with AOP-V, as explained above.

FSAR Section 12.3.2.6 has been revised to reflect the changes to the FSV EOPs described above. This activity was classified safety related and safety significant, but did not involve an unreviewed safety question.

Processing of EOP-2, EOP-3, and EOP-4 to an Issue Last status affects their capability to prevent or mitigate the consequences of accidents described in the FSAR, which were credible when the reactor was operating at power. However, as explained in the safety evaluation for this activity, the accidents which EOP-2, EOP-3, and EOP-4 would mitigate are either not possible, or do not pose a threat to the health and safety of the public, under defueling conditions. Therefore, this activity was considered safety significant.

EOP-1, Issue 4

System 12/Control Rods And Drives
System 93/Controls And Instrumentation

EOP-1, Restoration of Reactivity Critical Safety Function, provides instructions to the operators for dealing with a hypothesized criticality accident or approach to criticality, even though such an event is no longer considered credible at FSV. The basic philosophy of EOP-1 is unchanged from previous issues, only the action sequence is slightly different. The revised action sequence should result in insertion of neutron absorber material faster than the previous sequence.

Performing the actions in EOP-1, Issue 4, will have a significant effect on reactivity and will mitigate any unexpected reactivity increase.

FSAR Section 12.3.2.6 has been revised to indicate remaining new EOPs and their functions, and describe new AOPs. This activity was classified safety related and safety significant, but did not involve an unreviewed safety question.

This procedure is considered to be safety significant since its objective is to prevent or mitigate the consequences of reactivity addition accidents described in the FSAR. Based on the discussions in FSAR Sections 3.11.2 and 14.14.2, it is not considered credible that reactivity addition accidents which could occur during defueling could result in criticality.

EOP-CSFM, Issue 4

System/None

EOP-CSFM provides Operations personnel with instructional steps for Critical Safety Function Monitoring defined for the permanent shutdown and partially defueled condition of the FSV reactor. EOP-CSFM, EOP-1 and EOP-5 represent the revised set of EOPs which are based on the shutdown condition of the plant. These procedures, along with the Overall Plant Operating Procedures, the System Operating Procedures and the Abnormal Operating Procedure set, form a procedure infrastructure for assisting the operators in their roles in FSV nuclear plant safety.

EOP-CSFM provides the steps for monitoring the plant critical safety functions so that restoration activities can be undertaken should a challenge to the safety function occur. A systematic approach for restoration is utilized with a hierarchy in protection. The first priority is to assure the reactor is subcritical at all times. The second and final priority is to assure that no radiological releases are occurring. The EOP safety function monitoring and the operator response to challenges are consistent with the philosophies in Administrative Procedures D-1 and D-2, the Defueling SAR analyses, the FSAR analyses, and the Technical Specification bases.

FSAR Section 12.3.2.6 has been revised to reflect the new EOP and AOP sets and discuss their purposes. This activity was classified safety related and safety significant, but did not involve an unreviewed safety question. This procedure is considered to be safety significant since its use affects the capability to prevent or mitigate the consequences of accidents described in the FSAR.