

Bernard W. Reznicek  
General Manager

Omaha Public Power District  
1623 Harney Omaha, Nebraska 68102  
402/536-4000

March 4, 1983

Mr. James R. Tourtellotte  
Chairman  
Regulatory Reform Task Force  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Tourtellotte:

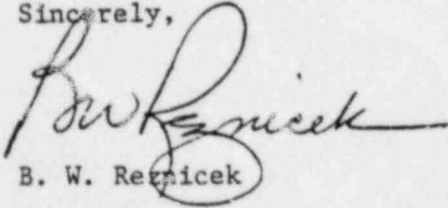
Please find enclosed the backfitting and regulatory impact cost data from the Omaha Public Power District's Fort Calhoun Nuclear Plant. Data is presented for Nuclear Regulatory Commission requirements (TMI and other Commission imposed backfits). We have also included data for the District's initiated modifications.

A review of the data presented in the attachments to your February 8, 1983 letter reveals that only hardware and analyses costs are included. The District believes that the "backfit" and regulatory costs involving other Commission imposed requirements should also be considered. These costs would include additions to staff, testing of equipment (e.g., hydrostatic testing and leak testing), increased training requirements, plant drills such as annual emergency plan exercises, and procedural requirements.

An example of these "non-hardware" costs is the presently proposed rule-making regarding the requirement for adding one additional Senior Reactor Operator to each operating shift. The Commission estimate that it will cost each utility \$600,000 per year is probably reasonably accurate. Projecting this annual cost for the lifetime of a nuclear plant clearly demonstrates that all major "backfit" costs certainly involve issues other than hardware.

The Omaha Public Power District supports the Regulatory Reform Task Force activities, and members of our nuclear staff are available to support your efforts in this area.

Sincerely,

  
B. W. Reznicek

BWR/WEM/KJM/pat

Attachments

6305230588 830304  
PDR ADOCK 05000285  
P PDR

OMAHA PUBLIC POWER DISTRICT  
FORT CALHOUN STATION

The Fort Calhoun Station consists of one pressurized water reactor, with an electrical rate of 501 MWe (gross).

The nuclear steam supply system, nuclear fuel, and turbine generator were purchased in October, 1966. The provisional construction permit was received in June, 1968 and commercial operation began in September, 1973.

In addition to the \$178 million construction cost for the plant, \$50 million has been spent on backfitting. Of this \$50 million, \$41 million was for NRC imposed costs which included TMI related backfits. The remaining \$9 million in backfitting costs were for those initiated by the District. The plant value, as of December 31, 1982, was \$211 million. The difference between the initial cost of \$178 million and the December 31, 1982 value of \$211 million is \$32 million, which is that portion of the \$50 million that has been capitalized. The remaining \$18 million will be accounted for by work in progress, which will cost approximately \$11 million. Operating accounts have been charged with \$7 million. The attached summary sheet and Appendices A through C provide additional details for these costs.

It is presently estimated that near term future backfit costs will be \$22 million. Additional information on these future costs is provided in Appendix D.

Although not identified as an NRC imposed backfit, the Nuclear Waste Policy Act of 1982 will result in a very substantial cost to the District. For the Fort Calhoun Station, it is estimated that presently accumulated liability relating to this act is \$33 million and will be over \$400 million by the year 2000.

FORT CALHOUN STATION  
COSTS OF BACKFITTING  
TOTAL THROUGH 12/31/82

SUMMARY

(a) COSTS FOR NRC IMPOSED BACKFITTING

1. Hardware	16,684,285
2. Analytical	7,384,500
Total	24,068,785

(b) COSTS FOR NRC TMI LESSONS LEARNED BACKFITTING

1. Hardware	14,762,807
2. Analytical	2,420,000
Total	17,182,807

(c) COSTS FOR UTILITY INITIATED BACKFITTING

1. Hardware	8,043,926
2. Analytical	1,120,500
Total	9,164,426

(d) ESTIMATE NRC FUTURE BACKFITTING COST

Total Cost	22,030,000
------------	------------

## (3) COSTS FOR NRC IMPOSED BACKFITTING - DETAIL

## 1. HARDWARE

1498	Auxiliary Building Crane Mod	1,565,284
1609	Replace Main Steam Line Penetration Bellows	64,846
1791	Steam Generator Support Mod	551,421
1878	Long Term Core Cooling	97,011
2415	Replacement of INC Mech. Snubbers	64,214
2421	Seismic Qualification of Auxiliary Feedwater Sys.	64,479
2550	Seismic Restraints for a Few Aux. Bldg. Block Walls	10,375
2677	Upgrade QA Vault	62,840
2764	Containment Nuclear Fire Emergency Alarms/Lights	538
2815	Radio-Chem. Lab Filters	5,993
2816	Replacement of Aux. Coolant Flow Transformer	17,951
2861	Portable Office Facility	40,692
2866	Replacement of Waste Gas Release Valves	8,485
2200/ 2058	Seismic Restraint Modification	6,778,261
2901	Beta Radiation Shielding for Elec. Pene. Lead Wire	546
2930	Reactor Coolant Pumps Oil Collection System	599
2447	Replace Spent Fuel Rack	1,248,025
531	Inst. of Battery Powered Smoke Detect. Control Room	161,432
532	Fire Water Loop System	344,675
533	Fire Extinguisher	42,401
536	Diesel Generators Separation	698,662
537	Installation of Fire Rated Seals	585,330
552	Diesel Room Sprinkler Alarms	4,714
1169	Electric Fire Pump	24,997
1175	Relocation of Methane and Hydrogen	13,780
1176	Battery Room 54 and 55 Modifications	37,306
1218	Fire Doors Modification	56,539

## (a) COSTS FOR NRC IMPOSED BACKFITTING (Continued)

## 1. HARDWARE (Continued)

1242	Remote Annunciation of Warehouse Sprinkler System	2,548
1341	Fire Damper Modifications	22,146
1367	Spent Fuel Pool Emergency Cooling Cross Connection	170,428
1384	Hazardous Material Storage	1,525
1393	Total Flooding Halon 1301 System for Control Room Walk In Lab and Cable Spread Room	228,496
1400	Fire Protection Modification	162,288
1455	Alternate Shutdown Capability	170,229
1457	Fuel Tank for Diesel Driven Fire Pump	19,037
1492	Reactor Coolant Pump Lube Oil Collection System	142,748
1582	Fire Alarm Addition	1,095
1893	Fire Barrier at Stairway in Electrical Pene. Room	13,421
2441	Seismic Restraint for Cable Spreading Room Halon Sys.	1,824
2794	Cable Spread Room Halon System Dampers	162
2811	Pressurized Heater	437
2819	Turbine Floor Modification	10,362
2930	Reactor Coolant Pumps Oil Collection	599
700	Site Security	2,789,269
702	Under Voltage	76,083
1464	79-01 Solenoid Replacement for LOCA Qualification	21,782
2106	Replace Unqualified Limit Switches	37,855
2326	Replace Limit Switches in Auxiliary Building	181,038
2746	Replace and Relocate Safety Injection Flow Trans.	33,812
2763	Replace Containment Steam Generator Pressure Trans.	<u>45,655</u>
	HARDWARE TOTAL	16,684,285

## (2) COSTS FOR NRC IMPOSED BACKFITTING - DETAIL

## 2. ANALYTICAL

Crane Cask Drop Analysis	22,500
Cooling Loop Failure Analysis	3,500
RCS Overpressure Analysis	35,000
Core Motion Signature Analysis	5,000
Reactor Vessel Support Analysis	1,000
Steam Generator Feedwater Waterhammer Analysis	10,000
RCS LTOP Analysis	10,000
PORV Testing - RCS LTOP	21,000
Charging Pump Vibration Analysis	30,000
Engineering Analyses - Post LOCA Long Term Core Cooling	100,000
Post LOCA LTCC at Stretch Power	35,000
Asymmetric LOCA Loads Analyses	1,000,000
Operating Manual Revisions	175,000
RV Weld Material Analysis - IE Bulletin 78-12, 12A	7,500
NRC Purge Valve Questions	10,000
NRC Questions on RV Fluence	20,000
Engineering Analysis/Services - IE Bulletin 79-13	95,000
SI Pump Room Ventilation Analysis	35,000
Stretch Power - Radiological Consequences	10,000
UT Weld Testing Per IE Bulletin 79-17	35,000
Metallographic Exam of Failed RCP Stud	8,000
Electrical Equipment Qualification	630,000
Iodine Spiking Issue	30,000
RETS	40,000
Test RV Surveillance Baseline Samples	36,000
Miscellaneous Analyses for FLCs, etc.	20,000
ATWS	100,000
IE Bulletins	110,000
PTS	250,000
Seismic Restraint Modification	<u>4,500,000</u>

ANALYTICAL TOTAL 7,384,500

HARDWARE AND ANALYTICAL TOTAL 24,068,785



## (b) COSTS FOR NRC TMI LESSONS LEARNED BACKFITTING - DETAIL

## 1. HARDWARE

1658	Direct Indication of Position of Power Operated Relief Valves and Press. Safety Relief Valve	83,012
1665	Auxiliary Feedwater Automatic Actuation System	1,307,030
1761	Instrumentation for Detection of Inadequate Core Cooling	142,344
1776	Onsite Technical Support Center	1,723,608
1817	Pressurizer Heaters	35,732
1906	Increase Range on Radiation Monitoring	274,417
1919	Containment Pressure Indication	49,848
1921	Containment Hydrogen Monitoring	176,416
1967	Improved Sampling System	186,949
1990	Plant Shielding	219,541
1999	Reactor Coolant System Ventilation	181,041
2004	Containment Sump Water Level Indication	329,460
2008	Auxiliary Feedwater Flow Indication	10,478
2009	Eng. Feedwater Tank Level Indication	9,478
2552	Emergency Response Facilities Computer System	2,681,690
2300	Dedicated Penetrations for External Recombiner on H <sub>2</sub> Purge System	31,815
2389	Telephone Conduit Cable Additives	50,368
2418	Control Room Modification	68,405
2502	HVAC System in Technical Support Center	19,285
2530	Core Cooling Differential System	3,370,450
2756	Replace Unqualified Charge Converters for Valve Monitoring	11,384
1900	OH TMI	3,452,351
2458	EOF Building N.O.	<u>348,705</u>
	HARDWARE TOTAL	14,762,807

## (b) COSTS FOR NRC TMI LESSONS LEARNED BACKFITTING - DETAIL

## 2. ANALYTICAL

EPRI Safety/Relief Valve Test Program	415,000
CE Owners Group Subcommittee - S/R Valves	85,000
Emergency Planning	40,000
Meteorological Analyses - Class A and B Model	100,000
Post TMI Lessons Learned	1,500,000
Auto AFW	<u>280,000</u>

ANALYTICAL TOTAL	2,420,000
------------------	-----------

HARDWARE AND ANALYTICAL TOTAL	17,182,307
-------------------------------	------------



## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL

## 1. HARDWARE

222	Air Supply to AC/RW Interface Valves	82,515
219	Replace Tube Bundle for Waste Evaporator	50,920
218	Reactor Coolant Level Ind. During Cold Shutdown	7,033
217	Shielding for Primary Sampling Room	49,907
212	SIRWT Level Ras Switches	5,518
208	Relocation of Oren Radiation Monitors	5,469
207	Chemical Lagoon Discharge Monitoring Inst.	7,668
2869	Component Cooling Drain Valves	526
2868	Personnel Air Lock Door	30,050
2867	Shutdown Cooling System	128,331
2832	Operational Interface Between HE2 and FH-12	5,682
2813	Atcor Radiation Waste Solidification System Startup	14,513
2793	Upstream Deflection Wall to Intake Structure	320,768
2792	Underwater T.V. Camera for Refueling Machine	48,908
2773	Outage Scheduling Room	48,549
2772	Outlet Manholes in Chemical Lagoons	18,590
2771	Upgrade Access Road and Storage Site for UF <sub>6</sub> Fuel	32,139
2769	Battery Discharge Test Equipment	4,274
2747	Long CEA Handling Tool	59,476
2741	Steam Generator Instrument Root Valves	56,716
2582	Replace Reactor Pressure Vessel Head and Seismic Skirt Insulation	249,454
2680	Reallocation of Laboratory Space	16,181
2669	Replacement of Feedwater Regulator Valve	3,939
2620	Condensate Recirculation Valves	60,649
2533	Raw Water Systems Piping Erosion	33
2514	FW-8 Corrosion	58,025

## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL (Continued)

## 1. HARDWARE (Continued)

2513	Installation of Platform for Containment Vents	16,388
2493	Build Gas Bottle Storage Dock	44,055
2460	Replace LCV-1199 for Heater Drains	14,434
2446	Emergency Feedwater Storage Tank Drain Valve	196
2440	Refueling Machine Grapple	15,270
2416	Isolation Valves for TCV 2897A; TCV 2897B	58,686
2500	Remodel Health Physics Station	19,206
2424	Additional Offices	8,974
2456	Doorway Between Room's 45 and 46	443
2925	Construction of Sewage Lagoons	144,116
2027	N2 Purge of R.C.D.L.T. and Quench Tank Mod.	1,402
1985	Engineering and Parts for Main Steam Valves	70,536
1993	Reactor Internals Holddown - Ring	82,602
2059	Level Transmitter Spent Resin	582
2817	Installation of an Isolation Valve to Presediment Desludge Line	147
2139	Condensate Tank Level Indication	3,273
2825	Install Retaining Rings on Condensate Pumps	51,678
2911	Hy 73 Approx. 3N of F.C. Rearrange Sec. for OPPD Crop Dryer	203
2412	Security Surveillance System	1,997
2919	Underground Lawn Sprinkler	11,419
2798	Shielding Wall for CVCS Letdown Line	5,257
581	Replace Existing Flexible Duct Between VA63 and VA64 with Rigid Type	11
2970	Removable Handrail Around Reactor Pit	2,758
2500	Remodel Health Physics Changes	1,488
626	Hy 73 at F.C.P. Supply 3 No. 14 W O/S No. 14 So. Street Light	2,317
2568	Emergency Lighting for Lab and Locker Room	3,829

## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL (Continued)

## 1. HARDWARE (Continued)

583	Air Conditioning of Switchgear Room	23,657
2340	Ventilating Discharge Dew-Point Level	2,631
2448	Extend Ductwork in Switchgear Room	5,090
2576	Installation of Condenser Evacuation Pump Seal Water Overflow Piping	1,163
2351	Rod Block Circuitry and Metroscope	12,709
1154	Containment Sump Modification	763
1152	Underwater Television System	21,930
1108	Addition of Generator Condition Monitor	21,688
1107	Restrooms for Fort Calhoun Warehouse	22,371
1085	Storage Container	21,059
1043	Install Platforms Above Condenser Water Box	16,855
1042	Relief Valve Modification on Diesel Generator No. 2	442
1041	Dual Volts Hertz Overexcitation Protection System	9,584
1037	Surveillance Capsule Removal	14,189
1016	Replace Valves HCV-2861 in Raw Water System	9,314
1013	Emergency Feedwater Tank Ladder Installation	2,014
1011	Alterrex De-Excitation Circuitry	5,021
995	River Temperature Indication	12,128
944	Install Jib Crane Turbine Building Deck Area	2,462
925	Control Room A/C	3,584
902	Radiation Monitor Administrative Control	6,668
791	Installation of Sigma-II Computer	171,963
783	Flange Installation on Flow Element Section of Feed-water	43,551
738	Plastic Relief Domes in Room 81	9,572
734	Reactor Coolant Pump Motor Access	10,735
724	Modification of Pressure Transmitter for EHC	23,867
719	Storage Bracket for Long Tool FH6	4,285

## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL (Continued)

## 1. HARDWARE (Continued)

705	Safety Injection System Relief Valves	4,604
652	Replacement of 2" Piping with 4" Piping in Spent Fuel Pool	6,909
648	Analyze and Provide Additional Sup. for Existing Seismic Restraints	16,273
1640	I and C Shop Modification	6,502
1631	Jib Crane in Containment for CEDM Removal	40,356
1608	Replacement of Main Steam Line Penetration Bellows	10,478
1592	PORV Piping Restraints	54,904
1587	Modify Old Maintenance Shop	6,456
1570	Replacement of Station Batteries and Relocation of Security System Batteries	190,070
1567	Steam Generator Feedwater Bypass Control	4,572
1566	Modification to Spent Fuel Handling Machine	8,400
1537	CEDM Cooling System	2,655
1533	Safety Inspection Piping RES	2,299
1518	Installation of Raw Water Pump Seismic Support	11,620
1517	Installation of Cooling Fans in House Ser. Transformer	3,171
1507	Steam Generator Blowdown Processing System	2,093,560
1506	Steam Generator Blowdown Control	11,113
1486	Access Platform for MS 308	1,078
1452	Magnetic Unit Platforms	9,693
1425	Spent Fuel Pool RTI and Recorder	14,600
1343	Outdoor Radwaste Storage	1,263
1209	Steam Generator Handrails	2,002
1208	3rd $\Delta T$ Channel on Weather Tower	2,146
1206	Emergency Modification FC-78-65	1,859
1178	Flowmeters for Radiation Monitors	5,562
1171	Turbine Bearing Metal Temperature Thermocouple Recorder	4,333

## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL (Continued)

## 1. HARDWARE (Continued)

2388	RCP No. 3C Vibration	18,636
2385	Replace Containment Sump Pumps	54,717
2384	Soil Erosion Control	46,604
2367	ENC Servo Valve Isolation	23,157
2335	Chemical Discharge Lagoon Recirculation Pump	10,670
2257	PCV 102 - 1 and 2 Power Operated Relief Valve Field Conver.	21,957
2218	Storage Deck	19,247
2064	Stretch Power Rating for Fort Calhoun	590,073
2049	Actuator for HCV 712A	11,531
2046	RPS Matrix Logic Relay Replacement	21,173
2030	Seal Water Modification for Circulating and Raw Water Pumps	123,959
2010	Raw Water Isolation Valve Replacement	653,028
1944	Maintenance Shop Sprinkler System	2,348
1907	Mine - Spray Valves	2,574
1890	Installation of Steam Dump and Bypass Valve Position Indicator	8,112
1836	Reactor Coolant Pump RC-3C Seal/Cooling Water Piping Vibration	2,495
1824	Main Feedwater Pump Recirculation Valve	95,188
1666	Chemical Pond Design Modification	18,665
1650	Secondary Plant Sampling System	19,947
1646	Emergency Alarm for Computer Room	529
1642	Room 31 Alternate Egress	15,401
638	Add Welding Receptacles in Turbine Room	7,612
637	Modification to the Handholes and Manways of Steam Generators A and B	9,050
633	Construct Maintenance Shop Addition	886,769
609	Radiation Dose Rates from Containment Basement Sump	29,792

## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL (Continued)

## 1. HARDWARE (Continued)

487	RPS Computer Output Modifications	7,576
477	Waste Processing Laundry Waste	6,104
435	Installation of Charcoal Filter Operating Timers	667
434	Concentrated Boric Acid Tank Level Indication	3,182
431	Replacement of Component Cooling Heat Exchanger Raw Water Inlet and Outlet	101,049
423	Relocation of Radiation Room 059	7,847
324	Modification to the Charging System	183,482
312	Structural Steel and Grating Around High Pressure Section of Turbine	8,999
311	Installed a Recirculation Line to Clarifier Softner and Presedimentation	687
307	Modification to Feedwater Heater Pipe Supports	1,478
306	Steam Lead Drain Valve Circuit Modification	3,283
302	Local Controls and High Level Alarm Indication	2,541
295	Construct Cafeteria Storage Room	6,134
278	Installation of Surge Arrestors on 4160/480 V Dry Type Transformer	54,607
274	Purchase of Salt and Sand Spreader OPPD No. 9788	1,268
238	Main Generator Phase Connection Modification	18,011
228	Modification of Chemical Waste Lagoon System	4,127
226	Modify Heater and Moisture Separator Pumps	13,139
224	Containment Sump Level Instrumentation	<u>3,638</u>
HARDWARE TOTAL		8,043,926



## (c) COSTS FOR UTILITY INITIATED BACKFITTING - DETAIL

## 2. ANALYTICAL

Physics Uncertainty Analysis	50,000
Guide Tube Wear Inspections	30,000
Stretch Power Studies and Support	730,000
Incore Detector Interim Tech. Spec.	50,000
FSAR	50,000
CEA Inspections	130,000
CVCS Bypass Analysis	3,500
QA Program Evaluation	7,000
Main Steam Vibration Analysis	60,000
Equipment Hatch Shielding Analysis	5,000
Replacement Spent Fuel Storage Rack Analysis	<u>5,000</u>
ANALYTICAL TOTAL	1,120,500
HARDWARE AND ANALYTICAL TOTAL	9,164,426

## (d) ESTIMATE NRC FUTURE BACKFITTING COST

Seismic Analysis Evaluation and Modifications	2,150,000
Seismic Qualification of Mechanical Equipment	1,500,000
Mechanical Qualification of Mechanical Equipment for LOCA	1,500,000
Third Auxiliary Feedwater Pump	350,000
Systematic Evaluation Plan <sup>a</sup>	3,000,000
Qualification of Backup Containment Instrumentation	481,000
Long Term Core Cooling	115,000
Modifications of PORV and Safety Valve Piping	100,000
Chemical Detection System/Control Room Habitability	622,000
Additional Spent Fuel Storage	1,857,000
Radioactive Waste Processing System	1,130,000
Procure and Install Emergency Response Facility Computer	725,000
Purchase of Simulator	2,500,000
P.T.S.	2,500,000
ATWS	<u>3,500,000</u>
TOTAL COST	22,030,000