NUREG-0241
COO-2477-5
VOL. 1 of 2

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1 IN A SERIES OF 8

Commercial Electric Power Cost Studies

Prepared for the Nuclear Regulatory Commission and The Energy Research & Development Administration by United Engineers & Constructors Inc.

Capital Cost: **Pressurized Water Reactor Plant**

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NUREG-0241 COO-2477-5

Capital Cost: Pressurized Water Reactor Plant

Commercial Electric Power Cost Studies

Prepared for the Nuclear Regulatory Commission under contract No. AT (49-24)-0351 and The Energy Research & Development Administration under contract No. EY-76-C-02-2477 by United Engineers & Constructors Inc., 30 South 17th Street, P.O. Box 8223, Philadelphia, Pa. 19101

June 1977

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COMMERCIAL ELECTRIC POWER COST STUDY
1139 MWe PRESSURIZED WATER REACTOR PLANT

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FOREWORD
by the
United States Energy Research & Development Administration
and United States Nuclear Regulatory Commission

In 1971 the Atomic Energy Commission authorized power plant investment cost studies, which culminated in the WASH-1230 reports (1000 MWe Central Station Power Plants - Investment Cost Study) published in 1972. Their purpose was to facilitate policy and economic decisions about electric generation facilities in the public and private sectors. The WASH-1230 report-series consists of five volumes: Pressurized Water Reactor, Boiling Water Reactor, Coal-Fired, Oil-Fired and High Temperature Gas-Cooled Reactor power plants. National priorities on energy, the regulatory environment and the cost of labor, equipment and material have changed significantly. These changes dictated the necessity of an update of these series of studies, and an expansion of scope to encompass consideration of the fuel cycle and the total generating cost. As a result, a program to study, reassess and produce a new set of updated reports was authorized and undertaken.

This report is one of the new series of commercial electric power cost studies that have been prepared by United Engineers & Constructors Inc. (UE&C). These studies have been completed under the cooperative direction of the Energy Research and Development Administration (ERDA), Division of Nuclear Research and Applications, and the Nuclear Regulatory Commission (NRC), Division of Site Safety and Environmental Analysis. The study effort was funded jointly by ERDA (Contract No. EY-76-C-02-2477) and NRC (Contract No. AT(49-24)-0351).

The current series includes investment cost reports for a Pressurized Water Reactor Plant, a Boiling Water Reactor Plant, High Sulfur Coal Plants, and Low Sulfur Coal Plants. The Oil Fired Power Plant Study was not updated because utilities are no longer expected to build significant numbers of these plants, and the High Temperature Gas-Cooled Reactor Plant Study was not updated because these reactors are not now being marketed. Investment cost reports on multi-unit stations and for different cooling system types are included. In addition, the series addresses fuel supply investment costs and total generating costs for both nuclear and coal fired power plants.

Following is a list of the report titles and funding agency(ies) responsible for each:

Funding Agency(ies)	Report Titles
ERDA	Capital Cost - Pressurized Water Reactor Plant (NUREG-0241, COO-2477-5)
ERDA/NRC	Capital Cost - Boiling Water Reactor Plant (NUREG-0242, COO-2477-6)
ERDA/NRC	Capital Cost - High and Low Sulfur Coal Plants - 1200 MWe (NUREG-0243, COO-2477-7)
NRC/ERDA	Capital Cost - Low and High Sulfur Coal Plants - 800 MWe (NUREG-0244, COO-2477-8)
ERDA	Capital Cost Addendum - Multi-Unit Coal and Nuclear Stations (NUREG-0245, COO-2477-9)
NRC	Fuel Supply Investment Cost - Coal and Nuclear (NUREG-0246, COO-2477-10)
NRC	Cooling Systems Addendum - Capital and Total Generating Cost Studies (NUREG-0247, COO-2477-11)
NRC	Total Generating Costs - Coal and Nuclear Plants (NUREG-0248, COO-2477-12)

The studies in these series have a uniform set of economic and technical criteria and a uniform accounting system as contained in (Guide for Economic Evaluation of Nuclear Reactor Plant Designs, NUS-531, January 1969). The investment cost estimates in these series are developed for reference plants constructed at a hypothetical site called "Middletown, USA".

The reference investment and total generating cost estimates can be used for baseline comparisons of different generating systems. However, the major use of the investment cost data is as input to the CONCEPT computer code which was developed for ERDA at the Oak Ridge National Laboratory (ORNL). The CONCEPT computer program adjusts the baseline cost estimates contained in these studies for different plant sizes, regional variations in material and craft labor rates, different construction schedule lengths, and different escalation and interest rates. These adjustments result in preliminary sets of alternative cost estimates for electric power plants constructed anywhere in the United States.

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SECTION 1

SUMMARY

1.1 INTRODUCTION

This investment cost study for the 1139 MWe pressurized water reactor (PWR) central station power plant consists of two volumes. Volume I includes in addition to the Foreword and Summary, the Plant Description and the Detailed Cost Estimate. Volume II contains the Drawings, Equipment List and Site Description.

1.2 MAJOR STUDY GROUND RULES

In addition to the "Site Description" presented in Volume II, Section 6, the major ground rules used in this study are as follows:

- The reference plant design is based upon principal technical features corresponding to the Public Service Company of New Hampshire Seabrook Station.
- The reactor plant design is based on the Westinghouse Reference Safety Analysis Report (RESAR-35). Key plant parameters for the nuclear steam supply system (NSSS) and steam and power conversion system are shown in Tables 2-1 and 2-2 in Section 2.
- Cost data is based on prices effective as of July 1, 1976.
- A full complement of licensing and design criteria circa January 1, 1976 are utilized. Safety classifications, seismic categories and design codes for the major structures and equipment are addressed in Section 2 and in the Equipment List, (Volume II, Section 5).
- The detailed cost estimate is developed for a single unit, with sufficient land area to accommodate an identical second unit.
- The detailed cost estimate is developed in accordance with an expanded AEC code-of-accounts (USAEC Report NUS-531).
- The design of the main heat rejection system is based upon the use of mechanical draft wet cooling towers. The nuclear ultimate heat sink is also based on mechanical draft wet cooling towers.
- Escalation and interest during construction are not included in the cost estimate.
- The plant has an onsite nuclear reactor core storage capacity for 4/3 core.

- o The design utilizes two independent offsite sources of power; one at 500 kV and one at 230 kV.
- o The plant design life is forty years during the first part of which it will be baseloaded.

1.3 COST SUMMARY

The estimated total base construction cost for the 1139 MWe PWR reference design is $568,831,011 or $499/kW based on July 1, 1976 prices. Summaries of the Detailed Cost Estimate at both the two and three digit account levels are shown in Tables 1-1 and 1-2 respectively. The cost estimate does not include normal contingency costs for the equipment, material and labor components of the total base construction cost; nor does it include escalation and interest during construction. Other items not included in the cost estimate are listed in the beginning of Section 3, Detailed Cost Estimate. As noted in the Foreword, for a specific site, this baseline cost estimate must be adjusted for regional variations in material and labor rates, different construction schedule lengths, and escalation and interest rates incurred during construction.

1.4 COMPARISON TO WASH-1230 RESULTS

The total base construction cost for the PWR power plant (1031 MWe net output) reference in WASH-1230 was approximately $211,000,000 or $205/kW, based upon prices effective January 1971. Thus, the 1977 study indicates approximately a 143 percent increase in the cost of the plant in terms of $/kW. The principal factors contributing to this increase are as follows:

- o Cost escalation from January 1971 to July 1976.
- o Regulatory requirements for additional engineering and safety features, and environmental considerations affecting plant design.

These result in increased engineering, management, labor, equipment and material costs due to increased scope and lengthened schedules.

The increase in direct construction costs of the current plant design over those estimated in WASH-1230 are directly related to increases in the quantities of the various construction commodities required for compliance with licensing and design criteria circa January 1, 1976. Following are examples of the differences in the quantities of some of these construction materials:

	WASH-1230 PWR 1031 MWe Net Output (1/71)	PWR 1139 MWe Net Output (1/76)
Concrete, cu. yds.	90,000	167,200
Reinforcing Steel, lbs.	22.0×10^6	43.2×10^6
Structural Steel, lbs.	8.8×10^6	21.8×10^6

Table 1-3 is a summary breakdown of the direct craft labor costs and hours for this reference design. The total direct craft labor cost of approximately $133,100,000 corresponds to an average hourly rate of $12.30. Approximately 10,820,000 craft labor manhours average about 9.5 manhours/kW. These compare to averages of $8.86/hour and 6.0 manhours/kW respectively for the earlier design reported in WASH-1230.

TABLE 1-1
COST ESTIMATE SUMMARY
TWO DIGIT ACCOUNT LEVEL
1139 MWe PRESSURIZED WATER REACTOR PLANT
MIDDLETOWN, USA

COST BASIS 07/76

04/12/77

ACCT NO	ACCOUNT DESCRIPTION	FACTORY EQUIP. COSTS	SITE LABOR HOURS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
20 .	LAND AND LAND RIGHTS				2,000,000	2,000,000
21 .	STRUCTURES + IMPROVEMENTS	5,902,426	4716266 MH	55,696,709	39,776,622	101,375,757
22 .	REACTOR PLANT EQUIPMENT	96,568,796	2145880 MH	27,763,659	9,142,990	133,480,445
23 .	TURBINE PLANT EQUIPMENT	82,629,701	1827006 MH	23,335,789	5,315,496	111,280,986
24 .	ELECTRIC PLANT EQUIPMENT	13,094,214	1449915 MH	17,792,985	8,541,037	39,428,236
25 .	MISCELLANEOUS PLANT EQUIPT	7,197,437	307827 MH	3,959,426	646,560	11,803,423
26 .	MAIN COND HEAT REJECT SYS	15,702,846	372347 MH	4,585,142	1,300,176	21,588,164
2 .	TOTAL DIRECT COSTS	221,095,420	10819241 MH	133,138,710	66,722,881	420,957,011
91 .	CONSTRUCTION SERVICES	21,080,000	1870000 MH	19,453,000	29,500,000	70,033,000
92 .	HOME OFFICE ENGRG.&SERVICE	49,220,000				49,220,000
93 .	FIELD OFFICE ENGRG&SERVICE	25,621,000			3,000,000	28,621,000
9 .	TOTAL INDIRECT COSTS	95,921,000	1870000 MH	19,453,000	32,500,000	147,874,000
	TOTAL BASE COST	317,016,420	12689241 MH	152,591,710	99,222,881	568,831,011

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TABLE 1-2

COST ESTIMATE SUMMARY
THREE DIGIT ACCOUNT LEVEL
1139 MWe PRESSURIZED WATER REACTOR PLANT
MIDDLETOWN, USA

COST BASIS
07/76

04/12/77

ACCT NO	ACCOUNT DESCRIPTION	FACTORY EQUIP. COSTS	SITE LABOR HOURS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
20 .	LAND AND LAND RIGHTS				2,000,000	2,000,000
211.	YARDWORK	169,400	418641 MH	4,509,959	4,597,277	9,276,636
212.	REACTOR CONTAINMENT BLDG	2,802,450	1575220 MH	19,303,154	13,568,531	35,674,135
213.	TURBINE ROOM + HEATER BAY	498,413	395795 MH	4,818,461	6,528,956	11,845,832
215.	PRIM AUX BLDG + TUNNELS	580,888	436042 MH	5,079,903	2,800,017	8,460,808
216.	WASTE PROCESS BUILDING	166,620	445639 MH	5,103,468	2,753,486	8,023,574
217.	FUEL STORAGE BLDG	327,971	213775 MH	2,603,503	1,559,838	4,491,312
218A	CONTROL RM/D-G BUILDING	754,992	478609 MH	5,566,014	2,877,834	9,198,840
218B	ADMINISTRATION+SERVICE BLG	517,454	190566 MH	2,321,290	1,834,301	4,673,045
218D	FIRE PUMP HOUSE,INC FNDTNS	16,904	10516 MH	124,317	78,424	219,645
218E.	EMERGENCY FEED PUMP BLDG	21,694	130311 MH	1,478,835	546,830	2,047,359
218F.	MANWAY TUNNELS (RCA TUNLS)	1,544	31306 MH	355,858	150,489	507,891
218G.	ELEC. TUNNELS	2,796	375 MH	4,857	2,729	10,382
218H.	NON-ESSEN. SWGR BLDG.	9,700	14446 MH	167,407	122,674	299,781
218J.	MN STEAM + FW PIPE ENC.	6,800	130761 MH	1,500,942	1,023,047	2,530,789
218K.	PIPE TUNNELS		17275 MH	196,298	86,775	283,073
218M.	HYDROGEN RECOMBINER STRUCT		5127 MH	59,892	46,812	106,704
218P.	CONTAIN EQ HATCH MSLE SHLD		9010 MH	101,647	31,600	133,247
218S.	HOLDING POND		6991 MH	77,881	32,882	110,763
218T.	ULTIMATE HEAT SINK STRUCT	24,800	196267 MH	2,221,145	1,091,323	3,337,268
218V.	CONTR RM EMG AIR INTK STR		9594 MH	101,878	42,795	144,673
21 .	STRUCTURES + IMPROVEMENTS	5,902,426	4716266 MH	55,696,709	39,776,622	101,375,757

TABLE 1-2

COST ESTIMATE SUMMARY
THREE DIGIT ACCOUNT LEVEL
1139 MWe PRESSURIZED WATER REACTOR PLANT
MIDDLETOWN, USA

COST BASIS 07/76

04/12/77

ACCT NO	ACCOUNT DESCRIPTION	FACTORY EQUIP. COSTS	SITE LABOR HOURS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
220A.	NUCLEAR STEAM SUPPLY(NSSS)	65,000,000				65,000,000
220B.	NSSS OPTIONS					
221.	REACTOR EQUIPMENT	475,000	87416 MH	1,146,383	1,946,890	3,568,273
222.	MAIN HEAT XFER XPORT SYS.	3,949,757	374562 MH	4,914,112	526,360	9,390,229
223.	SAFEGUARDS SYSTEM	4,114,778	461718 MH	5,986,702	904,924	11,006,404
224.	RADWASTE PROCESSING	5,642,776	245826 MH	3,193,188	776,310	9,612,274
225.	FUEL HANDLING + STORAGE	2,441,015	56335 MH	729,304	99,278	3,269,597
226.	OTHER REACTOR PLANT EQUIP	6,929,190	698741 MH	9,058,292	2,889,052	18,876,534
227.	RX INSTRUMENTATION+CONTROL	6,516,280	73617 MH	907,092	77,034	7,500,406
228.	REACTOR PLANT MISC ITEMS	1,500,000	147665 MH	1,833,586	1,923,142	5,256,728
22 .	REACTOR PLANT EQUIPMENT	96,568,796	2145880 MH	27,768,659	9,142,990	133,480,445
231.	TURBINE GENERATOR	54,874,642	417379 MH	5,194,091	1,287,465	61,356,198
233.	CONDENSING SYSTEMS	10,404,421	306962 MH	3,988,263	604,260	14,996,944
234.	FEED HEATING SYSTEM	8,807,502	427569 MH	5,548,535	632,545	14,988,582
235.	OTHER TURBINE PLANT EQUIP.	7,408,466	539642 MH	6,993,950	709,313	15,111,729
236.	INSTRUMENTATION + CONTROL	1,134,670	13973 MH	170,805	15,487	1,320,962
237.	TURBINE PLANT MISC ITEMS		121481 MH	1,440,145	2,066,426	3,506,571
23 .	TURBINE PLANT EQUIPMENT	82,629,701	1827006 MH	23,335,789	5,315,496	111,280,986

TABLE 1-2

COST ESTIMATE SUMMARY
THREE DIGIT ACCOUNT LEVEL
1139 MWe PRESSURIZED WATER REACTOR PLANT
MIDDLETOWN, USA

COST BASIS
07/76

04/12/77

ACCT NO	ACCOUNT DESCRIPTION	FACTORY EQUIP. COSTS	SITE LABOR HOURS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
241.	SWITCHGEAR	4,461,000	64453 MH	797,321	79,684	5,338,005
242.	STATION SERVICE EQUIPMENT	7,231,864	106510 MH	1,307,433	224,838	8,764,135
243.	SWITCHBOARDS	460,000	10372 MH	128,205	61,093	649,298
244.	PROTECTIVE EQUIPMENT		84003 MH	1,038,088	532,600	1,570,688
245.	ELECT.STRUC +WIRING CONTNR		557382 MH	6,810,330	2,181,363	8,991,693
246.	POWER & CONTROL WIRING	941,350	627195 MH	7,711,608	5,461,459	14,114,417
24 .	ELECTRIC PLANT EQUIPMENT	13,094,214	1449915 MH	17,792,985	8,541,037	39,428,236
251.	TRANSPORTATION & LIFT EQPT	1,938,225	28352 MH	366,766	116,648	2,421,659
252.	AIR,WATER+STEAM SERVICE SY	3,434,042	248457 MH	3,215,130	360,027	7,009,199
253.	COMMUNICATIONS EQUIPMENT	967,500	23372 MH	287,369	152,654	1,407,523
254.	FURNISHINGS + FIXTURES	857,670	7646 MH	90,141	17,231	965,042
25 .	MISCELLANEOUS PLANT EQUIPT	7,197,437	307827 MH	3,959,426	646,560	11,803,423
261.	STRUCTURES	96,693	104736 MH	1,209,739	783,950	2,090,382
262.	MECHANICAL EQUIPMENT	15,606,153	267611 MH	3,375,403	516,226	19,497,782
26 .	MAIN COND HEAT REJECT SYS	15,702,846	372347 MH	4,585,142	1,300,176	21,588,164
2 .	TOTAL DIRECT COSTS	221,095,420	10819241 MH	133,138,710	66,722,881	420,[illegible]97,011

COST BASIS
07/76

TABLE 1-2

COST ESTIMATE SUMMARY
THREE DIGIT ACCOUNT LEVEL
1139 MWe PRESSURIZED WATER REACTOR PLANT
MIDDLETOWN, USA

04/12/77

ACCT NO	ACCOUNT DESCRIPTION	FACTORY EQUIP. COSTS	SITE LABOR HOURS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
911.	TEMPORARY CONSTRUCTION FAC		1620000 MH	16,378,000	7,900,000	24,278,000
912.	CONSTRUCTION TOOLS & EQUIP		250000 MH	3,075,000	17,600,000	20,675,000
913.	PAYROLL INSURANCE & TAXES	21,080,000				21,080,000
914.	PERMITS,INS. & LOCAL TAXES				4,000,000	4,000,000
915.	TRANSPORTATION					
91 .	CONSTRUCTION SERVICES	21,080,000	1870000 MH	19,453,000	29,500,000	70,033,000
921.	HOME OFFICE SERVICES	45,790,000				45,790,000
922.	HOME OFFICE Q/A	2,180,000				2,180,000
923.	HOME OFFICE CONSTRCTN MGMT	1,250,000				1,250,000
92 .	HOME OFFICE ENGRG.&SERVICE	49,220,000				49,220,000
931.	FIELD OFFICE EXPENSES				3,000,000	3,000,000
932.	FIELD JOB SUPERVISION	18,396,000				18,396,000
933.	FIELD QA/QC	4,490,000				4,490,000
934.	PLANT STARTUP & TEST	2,735,000				2,735,000
93 .	FIELD OFFICE ENGRG&SERVICE	25,621,000			3,000,000	28,621,000
9 .	TOTAL INDIRECT COSTS	95,921,000	1870000 MH	19,453,000	32,500,000	147,874,000
	TOTAL BASE COST	317,016,420	12689241 MH	152,591,710	99,222,881	568,831,011

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TABLE 1-3
DIRECT CRAFT LABOR SUMMARY
1139 MWe PWR PLANT
MIDDLETOWN, USA
COST BASIS - 7/76

Craft Description	Site Labor Hours	% Hours	Site Labor Cost	% Cost
Asbestos Worker	114,208	1.1	1,486,989	1.1
Boiler Maker	635,914	5.9	8,788,330	6.6
Bricklayer	121,470	1.1	1,385,967	1.0
Carpenter	1,293,581	12.0	15,005,545	11.3
Dock Builder	3,053	0.0	41,887	0.0
Electrician	1,742,930	16.1	21,612,331	16.2
Iron Worker	1,234,876	11.4	16,362,185	12.3
Laborers	1,218,919	11.3	11,360,341	8.5
Millwrights	161,523	1.5	2,048,082	1.5
Operating Engineers	811,021	7.5	10,121,507	7.6
Painters	190,928	1.8	1,827,187	1.4
Pipefitters	2,995,349	27.7	40,137,677	30.1
Plumbers	640	0.0	7,828	0.0
Roofers	11,981	.1	161,502	.1
Sheet Metal Workers	117,888	1.1	1,379,290	1.0
Teamsters	164,960	1.5	1,412,062	1.1
TOTAL FOR PLANT	10,819,241	100.0	133,138,710	100.0

SECTION 2

PLANT DESIGN DESCRIPTION

2.1 INTRODUCTION

Section 2 describes the pressurized water reactor power plant design and the construction support activities covered by this study cost estimate.

The material presented in this section is organized to correspond to the uniform system of accounts (USAEC Report NUS-531) used for the detailed cost estimate. This format correlates the plant design description with the detailed cost estimate (Volume I, Section 3) and the detailed equipment list (Volume II, Section 5). The two digit accounts used in this regard are as follows:

A summary description is provided in Section 2 for each major account. This is followed by detailed descriptions of each system and structure at the three digit account level.

The descriptions associated with accounts 21 through 26 address the power plant design. This portion corresponds to the "direct cost" portion of the cost estimate. The descriptions associated with the accounts 91 through 93 define the construction support activities. This corresponds to the "indirect cost" portion of the cost estimate. The sum of the "direct cost" and the "indirect cost" is the "total base construction cost".

The scope of the indirect cost accounts varies with utility and project. Therefore, an understanding of the definition of these accounts, provided later in this section, will avoid confusion when utilizing the cost estimates provided herein.

2.2 PLANT DESIGN CRITERIA

2.2.1 General Study Criteria

The major criteria for the PWR plant study were discussed in Section 1. The key parameters are tabulated in Tables 2-1 and 2-2 in this section. Licensing and design criteria circa January 1, 1976 are utilized. Safety classifications, seismic categories and design codes for the major structures and equipment are addressed below and in the Equipment List, (Volume II, Section 5). The design of the main heat rejection system is based upon the use of mechanical draft wet cooling towers. The nuclear ultimate heat sink is also based on mechanical draft wet cooling towers.

2.2.2 Structural Design Criteria

The structural design criteria used in formulating the design of the nuclear and non-nuclear structures of the reference plant design are summarized as follows:

TABLE 2-1

KEY PLANT PARAMETERS, NUCLEAR STEAM SUPPLY SYSTEM
1139 MWe PRESSURIZED WATER REACTOR PLANT

NSSS Warranted Power, MWt	3,425
Steam Flow, 10^6 lb/hr	15.14
Steam Pressure, psia	1,000
Power Density - Avg., kW/liter	104
Linear Power - Avg., kW/ft	5.4
Linear Power - Max., kW/ft	12.6
Heat Flux - Avg., Btu/hr/ft^2	189,800
Heat Flux - Max., Btu/hr/ft^2	474,500
Min. Crit. Heat Flux Ratio	1.3
Number of Fuel Assemblies	193
Number of Control Assemblies	65
Reactor Vessel ID, in	173
Number of Coolant/Recirculation Loops	4
Pump Capacity, gpm	94,400
Coolant Flow, 10^6 lb/hr	140.3
Coolant Inlet Temp., ^oF	558.1
Avg. Delta T through Vessel	60.2
Coolant Pressure - Outlet, psia	2,250
Steam Generator Size - Height, ft-in	67 ft - 8 in
- Dia., ft-in	14 ft - 7-3/4 in

TABLE 2-2

KEY PLANT PARAMETERS, STEAM AND POWER CONVERSION SYSTEM
1139 MWe PRESSURIZED WATER REACTOR PLANT

Turbine Output, MWe	1,192.400
Auxiliary Power, MWe	53.790
Net Power to Transformer, MWe	1,138.610
Generator Rating, MVA	1,350
Net Station Steam Rate, lbs/kWhr	13.3
Net Station Heat Rate, Btu/kWhr	10,224
Thermal Efficiency, %	33.38
Main Steam Flow at HP Turbine Inlet, lbs/hr	13,717,722
Main Steam Pressure at HP Turbine Inlet, psia	975
Main Steam Temperature at HP Turbine Inlet, F	544

2.2.2.1 Reactor Containment Building

The reactor containment building including the shield, dome, and foundation mat are designed in accordance with the requirements of the Code for Concrete Reactor Vessels and Containments, ASME Boiler and Pressure Vessel Code, Section III, Division 2, dated January 1, 1975 (hereinafter referred to as Division 2).

The loads listed below are considered in the design of the containment structure.

- Dead Loads - Permanent gravity loads including concrete, structural steel, equipment, piping, cable trays and hydrostatic pressure. The ground water level is assumed at El + 10 ft - 0 in. Buoyancy from ground water is considered in building stability and base mat design.

- Live Loads - Loads which vary with intensity and/or occurrence. During normal operation the live loads considered are a snow load of 80 psf and the lateral soil pressures. During construction live load from cranes, wet concrete on the liner plate and major equipment transport loads are also considered.

- Operational Thermal Loads - A temperature gradient through the containment wall varying between 50 to 120 F on the inside and -10 to 90 F outside.

- Operation Pipe Reactions - Piping reactions transmitted to the containment during normal operation or shutdown conditions.

- Pressure Variation - Differential pressure loads resulting from pressure variation either inside or outside the containment. The maximum pressure considered in the design is 3 psi.

- Test Loads - The structural integrity test pressure is 115 percent of the design pressure and the temperature inside the containment during the test is 100 F to 50 F.

- Wind Load - A basic wind velocity of 130 mph (highest wind velocity assumed at 30 ft above plant grade) and having a 100 year period of recurrence is established for design. Based on this, the wind velocities at various height zones above the ground and the appropriate gust and shape factors employed in translating these velocities into applied wind forces on the structure are determined in accordance with American National Standards Institute, ANSI A58.1 - Building Code Requirements for Minimum Design Loads in Buildings and Other Structures.

- Operating Basis Earthquake (OBE) - The earthquake that could reasonably be expected to affect the plant site during the operating life of the plant. The vertical and horizontal design response spectra are obtained from USNRC Regulatory Guide 1.60, Rev. 1, Dec. 1973, scaled for a peak horizontal acceleration of 0.125g. The effects of two orthogonal horizontal direction earthquakes and one vertical earthquake are considered simultaneously. The effects of the three directions are combined by the square root of the sum of the squares. The dynamic effects of soil are also considered.

- Safe Shutdown Earthquake (SSE) - The earthquake based upon an evaluation of the maximum earthquake potential in the plant region. The effects are considered in the same manner as described for the OBE except that the design response spectra is based on USNRC Regulatory Guide 1.60, Rev. 1, Dec. 1973 scaled for a peak horizontal acceleration of 0.25g.

- Tornado Loads - Tornado effects include wind pressure, diferentail pressure loads due to rapid atmospheric pressure change and tornado generated missile impact effects. The maximum rotational wind velocity of 290 mph, a translational velocity of 70 mph and a pressure drop of 3 psi at a rate of 2 psi/sec are used in design. Horizontal tornado missiles include a wood plank, wood pole, steel rod, steel pipes, and automobile. Vertical missiles are in accordance with USNRC Standard Review Plan 3.5.1.4.

- Flood Loads - The plant site lies ten ft above the 100 year maximum water level of the North River. Consequently no flooding of the site is considered.

- Accident Pressure Load - The maximum design pressure equivalent to the maximum calculated internal pressure associated with a Design Basis Accident with an appropriate margin to account for uncertainties in the analysis. A value of 52 psig is used for design.

- Accident Temperature - The maximum liner temperature associated with the design pressure response. A value of 271 F is used for design. The transient properties of the accident pressure and temperature loads are considered in design.

- Accident Pipe Reactions - Pipe reaction loads due to thermal conditions generated by the Design Basis Accident.
- Pipe Break Loads - The local effects of a reptured high energy pipe including jet reaction forces, jet impingement loads and missile impact forces.

2.2.2.2 Other Seismic Category I Structures

NRC Regulatory Guide 1.29, Seismic Design Classification, requires that structures important to safety be designed to withstand the effects of the Safe Shutdown Earthquake and remain functional. These structures, which are described in Subsection 2.3, Account 21, are designated as Seismic Category I structures, and are designed to loads similar to those described for the reactor containment building. These structures must assure:

a. The integrity of the reactor coolant pressure boundary.

b. The capability to shut down the reactor and maintain it in a safe shutdown condition.

c. The capability to prevent or mitigate the consequences of accidents which could result in potential offsite radiation exposures comparable to the guideline exposures of 10 CFR Part 100.

2.2.2.3 Non-Seismic Category I Structures

Non-Seismic Category I structures are all the remaining plant structures that have not been classified as Seismic Category I, as listed in Subsection 2.3.

Non-Category I structures are designed to withstand the effects of various combinations of all normal loadings to which they are subjected in accordance with ACI 318, Building Code Requirements for Reinforced Concrete, AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings and applicable local building codes. The structures are designed for seismic effects in accordance with criteria established by the Uniform

Building Code. Where a Non-Seismic Category I structure could compromise the function of a Seismic Category I structure, the Non-Seismic Category I structure is designed to resist the same safety related loads (seismic, tornado, etc.) as those used for design of the safety related structures.

In general the major Non-Seismic Category I structures are steel framed structures designed in accordance with the requirements of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. The concrete foundations are designed in accordance with ACI 718.

2.3 PLANT DESIGN DESCRIPTION

Following are the PWR plant design descriptions for accounts 21 through 26.

ACCOUNT 21 STRUCTURES AND IMPROVEMENTS

The primary structure in the plant is the reactor containment building. This structure is a Seismic Category I reinforced concrete enclosure, consisting of a vertical cylindrical shell with a hemispherical dome and a flat base. A continuously welded plate liner is attached to the inside face of the concrete to ensure a high degree of leak-tightness. The containment and other reinforced concrete Seismic Category I structures house all safety related equipment essential for safe plant operation, shutdown and control. These structures generally consist of reinforced concrete foundation mats, exterior walls, interior walls, floor slabs and roof slabs and resist horizontal loads with exterior walls behaving as shear walls. The interior slabs and roof slabs are supported on heavy structural steel framing.

The major Seismic Category I structures include:

Reactor Containment Building - Houses the NSSS and associated equipment, provides biological shielding and protects the environment in the event of a postulated abnormal condition in the reactor coolant system. The interior concrete of the reactor containment structure is also Seismic Category I, and supports the components and equipment, provides biological shielding and protects the steel liner from postulated pipe break effects in the reactor coolant system.

ACCOUNT 21

Primary Auxiliary Building - Houses auxiliary nuclear equipment such as heat exchangers, pumps, demineralizers, filters, tanks ventilation equipment and residual heat removal equipment.

Waste Process Building - Houses liquid, solid and gaseous radioactive waste processing and boron recovery equipment.

Fuel Storage Building - Houses new and spent fuel, associated pool cooling and cleaning systems, and decontamination and shipping areas.

Control and Diesel Generator Building - The North portion of the structure comprising the diesel generator building houses the emergency diesel generators, their associated equipment and the diesel oil storage tanks. The South portion of the structure comprising the control building houses the necessary instrumentation and control equipment essential for plant operation under normal and accident conditions.

Emergency Feedwater Pump Building (Including Electrical Tunnels) - Houses emergency feedwater pumps, demineralized water makeup pumps and the electrical cables and conduits running between the reactor containment building and the control building.

Main Steam and Feedwater Pipe Enclosures - Houses the Seismic Category I sections of the main steam and feedwater piping outside of the reactor containment building.

Ultimate Heat Sink Structure - Houses the cooling towers and associated equipment necessary to provide emergency service water to the plant.

ACCOUNT 21

The major Non-Seismic Category I structures house Non-Seismic Category I equipment and components not required for plant safety or safe shutdown. These structures generally consist of structural steel framing, metal siding and concrete plank roofing, and are founded on reinforced concrete spread footings. These structures are designed to assure that their failure will not cause loss of function of a Seismic Category I structure.

The major Non-Seismic Category I structures include:

Turbine Room and Heater Bay - Houses the turbine generator, condensers and associated equipment, feedwater heaters, feedwater pumps, condensate pumps, condensate booster pumps, condensate polishing and demineralizing equipment, other auxiliary equipment, and switchgear rooms.

Administration and Service Building - Houses the general offices, conference rooms, storage areas, auxiliary boilers, water treatment equipment and various laboratories and shops.

Make-up Water Intake and Discharge Structure

Fire Pump House

Non-Essential Switchgear Building

Circulating Water Pump House

Holding Pond

Chlorination Building

Make-up Water Pretreatment Building

ACCOUNT 21

ACCOUNT 211 Yardwork

The plant location is the hypothetical site of Middletown USA. This is as defined in Section 6 (Site Description) of this report.

The datum plane for site and yard elevations is mean river level. Main plant finish grade is 18 ft above mean river level. Soil overburden is estimated to be eight ft thick. Limestone rock with no underground cavities and satisfactory for supporting plant structures is located below the overburden.

Site preparation consists of clearing, grubbing, and stripping of top soil for all structures, roads, railroads, parking areas, materials handling areas and construction facilities. Rough grading quantities include the general cut and fill for the main plant structures and fine grading with landscaping.

Earth excavation, rock excavation, backfill, concrete fill and dewatering for the main plant structures are included with the structure associated yardwork. This includes all excavation work for the main nuclear and turbine plant areas. Excavation work for structures not included with the main excavation are included with the structural work for each of the individual buildings. The cut and fill work also includes hauling, dumping stock-piling, placing and compacting. The fill is separated into select and compacted Category I fill adjacent to Seismic Category I structures, select and compacted Non-Category I fill adjacent to Non-Seismic Category I structures and general area fill in the main plant area. In addition concrete fill is used under and adjacent to portions of the structure below rock. In cases where rock elevations vary, concrete fill is used to assure that building loads are carried to competent rock. In general, the main plant excavation is a large open cut with deeper cuts provided to accommodate the reactor containment building, reactor cavity pit and the safeguards pump vault.

Excavated material is used on site for general fill as much as possible. Spoil areas and storage areas are utilized for excavated material not used for fill or for top soil. Erosion and sedimentation control of these areas is practiced in accordance with EPA requirements. Temporary settling basins are provided to collect all runoff during construction prior to discharge into the North River.

Transformer area, above ground oil storage tanks and other oil or chemical storage and handling areas are designed to contain spills and collect and route surface runoff to the holding pond prior to discharge to the North River. In addition, turbine building floor drains and other plant dirty drains, are routed by underground piping to the waste process building, as required, or to the holding pond for treatment before discharge into the North River.

The yard drainage system consists of interceptor ditches (paved and unpaved) and storm drains with catch basins to carry off storm water from developed areas. Water courses that are intercepted near the plant are diverted by ditches into existing stream beds or storm drains. Culverts carry stream flow under the railroad and roads. The yard surface water drainage is directed to the North River via the existing water courses as much as possible. Building roof drainage is directed to the yard drainage system.

ACCOUNT 21

A temporary sanitary sewerage system is provided during construction. Piping and toilet facilities for permanent plant requirements are designed based on permanent plant personnel requirements.

Highway access is provided to the site by five miles of secondary roads connecting to a state highway. This road is in good condition and needs no additional improvements. An onsite asphalt road is provided around the main plant structures. The highway road is paved in accordance to the standard thicknesses required for public highways. In addition, parking areas, concrete curbs and walks are provided. Temporary construction roads with minimum thickness paving (AASHO HS20 Loading) and unpaved roads for materials handling equipment are provided. Service roads are arranged to provide access to all truck sized doors in the plant and to all buildings requiring servicing or maintenance by vehicles.

Railroad access is provided by constructing a railroad spur which intersects the B&M Railroad. The length of the spur from the main line to the plant site is five miles in length. The spur approaches the site from the east. Additional spurs are provided to the southeast end of the turbine building and the south end of the fuel storage building. All roadbed and trackage are designed in accordance with the latest railroad standards. Railroad structures are designed for Cooper E80 wheel loading.

In addition to the above items, fencing, a gate house and roadway and yard lighting are provided with the yardwork.

ACCOUNT 212 Reactor Containment Building

The containment, which houses the NSSS and associated equipment, is a Seismic Category I reinforced concrete cylindrical structure with a hemispherical dome and a flat reinforced concrete foundation keyed into the rock by the depression for the reactor cavity pit. The reinforced concrete foundation is 151 ft in diameter and 10 ft thick and founded approximately 60 ft below finished grade and 52 ft below the top of rock. The reactor cavity pit extends an additional 23 ft below the bottom of the reinforced concrete foundation. The cylindrical portion of the containment has an inside diameter of 140 ft. It measures 149 ft from the top of the foundation mat to the springline of the dome and has a wall thickness of 4½ ft. The dome portion has an inside spherical radius of 70 ft and a thickness of 3½ ft. The inside height from the top of the mat to the dome is 219 ft.

A continuously welded steel plate liner, 3/8 in thick on the cylinder wall, ½ in thick on the dome and ¼ in thick on the foundation mat, is anchored to the inside face of the concrete to function as a leak-tight membrane. The bottom liner plate is supported on top of the foundation mat and is protected by a four ft thick concrete slab which supports internal equipment loads and forms the floor of the containment.

A combination equipment hatch and personnel air lock is provided in the containment wall at the level of the operating floor and is used to move equipment into the containment during construction and for removal and replacement of equipment during plant operation. A personnel lock is provided for access at a lower floor level of the containment. Piping, electrical fuel transfer and duct penetrations are also provided through the wall at various locations and designed to remain gas-tight during all conditions for which the containment is designed.

The containment floor supports all primary equipment, primary equipment supports, supports for other components and equipment located in the containment and the interior containment structures. All containment interior structures are independent of the containment cylinder wall. The major containment interior structures include the following:

a) Primary Shield Wall - A six ft circular reinforced concrete wall enclosing and supporting the reactor pressure vessel.

b) Secondary Shield Wall - A four ft octagon shaped reinforced concrete wall enclosing the reactor coolant piping, steam generators, reactor coolant pumps and their supports.

c) Refueling Canal - Reinforced concrete walls and floors covered with stainless steel liner through which new and spent fuel elements are transported during refueling.

d) Operating Floor Slab and Crane Support Beams - A three ft thick reinforced concrete slab spanning between the crane support structure beams. The beams are supported on a series of reinforced concrete columns. The crane rails at the extremities of the operating floor slab support a gantry type polar crane used for placement and maintenance of major equipment in the containment.

Other concrete internal structures are the pressurizer shield wall and control rod missile shield.

The annulus between the secondary shield wall and the containment wall houses accumulator tanks, the pressurizer relief tank, instrumentation racks, heat exchangers, cooling units, filter systems and miscellaneous equipment for auxiliary systems. The primary system is housed within the secondary shield wall which isolates the system and postulated accidents from the auxiliary systems in the containment structure and provides necessary shielding. Structural steel is utilized to support floors in the annulus at the operating level and intermediate levels to provide means of travel and access to the various components and equipment.

In addition to housing the NSSS and providing a leak tight structure, the containment also serves as a biological shield which protects the environment from the effects of normal plant operation and abnormal events. It also protects the housed systems from the effects of various natural phenomena occurring at the plant site.

The containment building heating, ventilating and air conditioning (HVAC) systems maintain a containment atmosphere suitable for equipment operation and provide a means for removing fission products prior to entry, during refueling and following a design basis accident (DBA).

ACCOUNT 21

During normal operations suitable temperatures are maintained by the containment recirculation cooling system. This system is comprised of six fan coil units, each rated at 20 percent of the maximum design heat load. Two 100 percent capacity water chillers, located in the primary auxiliary building, provide water at 48 F to the fan coil units in the containment.

Prior to entry into the containment, fission products are reduced to acceptable levels by the containment recirculating filter system and pre-entry purge system. The pre-entry purge system purges the containment through prefilters and HEPA-charcoal - HEPA filters at 15,000 cfm, following recirculation of the containment atmosphere, by the recirculating filters system, for a predetermined period of time. The recirculating filter system is equipped with prefilters and HEPA-charcoal - HEPA filters and rated at 4000 cfm. In addition, the recirculating filter system, a fully redundant safety related system, functions during post LOCA conditions to promote mixing hydrogen rich atmosphere with remaining containment volume, and to reduce the inventory of fission products available for release prior to venting the containment for hydrogen control.

The gross volume of the containment is 3,000,000 cu ft and the net volume is 2,750,000 cu ft.

ACCOUNT 213 Turbine Room and Heater Bay

The turbine building (including heater bay) is a Non-Seismic Category I structure, located east of the containment structure. The turbine building is a three story steel framed structure 135 ft wide, 325 ft long and 130 ft high. The heater bay is a two story steel framed structure 65 ft wide, 325 ft long and 77 ft high. The building is supported on reinforced concrete spread footing on rock. The reinforced concrete ground floor is located at grade. The building volume is approximately 7,500,000 cu ft. The mezzanine and operating floors are reinforced concrete slabs supported on metal deck on steel framing. The roof is concrete channel plank covered with a roofing membrane. The exterior walls are insulated metal siding, and the interior walls are concrete block. The massive "high-tuned" turbine pedestal is reinforced concrete and is supported on a thick concrete foundation mat bearing on rock. The turbine pedestal is isolated from the remaining building support loads. The building houses the turbine-generator machine, its condensers and associated equipment, feedwater heaters, feedwater pumps, condensate pumps, condensate booster pumps, condensate polishing and demineralizing equipment, turbine lube oil equipment, other auxiliary equipment, and switchgear rooms.

The turbine room and heater bay are cooled by a total of 20 roof ventilators. Each ventilator, ten for the turbine room and ten for the heater bay, is rated at 90,000 cfm. During the winter months heating is provided by 24 steam heater units located throughout the turbine building.

At the east end of the building is located a rail car bay for transport of generator and turbine parts. An overhead travelling crane located at the top of the building serves this bay as well as the full operating floor area. All floors are connected by several stairways and a passenger elevator.

ACCOUNT 215 Primary Auxiliary Building And Tunnels (Including Residual Heat Removal Vault)

The primary auxiliary building is a reinforced concrete Seismic Category I structure located north of the containment structure and supported on a four ft thick reinforced concrete foundation. The building is not symetric and has changes in elevation of the base mat at various locations in the building. Nominally the base mat is founded on rock 30 ft below grade. Portions of the building are founded deeper or shallower than the above. However, in all cases support is provided by rock. The major portion of the building is 79 ft wide, 144 ft long and three stories or 91 ft high. Some portions of the building have a raised roof. The portion of the building housing the safeguards pumps is an attached section founded on rock 85 ft below grade. The height of the safeguards vault is 90.5 ft. The volume of the primary auxiliary building and safeguards vault is 1,140,000 cu ft.

The exterior walls, interior walls, floor slabs and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The floor slabs are cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place concrete over metal deck, covered with a roofing membrane and supported on steel framing.

The 79 by 144 ft portion of the building has two intermediate reinforced concrete floors which house miscellaneous auxiliary nuclear equipment such as heat exchangers, pumps, demineralizers, filters, tanks and ventilation equipment. Below grade reinforced concrete pipe tunnels connect the building to the containment, waste treatment building and fuel storage building.

ACCOUNT 21

The safeguards section is subdivided into compartments and houses containment spray pumps, residual heat removal pumps and heat exchangers.

The primary auxiliary building is cooled by outside air supplied at 250,000 cfm. During the winter months heating is provided by duct coils and unit heaters supplied from the building hot water heating system. Approximately 60,000 cfm of the supply air is directed from the primary auxiliary building to the fuel storage building for area ventilation and eventual exhaust. The primary auxiliary building exhaust is divided into non-contaminated and potentially-contaminated systems. The non-contaminated exhaust is sent directly to the plant vent without filtration and is rated at 120,000 cfm. Potentially contaminated areas of the building are exhausted separately through prefilters and a HEPA-charcoal-HEPA filter bank in the atmospheric cleanup system. The atmospheric cleanup exhaust system is rated at 76,000 cfm.

ACCOUNT 216 Waste Process Building (Including Tank Farm)

The waste process building is a partially reinforced concrete structure located North of the primary auxiliary building and supported on a four ft thick reinforced concrete foundation. The building is not symetric and has changes in elevation of the base mat at various locations in the building. Nominally, the base mat is founded on rock 55 ft below grade. Portions of the building are founded shallower than the above. However, in all cases, except the tank farm portion which is founded at grade, support is provided by rock.

The waste process building is approximately 80 ft wide, 150 ft long and four stories or 120 ft high. Some portions of the building have a raised roof for mechanical equipment location. The tank farm portion of the building is approximately 57 ft wide by 128.5 ft long and is attached to the south end of the building adjacent to the primary auxiliary building. The height of the tank farm building is 65 ft. The volume of the waste processing building is 1,350,000 cu ft and the volume of the tank farm portion is 450,000 cu ft.

The major portion of the waste process building, the exterior walls, interior walls, floor slabs and roof slab, are reinforced concrete. The exterior walls are a minimum of two ft thick. The floor slabs are cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place concrete over metal deck, covered with a roofing membrane and supported on steel framing. Portions of the building have insulated metal siding and the roof is concrete channel plank covered with a roofing membrane. Steel framing is used in these portions of the building instead of reinforced concrete. Seismic Category I requirements are invoked where necessary to protect selected components.

ACCOUNT 21

The tank farm portion is structural steel framing with insulated metal siding and insulated built-up roofing on metal roof deck supported on structural steel. A 20 ft high reinforced concrete dike wall surrounds the refueling water storage tank.

A reinforced concrete truck facility is attached to the west wall for shipping drums or containers. Below grade pipe tunnels connect the waste process building to the primary auxiliary building. The building contains radioactive liquid, gaseous, and solid waste processing and boron recovery equipment. The tank portion of the farm building houses the make-up water storage tank and the refueling water storage tank.

The waste process building is cooled by outside air supplied at 120,000 cfm. During the winter months the supply air is heated by steam coils in the supply air units and a hot water unit heater located in the boron waste compartment. Air is exhausted from the building through prefilters and HEPA-charcoal-HEPA filtration units to reduce the level of radioactive materials that might be present, and discharged to the plant vent.

ACCOUNT 217 Fuel Storage Building

The fuel storage building is a reinforced concrete Seismic Category I structure located west of the containment structure and supported on a four ft thick reinforced concrete foundation. The building is not symetric and has changes in elevation of the base mat at various locations in the building. The spent fuel pit is founded on rock 40 ft below grade. Portions of the building are located above this elevation but are supported on rock except for the cask shipping area which is supported on grade. The building is 94 ft wide, 96 ft long and 104 ft high. The volume of the building is 630,000 cu ft.

The spent fuel storage area is constructed of thick reinforced concrete walls and floor. They are lined on the inside surfaces with stainless steel plates for leak tightness. The building exterior walls, interior walls, floor slabs and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The floor slabs are cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place concrete over metal deck, covered with a roofing membrane and supported on steel framing.

The building contains the new fuel storage area, spent fuel storage area, cask storage area, cask decontamination and shipping areas and spent fuel pool cooling and cleaning systems. New and spent fuel are stored in stainless steel racks located in pools of borated water. The 125 ton bridge crane and auxiliary hoists handle the spent fuel casks and new fuel bundles. A crane that runs on rails supported on the operating floor handles the fuel assemblies.

ACCOUNT 21

The fuel storage building is cooled by outside air supplied from the primary auxiliary building supply system at approximately 60,000 cfm. During the winter months heating is provided by ten hot water unit heaters located throughout the building. Air is exhausted from the building through prefilters and HEPA-charcoal-HEPA exhaust filtration units to reduce the level of radioactive materials that might be present, and directed to the primary auxiliary building exhaust system for discharge to the plant vent.

ACCOUNT 21

ACCOUNT 218A Control And Diesel Generator Building

The control and diesel generator building is a reinforced concrete Seismic Category I structure located east of the primary auxiliary and waste process buildings with a four ft thick reinforced concrete base slab located at grade. All load carrying walls and columns are founded on rock below grade. The overall dimensions of the building are 90 ft wide and 231 ft long. The south portion of the structure comprising the control building is 90 ft wide, 138 ft long and three stories or 78 ft high. The north portion of the structure comprising the diesel generator building is 90 ft wide, 93 ft long and two stories or 58.5 ft high. Below the north end of the diesel generator building, the seven day diesel oil storage tanks are located in a 90 ft by 47 ft room with a reinforced concrete foundation founded on rock 40 ft below grade. The volume of the control building is 900,000 cu ft and the volume of the combined diesel generator seven day storage tank building is 530,000 cu ft.

The exterior walls, interior walls, floor slabs and roof slabs are reinforced concrete. The exterior walls are a minimum of two ft thick. A reinforced concrete wall separates the diesel generators and supports the second floor. The roof of the diesel generator building and the intermediate floors and roof of the control building are supported on reinforced concrete columns. All floor slabs are cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place concrete over metal deck covered with a roofing membrane and supported on steel framing. The diesel generator building houses the diesel generators, air intakes for the diesel generators, building ventilation equipment, and the diesel oil storage tanks. The control building houses electrical switchgear, MG sets and battery rooms on the first floor. The second floor is for cable spreading, and the main control and computer rooms are located on the third floor.

The control building HVAC system provides the equipment and redundancy necessary to maintain an operating environment in the control room and emergency switchgear, battery, and cable spreading areas during all normal and emergency conditions. The control room is also provided with redundant environmental control systems that ensure habitability for extended periods of time following postulated design basis accidents. These control room habitability systems are considered to be part of the station engineered safety features (ESF) and consist of redundant emergency air intakes and recirculation charcoal filtration units. Each diesel generator compartment in the building is provided with its own ventilation system for use when the diesels are in operation and a standby heating system for equipment protection under winter conditions. Heating for other general building areas is provided by a non-safety related hot water heating system serving heating coil units and duct reheat coils throughout the building. Those safety related areas that require heating during shutdown under winter conditions are equipped with electrical space heaters to provide hot water to protect the equipment.

ACCOUNT 218B Administration and Service Building

The administration and service building is a Non-Seismic Category I structure located north of the turbine building heater bay. The building is a two story steel framed structure 176 ft wide, 270 ft long and 38 ft high. This building is supported on reinforced concrete spread footings on rock. The reinforced concrete ground floor is located at grade. The intermediate floor is reinforced concrete supported on metal deck on steel framing. The roof is concrete channel plank covered with a roofing membrane. The exterior walls are insulated metal siding and the interior walls are either concrete block or metal partitions. Most areas are provided with suspended accoustical ceilings. The building volume is approximately 1,500,000 cu ft.

The building houses the auxiliary boilers, water treatment equipment, locker and change rooms, toilets, spare parts room, small shops, machine shop, laboratories, general offices, conference rooms and storage areas.

The administration and services building HVAC systems maintain environmental conditions of normally occupied spaces within the prescribed comfort zone and ensure that temperatures and humidity in other areas are suitable for material storage and equipment operation. Heating and air conditioning is provided by fan cooler/heating units located throughout the building. All supply air to the building is heated as necessary by steam preheaters and hot water coils in the supply air units. Hot water and chilled water for the fan cooler/heating units are supplied from central hot water heating systems and refrigerated chilled water systems. Steam for preheating supply air to the building is supplied by the auxiliary boiler system. All HVAC systems associated with the administration and services building are non-safety related systems.

ACCOUNT 218D Fire Pump House Including Foundation For Two Fire Protection Tanks

The fire pump house is a Non-Seismic Category I structure located southeast of the main plant structures, east of the fuel oil storage tank and south of the main switchyard. The Non-Seismic Category I fire protection tanks are located south of the fire pump house. The fire pump house is a single story steel frame structure 28 ft wide, 76 ft long and 17 ft high. The building is supported on reinforced concrete spread footings. The reinforced concrete ground floor is located at grade. The roof is insulated built-up roofing on metal roof deck supported on structural steel. The exterior walls are insulated metal siding. A ten ft square by 20 ft deep reinforced concrete pit is attached to the west end of the building below grade with its bottom slab supported on rock. The approximate volume of the building is 34,000 cu ft, and houses the fire pumps and associated equipment.

The foundations for the fire protection tanks are reinforced concrete ring walls 45 ft in diameter, 1.5 ft thick and 5.6 ft high. A compacted sand bed is provided inside the ring wall.

ACCOUNT 218E Emergency Feedwater Pump Building and ACCOUNT 218G Electrical Tunnel

The emergency feedwater pump building is a reinforced concrete Seismic Category I structure located east of the containment structure and above the electrical cable tray tunnel. The building extends from the roof of the electrical tunnel seven ft above grade to 27 ft above grade. The portions of the building extending beyond the electrical tunnel are supported on reinforced concrete walls founded on rock. The containment serves as the west wall of the building. The building is approximately 33 ft wide and 80 ft long. The volume is 66,000 cu ft.

ACCOUNT 21

The electrical cable tunnel is a reinforced concrete box type Seismic Category I structure located beneath the emergency feedwater pump house. It is a two-story high structure where it joins the containment. The tunnel which is approximately 52 ft wide and extends from seven ft above grade to 50 ft below grade is founded on rock. The top slab is the floor of the emergency feedwater pump building. In the area away from the containment, tunnel dimensions, configurations and elevations vary, but are nominally 19 ft wide.

The exterior walls, interior walls, floor slab and roof slab are reinforced concrete. The exterior walls are a minimum of two-ft thick. The portion of the floor slab which forms the roof of the electrical tunnel is cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place concrete over metal deck, covered with a roofing membrane and supported on steel framing. The roof is supported on reinforced concrete columns on the west side adjacent to the containment. The emergency feedwater pump building contains emergency feedwater pumps, demineralized water make-up pumps, valve stations and an auxiliary control panel. The electrical tunnel contains cable runs from the containment to the control building.

ACCOUNT 218F Radiological Control Access Manway Tunnels

The manway tunnels are reinforced concrete box type Seismic Category I structures, which are founded at various elevations. Where they extend beneath a building the bottom floor of the building forms the roof of the tunnel. In other areas the roof is cast in place concrete over metal deck and supported on steel framing. The clear dimensions of the tunnels are eight ft square.

The tunnels provide controlled access to various main plant structures from the administration and service building.

ACCOUNT 218H Non-Essential Switchgear Building

The non-essential switchgear building is a Non-Seismic Category I structure located east of the control building and west of the administration and service building. The building is a single story steel frame structure 39 ft wide, 98 ft long and 28 ft high with a volume of 117,000 cu ft. The building is supported on reinforced concrete spread footings, and the reinforced concrete ground floor is located at grade. The roof is concrete channel plank covered with a roofing membrane. The exterior walls are insulated metal siding and masonry. The east and west walls are common with the administration and service building and control building respectively. The building houses all non-safety related switchgear.

ACCOUNT 218J Main Steam and Feedwater Pipe Enclosures

The main steam and feedwater pipe enclosure areas are reinforced concrete Seismic Category I structures located on the south and north sides of the containment structure. The floors are located 17 ft below grade with the walls extending to competent rock for support except in the portion of the north tunnel near the containment where the roof of the mechanical penetration area forms the floor of the enclosure. The mechanical penetration area is 39 ft high and founded on rock 56 ft below grade. The enclosures are each 59 ft high, 115 ft long and 18 ft wide (20 ft wide on north side) with a total volume of approximately 70,000 cu ft. The mechanical penetration area is approximately 25 ft wide and 90 ft long.

The exterior walls, interior wall slabs and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The roof of the mechanical area which forms the floor of the enclosure is cast in place concrete over metal deck and supported on steel framing. The roof of the enclosures is reinforced concrete supported on reinforced concrete beams and covered with a roofing membrane.

The enclosures support and protect the Seismic Category I portion of the main steam and feedwater piping between the containment and the turbine building.

ACCOUNT 218K Pipe Tunnels

The pipe tunnels are reinforced concrete box type structures. Where the pipe in the tunnel is Seismic Category I the tunnel is designed to be Seismic Category I. They are founded at various elevations. Where they extend beneath a building the bottom floor of the building is the roof of the tunnel. In other areas the roof is cast in place concrete over metal deck and supported on steel framing. The clear dimensions of the tunnel are eight ft wide by ten ft high. The tunnels provide protection for piping between various buildings.

ACCOUNT 218M Hydrogen Recombiner Structure

The hydrogen recombiner structure is a reinforced concrete Seismic Category I structure located west of the south main steam and feedwater pipe enclosure.

The bottom slab is located at grade and forms the roof of the below grade electrical room. The building is 16 ft wide, 24 ft long and 18 ft high. The volume is approximately 7000 cu ft. Attached to the south end of the building is a ten ft wide and 27 ft long instrument room which also serves as a shield for the hydrogen recombiner structure.

The exterior walls, floor slab and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The roof slab is cast in place concrete over metal deck covered with a roofing membrane and supported on steel framing.

The building houses the hydrogen recombiner and associated equipment.

ACCOUNT 218P Containment Equipment Hatch Missile Shield

The containment equipment hatch missile shield is a reinforced concrete Seismic Category I structure located adjacent to the containment structure in the southwest quadrant. Three walls are supported on a reinforced concrete footing on rock. The other wall is the containment structure. The bottom reinforced concrete floor is located at grade at the elevation of the equipment hatch floor. The structure is ten ft wide, 34 ft long and 40 ft high. The volume is approximately 14,000 cu ft.

The walls, floor slab and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The wall in front of the equipment hatch is removable.

The missile shield provides an entrance enclosure and protects the steel equipment hatch from tornado generated missiles.

ACCOUNT 218S Hold Pond

The holding pond is a Non-Seismic Category I reinforced concrete basin located on the river side to the north of the main plant structures and founded approximately eight ft below grade. The basin is eight ft deep. The foundation is a two ft thick reinforced concrete mat founded on rock. The plan dimensions are 67 ft square, and the volume is approximately 36,000 cu ft. The holding pond collects effluent from non-radioactive plant drains.

ACCOUNT 218T Ultimate Heat Sink Structure

The ultimate heat sink structure is a Seismic Category I reinforced concrete structure located west of the main plant structures and supported on a three ft thick reinforced concrete foundation. The major portion of the base mat is founded on rock 31 ft below grade. The north and south bays have reinforced concrete floor slabs at grade level and are supported on wall footings bearing on rock. The building is 45 ft wide, 250 ft long and 88.5 ft high. The building volume is approximately 850,000 cu ft.

The exterior walls, interior walls, floor slabs and roof slab are reinforced concrete. The exterior walls are a minimum of two ft thick. The floor slabs are cast in place concrete over metal deck and supported on steel framing. The roof slab is cast in place watersealed concrete over metal deck and supported on steel framing.

The two middle bays contain two cooling tower cells with a basin which provides 7 days of service water to the plant in the event that the Non-Seismic Category I main cooling towers are not operable. The two-story bays north and south of the tower bays contain the pumps which transport the service water through underground pipes to the main plant buildings. The end building bays are each two story mechanical and electrical equipment rooms.

ACCOUNT 218V Control Room Emergency Air Intake Structures

The control room emergency air intake structures are two Seismic Category I reinforced concrete structures remotely located approximately 500 ft northeast and southwest of the control building. The air intake piping pit is located below grade and founded on rock ten ft below grade. Each structure has a base slab and walls of reinforced concrete ten ft square and nine ft deep, and has a volume of 500 cu ft. Each structure has a top slab of reinforced concrete, which covers the piping pit and forms the floor of the security area around the air intake pipe. Each slab is at grade level and is 18 ft square. An 8.5 ft security fence is located around the perimeter of each slab, which is supported on edge footings beneath the security fence.

Each air intake structure is capable of providing air required to ensure habitability of the control room in the event of an abnormal event during plant operation.

ACCOUNT 22 REACTOR PLANT EQUIPMENT

The design of the reactor plant is primarily based on the Westinghouse Reference Safety Analysis Report (RESAR-3S), and on principal technical features corresponding to the Public Service Company of New Hampshire Seabrook Station. RESAR-3S describes the Westinghouse standardized four-loop, single unit NSSS for a pressurized water reactor. The NSSS scope includes the reactor, reactor coolant system, residual heat removal system, emergency core cooling system, chemical and volume control system, fuel handling system, and associated instrumentation and controls for these systems.

The balance of the reactor plant systems include the boron recycle system, radioactive waste system, service water system, containment spray system, combustible gas control system, fuel handling and storage system, reactor make-up water system, primary component cooling water system, and air clean-up system.

This section includes brief technical descriptions of the reactor plant equipment as follows:

ACCOUNT 221 Reactor Equipment (reactor vessel, reactor core, rod cluster control assemblies, and control rod drive mechanisms)

ACCOUNT 222 Main Heat Transfer and Transport System (steam generators, reactor coolant pumps, pressurizer, pressurizer relief tank and associated pipings and valves)

ACCOUNT 22

ACCOUNT 223 Safeguards System (residual heat removal system, safety injection system, containment spray system, and combustible gas control system)

ACCOUNT 224 Radwaste Processing System (liquid waste, steam generator blowdown processing, gaseous waste and solid waste systems)

ACCOUNT 225 Fuel Handling and Storage System (new and spent fuel storage system, and spent fuel pool cooling and purification system)

ACCOUNT 226 Other Reactor Plant Equipment (gas supply system (H_2/N_2), reactor make-up water system, chemical and nuclear control system, boron recycle system, fluid leak detection system, nuclear service water system, primary component cooling water system, maintenance equipment and sampling system)

ACCOUNT 227 Instrumentation and Control System.

ACCOUNT 221 Reactor Equipment

The reactor includes the reactor vessel, fuel core, control rod clusters, their drive mechanisms, and various internal support mechanisms. The reactor vessel serves to contain the light water moderator coolant. The coolant flows through the fuel core where it picks up heat and transports it to the external steam generators for the production of steam.

Reactor Vessel

The reactor vessel is cylindrical, with a welded hemispherical bottom head and a removable, flanged and gasketed, hemispherical upper head. The vessel contains the core, core supporting structures, control rods and other parts directly associated with the core.

The vessel has inlet and outlet nozzles located in a horizontal plane just below the reactor vessel flange but above the top of the core. Coolant enters the vessel through the inlet nozzles and flows down through the core barrel-vessel wall annulus, and is then directed up through the core to the outlet nozzles.

Reactor Core

The core is approximately cylindrical in shape and consists of fuel assemblies containing the fissionable material. The fuel is in the form of slighrly enriched uranium dioxide pellets which are enclosed in Zircaloy-4 tubes. The tubes (rods) are then combined to form the fuel assemblies. Pressurized water flows downward between the core and the reactor vessel and then upward through the core; the water acts as moderator, coolant, and a solvent for the boric acid shim.

The reactor core is of the multi-region type. Fuel assemblies having the highest enrichment are placed on the periphery of the core; those with lower enrichments are mixed in the central region of the core in a pattern that yields the most uniform power distributions. At the time of refueling, the central region fuel assemblies having the lowest enrichments are removed and outer region fuel assemblies are shifted inward in accordance with a selected reload pattern. Fresh fuel is then added at the core periphery. This method ensures the desired power distribution and results in the optimum power output for the entire core.

ACCOUNT 22

Reactor control is provided by neutron-absorbing control rod clusters and by a neutron absorber (boric acid) dissolved in the reactor coolant. The control rod clusters are used to follow load changes, to provide reactor trip capability, and to furnish control for slight deviations in reactivity due to temperature. In event of a reactor trip, the control rods fall into the core by gravity. The concentration of the boric acid is varied during the life of the core to compensate for changes in reactivity that occur with fuel depletion, as well as to compensate for the reactivity associated with the xenon transients arising from power level changes.

Rod Cluster Control Assemblies

The control elements of a rod cluster control assembly consist of cylindrical neutron absorber rods, having approximately the same dimensions as a fuel rod and connected at the top by a spider-like bracket to form rod clusters. Two types of rod cluster controls are employed: full-length and part-length. The full length type incorporates rods of silver-indium-cadmium absorber material extending the full length of the core. Stainless steel tubes encapsulate the absorber material, isolating it from the reactor coolant. Full-length rod cluster controls provide operational reactivity control and can shut the reactor down at all times, even with the most reactive rod stuck out of the core.

The part-length rod cluster controls, although identical in external appearance and design, incorporate rods with absorber material only in the bottom quarter of the tube. The remainder of the tube is filled with aluminum oxide. The absorber region of the part-length rod is positioned at various elevations in the core to shape the axial power distribution and to control axial xenon redistribution accompanying power level changes.

Control Rod Drive Mechanisms

The full-length control rod clusters are positioned by latch-type magnetic jack drive mechanisms mounted on the reactor vessel head.

The drive mechanism consists of five major components: 1) pressure housing, 2) operating coil stack, 3) internal latch assembly, 4) position indicator coil stack, and 5) control rod cluster drive shaft.

All moving components of the mechanism are contained in a stainless steel pressure housing attached to a heat adapter. The adapter is welded to the reactor vessel and constitutes, in effect, an integral part of the vessel. The housing is completely free of mechanical seals and of penetrations for hydraulic and electric lines.

The part-length control rod clusters are positioned by magnetic jack-type mechanisms mounted on the reactor vessel head. The design and operation of this mechanism is essentially the same as that of the full-length mechanism.

The unique feature of the part-length mechanism is its ability to hold and maintain control rod position in the event of a power interruption or a complete power failure. The part-length rods remain in position during a reactor trip.

ACCOUNT 22

ACCOUNT 222 Main Heat Transfer and Transport System

The reactor coolant system (RCS) consists of four similar heat transfer loops connected in parallel to the reactor pressure vessel. Each loop contains a reactor coolant pump, steam generator and associated piping and valves. In addition, the system includes a pressurizer, a pressurizer relief tank, interconnecting piping and instrumentation necessary for operational control. All the above components are located in the containment building.

During operation, the RCS transfers the heat generated in the core to the steam generators where steam is produced to drive the turbine generator. Borated demineralized water is circulated in the RCS at a flow rate and temperature consistent with controlling the reactor core thermal-hydraulic performance. The water also acts as a neutron moderator and reflector, and as a solvent for the neutron absorber used in chemical shim control.

A block diagram of the reactor coolant system is shown in Dwg. No. 6509.003-P-21.

Steam Generators

The steam generators are identical vertical shell and U-tube evaporators with integral moisture separating equipment. The reactor coolant flows through the inverted U-tubes, entering and leaving through the nozzles located in the hemispherical bottom head of the steam generator. Steam is generated on the shell side and flows upward through the moisture separators to the outlet nozzle at the top.

Reactor Coolant Pumps

The reactor coolant pumps are identical single-speed centrifugal units driven by air-cooled, three-phase induction motors. The shaft is vertical with the motor mounted above the pump. A fly wheel on the shaft above the motor provides additional inertia to extend pump coastdown. Coolant enters at the bottom of the pump and is discharged from the side.

Piping

The reactor coolant loop piping is specified in sizes consistent with system requirements.

The hot leg inside diameter is 29 inches and the inside diameter of the cold leg return line to the reactor vessel is 27-1/2 inches. The inside diameter of the piping between the steam generator and the pump suction is increased to 31 inches to reduce pressure drop and improve flow conditions to the pump suction.

Pressurizer

The reactor coolant system is controlled by the use of the pressurizer where water and steam are maintained in equilibrium by electrical heaters or water sprays. Steam is formed by the heaters or condensed by the pressurizer spray, to minimize pressure variations due to contraction and expansion of the reactor coolant.

The pressurizer is a vertical, cylindrical vessel with hemispherical top and bottom heads. Electrical heaters are installed through the bottom head of the vessel while the spray nozzle, relief and safety valve connections are located in the top head of the vessel.

ACCOUNT 22

Pressurizer Relief Tank

The pressurizer relief tank is a horizontal, cylindrical vessel with hemispherical ends. Steam from the pressurizer safety and relief valves is discharged into the pressurizer relief tank through a sparger pipe under the water level. This condenses and cools the steam by mixing it with water that is near ambient temperature.

Safety and Relief Valves

The pressurizer safety valves are of the totally enclosed pop-type. The valves are spring-loaded, self-activated with back-pressure compensation. The power-operated relief valves limit system pressure for large power mismatches. They are operated automatically or by remote manual control. Remotely operated valves are provided to isolate the inlet to the power-operated relief valves if excessive leakage occurs.

ACCOUNT 22

ACCOUNT 223 Safeguards System

The safeguards system is provided to mitigate the consequences of postulated accidents. The system consists of the residual heat removal (RHR) system, safety injection system (SIS), containment spray system (CSS), and combustible gas control (CGC) system. The containment systems and the habitability systems are discussed in section 212 and 218 respectively, and the primary component cooling water system and the nuclear service water system are discussed in section 226.

Residual Heat Removal (RHR) System

In compliance with the General Design Criteria 34 and 35 of Appendix A to 10 CFR Part 50, the primary function of the residual heat removal system is to transfer fission product decay heat energy from the core and RCS during plant shutdown and refueling operations. The system is also employed in conjunction with the safety injection system for emergency core cooling under postulated pipe rupture accident conditions. The system may also be used to transfer refueling water between the refueling cavity and the refueling water storage tank at the beginning and end of refueling operations.

The RHR system consists of two trains that are completely independent and redundant to each other with respect to safeguards activities.

Under residual heat removal mode, the system is capable of:

1. Cooling the reactor coolant from 350 F and 4000 psig to 140 F within 20 hours after shutdown with both pumps and both heat exchangers in operation.

2. Maintaining reactor coolant temperature as refueling progresses with only one pump and heat exchanger.

3. Draining the refueling cavity back to the refueling water storage tank (RWST) with one residual heat removal pump, without the transfer being on the critical path for refueling.

Under safeguards mode, for a postulated large loss-of-coolant-accident (LOCA), the system is capable of:

1. Injecting sufficient water into the reactor coolant system from the refueling water storage tank to maintain short term core flooding and cooling.

2. Recirculating and cooling sufficient containment sump water back into the reactor coolant system to maintain long term core flooding and cooling.

The RHR system heat exchangers are cooled by the primary component cooling water system, which is described in section 226. A block diagram of the RHR system is shown in Dwg. No. 6509.003-P-20.

Safety Injection System (SIS)

The safety injection system supplies borated water to the reactor coolant system to limit fuel rod cladding temperature during a postulated LOCA. In the event of a postulated steam line break, the system supplies a highly concentrated boric acid solution to provide rapid shutdown.

ACCOUNT 22

The SIS has three modes of operation: Injection phase (passive and active), cold leg recirculation, and hot leg recirculation.

During the passive injection phase, accumulator tanks (one per loop) rapidly inject borated water, stored at approximately 650 psig, into the cold legs of the reactor coolant system. The contents of the accumulators are discharged automatically if depressurization of the RCS causes a reversal of the pressure differential across the accumulator check valves.

The active safety injection phase is handled in two ways: a low-head operation, for injection of borated water into the RCS for large potential breaks, which result in rapid blowdown and depressurization; and a high-head operation, for injection into the RCS for small potential breaks which result in slow blowdown and depressurization.

Emergency coolant flow is maintained to the RCS cold legs after the RWST is emptied following a postulated LOCA, by recirculating water from the containment sump via the RHR system pumps. After approximately 24 hours of cold leg recirculation, the recirculation flow is shifted to the RCS hot legs.

The multiple paths in the accumulator subsystem are completely independent and redundant to each other with respect to safeguards activities. The same holds true for the safety injection subsystem.

Transfer from the injection phase to the cold leg recirculation phase is automatic. Transfer from cold leg recirculation to hot leg recirculation is remote manual.

ACCOUNT 22

A flow diagram of the safety injection system is shown in Dwg. No. 6509.003-P-23.

Containment Spray System (CSS)

In the event of a postulated LOCA the containment spray system is capable of:

1. Serving as an active containment heat removal system to limit, in conjunction with the RHR System, the containment pressure to values below the design pressure, in compliance with the General Design Criterion 38 of Appendix A to 10 CFR Part 50.

2. Removing sufficient containment airborne iodine to limit external doses to values below those set by 10 CFR 100, in compliance with the General Design Criterion 41 of Appendix A to 10 CFR 50.

The combined energy removal rate provided by the CSS and RHR System, in its safeguards mode, is sufficient to reduce containment pressure such that leakage is reduced to one-half of the design leakage within 24 hours after a postulated LOCA.

The CSS system first functions on water from the RWST and then on water recycled from the containment sump. Activation of the injection phase of the CSS is automatic. Activation of the recirculation phase of the CSS is automatic but operator action is required to isolate the depleted RWST.

The CSS consists of two independent, redundant trains with the exception of the common RWST and spray additive tank.

The RWST is designed to supply the safety injection, the charging, the residual heat removal and the containment spray pumps for at least 20 minutes during the injection phase of a design basis accident or to supply the refueling water. The CSS heat exchangers are cooled by the primary component cooling water system.

A block diagram of the containment spray system is shown in Dwg. No. 6509.003-P-25.

Combustible Gas Control System

The combustible gas control system provides concentration control of hydrogen in the containment atmosphere following a postulated LOCA. The system is capable of removing sufficient hydrogen from the containment atmosphere following a postulated LOCA to keep the containment atmosphere hydrogen content below four percent by volume. Effluent hydrogen concentration does not exceed 0.1 percent by volume after one hour of operation.

In the postulated event of complete hydrogen recombiner system failure or unavailability, the containment atmosphere hydrogen concentration is controlled by feed and bleed using the compressed air and exhaust filter systems.

The system is manually started within 15 days of a postulated LOCA and functions with no further operator action for a period of about 100 days.

The two combustible gas control system trains are completely independent and redundant to each other.

A block diagram of the combustible gas control system is shown in Dwg. No. 6509.003-P-18.

ACCOUNT 224 Radwaste Processing Systems

The concept of radioactive waste processing for the plant is based on an examination of all potential pathways of radioactive release to the environment and provides processing and treatment equipment as necessary to keep the release of radioactivity to the environment as low as is reasonably achievable and in compliance with 10 CFR 20 and Appendix I of 10 CFR 50.

The transport of radioactivity from the primary coolant system to various parts of the plant during normal operation is traced and evaluated in order to determine the performance of each process interposed between the source of radioactivity and the subsequent pathways to the environment.

There are three radwaste systems: The radioactive liquid waste system, the radioactive gas waste system, and the radioactive solid waste system. All potentially radioactive liquids, gases and solids are collected and processed according to physical and chemical properties, and the radioactive concentrations. Care is taken in design to minimize the mechanical leakage paths in these systems in order to limit unprocessed leakage.

Liquid Waste System

The radioactive liquid waste system is designed to collect and process potentially radioactive liquid wastes for recycle or for release to the environment.

Radioactive liquid wastes are segregated into six streams, namely, non-aerated reactor coolant (normally processed in the boron recovery system), aerated equipment drains, miscellaneous waste (floor drains, decontamination waste, etc.), detergent waste, regenerant waste, and hot lab chemical waste. Each stream is independently processed with treatment components selected based on the chemical/radiochemical composition and the ultimate deposition of the stream.

Two collection tanks are provided for each major input stream with automatic valves on their respective inlet lines. These valves are interlocked so that one valve or the other is always in the opened position. This design permits complete isolation of a collection tank prior to processing, thus eliminating the potential of its contents being contaminated after sampling and chemical adjustment due to uncontrolled inputs, and thus assures the chemical/radiochemical continuity of the process stream. This isolation capability is also provided for the various stream test tanks, however, isolation is done manually. Collection tank capacity for drainage streams are based on accommodating 30 days of average daily input plus one anticipated transient, plus 20 percent contingency, plus an added 10 percent overall margin of design. Other collection tanks are sized based on operating requirements and operating experience for the particular waste stream.

Two 100 percent pumps are provided with each set of major collection tanks and test tanks. Piping and valving is provided such that, if it is necessary, each pump associated with a set of tanks can take suction from either tank and can recirculate to either tank. Tank pumps are designed to recirculate two complete tank volumes within an eight hour period in order to assure adequate mixing for sampling, analysis and chemical adjustment prior to process or transfer of the tank contents.

Dual components and strategic interconnections between treatment streams are provided in order to provide operational flexibility.

Two mixed bed demineralizers are provided in the miscellaneous waste stream. These demineralizers are utilized for either series or parallel operation depending on the radiochemical composition of the process stream. When aligned in series, the decontamination factor (DF) for the demineralizers is 10^3. When used in parallel, one demineralizer is utilized as a spare and the demineralizer DF is 10^2. In order to protect these demineralizers, two 100 percent reverse osmosis units are provided to pretreat the water. These components are effective in removing organics and trace amounts of oil which can be present in the miscellaneous waste system. A DF of 10 is credited to this component.

The system is capable of processed water recycle. All water used for system make-up is deaerated utilizing a vacuum degasifier. The main source of detergent wastes is the rad-laundry, and the processed waste originating from this facility is reused for laundry. Processed water is also used for decontamination operations. In the event that the processed water quality in a test tank is sub-standard, the capability exists for reprocessing this liquid.

Process parameters are monitored and the treatment system flow is controlled from the radioactive waste management control room located in the radioactive waste processing building. If it is ever necessary to discharge liquid to the environment, it is monitored for compliance with the requirements of 10 CFR 50, Appendix I and 10 CFR 20.

A block diagram of the liquid waste system is shown in Drawing No. 6509.003-P-14.

ACCOUNT 22

Steam Generator Blowdown Processing System

Secondary side water chemistry control specifications require continuous blowdown from each steam generator to achieve optimum effectiveness from the steam generator chemistry control program.

The steam generator blowdown processing system is designed to accommodate blowdown under a wide range of conditions. A minimum blowdown rate of 5 gpm per generator is required for chemistry control purposes. Assuming steam generator primary to secondary side leakage of 0.1 gpm coincident with fuel defects of 0.5 percent, it is possible to continuously blowdown through the ion exchangers provided the resin is periodically renewed. Under other conditions of steam generator inleakage, a continuous blowdown rate of 12.5 gpm maximum per generator is provided to maintain proper chemistry control in the generator. The design basis of the processing portion of the blowdown processing system is 50 gpm total, permitting 12.5 gpm continuous blowdown from each generator. To facilitate the removal of any accumulated solids from the tube sheet, the system is designed to accommodate, through the bypass portion of the system, a blowdown rate of 50 gpm per generator or 200 gpm total.

Although processed system effluent is normally recycled to the main condenser, the system is designed to permit continuous release of processed steam generator blowdown fluid diluted with condenser circulating cooling water, provided the concentrations of radionuclides do not exceed the limits.

As this system performs no function related to safe shutdown of the plant, all components downstream of the blowdown processing system isolation valve are classified as non-nuclear safety (NSS) class. Piping and valving inside and outside the containment up to the blowdown processing system isolation valve are classified ANS Safety Class 2, and are designed, fabricated, tested and inspected in accordance with ASME Section III.

The reactor unit has four steam generators and each generator has its own blowdown and sample lines. The flow of blowdown fluid from each of the four steam generators is individually flow rate controlled before the blowdown lines are manifolded outside of the containment barrier.

Fluid from the steam generator manifold enters under pressure into a shell and tube heat exchanger, where the fluid temperature is reduced by plant service cooling water which is controlled to maintain a constant blowdown fluid exit temperature. The pressure is then reduced across a pressure control valve, and the blowdown fluid is directed through an inlet filter, a radiation monitor and into a surge tank. From the surge tank the fluid is pumped to the discharge line through a second radiation monitor by the discharge pumps. The rate of discharge is controlled by level instrumentation in the surge tank so that tank level is maintained nearly constant.

Normally, when the radioactivity of the blowdown fluid is below required plant operating limits, the blowdown fluid follows the path described above, and receives no processing except filtering and cooling. In the event of major steam generator leakage causing the activity of the secondary side to be above a predetermined level, the radiation monitor located upstream of the surge tank triggers an alarm in the control room and trips closed the control valve downstream of the heat exchanger, providing automatic isolation of the system. As the surge tank level decreases, the control valve throttles down the discharge flow, and a low surge tank level switch shuts off the pumps.

In the event the first radiation monitor fails to detect the activity, a redundant monitor is located on the discharge side of the surge tank that trips closed a valve isolating the system. In this cas , with the pumps deadheaded, mini flow lines protect the pumps. The surge tank level increases until a high level switch trips closed the control valve downstream of the heat exchanger, thereby terminating blowdown. Operator action can also shut off the pumps.

For the events described above, the contaminated blowdown fluid is directed through the processing portion of the system by establishing an alternate flow path.

The processing portion of the system consists of two cation demineralizers and two mixed bed demineralizers, connected in series, a filter and instrumentation that provides process related information used to assess system performance. After processing, the fluid normally is recycled to the main condenser, but can be discharged through the discharge line when required.

The processing system is designed to operate continuously provided the resin beds are periodically renewed. Resin bed exhaustion is signaled by alarms on pH meters located between each pair of series connected demineralizers, and between the cation and mixed bed demineralizers. A pH change indicates breakthrough of the upstream bed, but the fresh downstream bed continues to process the flow. Process flow is then diverted through the downstream bed, spent resin is transferred to the solid waste system, and new resin is charged to the demineralizer. This fresh demineralizer is then valved back on line as the new downstream bed.

A block diagram of the steam generator blowdown processing system is shown in Dwg. No. 6509.003-P-13.

Gas Waste System

The radioactive gas waste system is designed to provide storage for short-lived isotope decay and controlled release to the enviroment of fission product gases removed from the volume control tank, the boron recycle evaporator, the reactor coolant drain tank and the reactor vessel.

The system continuously accepts inputs from the various gas waste sources. Since the major input to the system is from the volume control tank which contains significant amounts of hydrogen, a means for hydrogen removal is incorporated into the system design. This serves two functions, namely the reduction of the quantity of gas that must be stored and the elimination of a potentially explosive constituent from the process steam.

The system provides sufficient holdup of the gas to allow the short-lived isotopes to decay so that the only major dose contributor released to the environment is Kr-85. Releases from the system are performed on a controlled basis so that environmental discharges are made when favorable meteorological conditions exist. In addition all releases are monitored for compliance with the requirements of 10 CFR 20 and 10 CFR 50 Appendix I.

Four gas decay tanks are provided. These tanks are used in the following manner: one tank filling, one tank decaying, one tank releasing, and one tank on standby.

Two recombiner and two gas compressor packages are provided. In both cases, one unit is normally used with the other on a standby basis.

The process is monitored and controlled from the radioactive waste management control room located in the radioactive waste processing building.

A block diagram of the gaseous waste system is shown in Dwg. No. 6509.003-P-15.

Solid Waste System

The radioactive solid waste system is designed to collect, process and store, for eventual off-site disposal, the radioactive solid wastes generated by reactor plant operation and maintenance. Radioactive inputs to the system are spent demineralizer resins, evaporator and reverse osmosis concentrates, expended filter cartridges and other miscellaneous soild waste refuse.

It is advantageous to minimize the volume of solid radioactive material for off-site disposal, since the costs associated with their shipment and burial are continuously increasing. This is accomplished in the volume reduction system. Water recovered from the volume reduction process is processed in the liquid waste system and recycled within the plant.

Two collection tanks are provided for the accumulation of evaporator and reverse osmosis concentrates. This permits the isolation of a given tank for processing while the other tank is aligned for continued concentrates input. Two redundant concentrate tank pumps are provided. Each pump is designed to recirculate two complete tank volumes within an eight hour period in order to assure adequate mixing for sampling, analysis and chemical adjustment prior to processing.

A single spent resin storage tank and spent resin transfer pump are provided. In addition, a resin sluicing system consisting of a sluice pump and sluice filter is provided. The sluice system uses water from the spent resin storage tank to sluice resin from the various demineralizer vessels back to the spent resin storage tank.

Evaporator reverse osmosis and hot laboratory waste concentrates are processed through the volume reduction system, solidified inside a suitable container, and stored for offsite disposal. Spent resins are transferred directly from the spent resin storage tank to the solidification system by the spent resin transfer pump for solidification in a suitable container, and also stored for offsite disposal.

Miscellaneous dry wastes such as rags, paper, etc., accumulated during plant operation, are compacted to reduce their volume, and packaged in 55 gallon drums for offsite disposal, using hydraulic balers.

Radioactive filter cartridges are remotely removed from the filter vessels, and are transported to the solid waste handling area for further processing, if required, storage and offsite disposal.

Storage is provided for both filled and empty containers. The hot storage area is serviced by suitable remote handling equipment with visual monitoring provided. In addition, the design incorporates an area for decontamination of containers prior to loading on a truck for offsite shipment.

All wastes are solidified, packaged and shipped offsite in accordance with ANSI 14.9.1, 10 CFR 73, and 49 CFR 172. System designs and general arrangements address the requirements of Regulatory Guide 8.8.

A block diagram of the solid waste system is shown in Dwg. No. 6509.003-P-16.

ACCOUNT 225 Fuel Handling and Storage

The fuel handling and storage system is required to process and inspect new fuel shipped to the site, perform refuelings of the reactor, store spent fuel, and prepare shipments of spent fuel for offsite processing. These facilities are designed to meet the appropriate requirements of NRC Regulatory Guides 1.13 and 1.29.

New Fuel Storage

The new fuel storage facilities are located adjacent to the spent fuel pool in the fuel storage building. The storage vault is a rectangular concrete room containing the new fuel storage racks which securely hold the new fuel in a vertical position. A minimum center-to-center spacing is 21 inches in both directions which is sufficient to maintain keff $\gtrsim$ 0.90, even if immersed in unborated water. Space is provided for handling and storage of 75 new fuel assemblies which is equal to a 1/3 core load plus 10 spare assemblies.

Spent Fuel Storage

The spent fuel storage pool is designed to accommodate 1 1/3 cores (258 fuel assemblies) plus 22 additional spare spaces. The spent fuel assemblies are stored in racks located at the bottom of the spent fuel pool. The spent fuel pool is a water-filled cavity constructed of reinforced concrete, with stainless steel lined interior surfaces. A center-to-center spacing is 21 inches, which assumes keff $\geq$ 0.90, even if the fuel is immersed in unborated water.

A minimum of 10 ft 6 in of water above the highest fuel element position is provided to permit fuel handling without exceeding 2.5 mr/hr. The concrete walls provide adequate radiation protection from irradiated fuel assemblies.

Spent Fuel Pool Cooling and Purification System

The spent fuel pool cooling and purification system removes the decay heat generated by the fuel elements stored in the spent fuel pool. It also maintains the purity and optical clarity of the spent fuel pool water. In addition, after reactor refueling, the system purifies the water in the reactor vessel cavity and returns the water to the refueling water storage tank.

Either spent fuel pool pump is capable of circulating sufficient pool water to transfer the required heat load from the pool, with 1/3 of a core of spent fuel in the pool, to prevent the pool temperature from exceeding 125 F. For 1 1/3 cores of spent fuel in the pool, one pump maintains the temperature at 175 F while both pumps maintain the temperature at 150 F. The purification loop processes a volume at least equal to one-third of the fuel pool per day, and only operates when the fuel pool water does not exceed 130 F.

Cooling water flow to the spent fuel pool heat exchanger is stopped upon initiation of a safeguards signal and is manually restarted.

All liquid connections at the spent fuel pool are at an elevation such that any pipe failure would not drain the pool to the extent that spent fuel is exposed.

The cooling and purification loops are capable of cross-connection if necessary.

A block diagram of the spent fuel pool cooling system is shown in Drawing No. 6509.003-P-19.

ACCOUNT 226 Other Reactor Plant Equipment

This section discusses the remainder of the reactor plant equipment such as the H_2/N_2 gas supply system, reactor make-up water system, chemical and volume control system, boron recycle system, fluid leak detection system, nuclear service water system, primary component cooling water system, maintenance equipment and sampling system.

H_2/N_2 Gas Supply System

This system provides nitrogen and hydrogen from commercial cylinders to nuclear components, as necessary, for operation and testing. The depletion of cylinders is indicated in the control room so that they can be replaced.

The system pressurizes the accumulators to 650 psig with nitrogen, provides nitrogen blanketing in the various tanks, and supplies hydrogen to the hydrogen recombiners, as necessary, for equipment testing. The system also provides and maintains a hydrogen concentration in the primary coolant through the volume control tank. This system has no safeguard functions.

Reactor Make-up Water System

The reactor make-up water system provides for the storage and distribution of tritiated reactor grade water. It also provides the storage capacity for recycled water from the boron recycle system and the liquid waste processing system. Since the water contains tritium, its use is restricted.

The system serves no safeguard functions, and is designed as non-nuclear, Non-Seismic Category I, except for the reactor make-up water storage tank, which is designed to ASME Section III, Class 3, Seismic Category I. The capacity of the reactor make-up water storage tank is 112,000 gallons. The tank is located indoors where a temperature of at least 50 F is maintained. The tank is also provided with an internal diaphragm to exclude air. Demineralized make-up water is supplied from the demineralized water storage tank.

The system consists of two 100 percent capacity reactor make-up water pumps. The system provides water to the recycle evaporation packages, spent resin storage tank, waste evaporator package, boric acid blender, chemical mixing tank, pressurizer relief tank, reactor coolant pump standpipes, boric acid batching tank, boron thermal regeneration demineralizers, recycle demineralizers, spent fuel pool, resin fill tank, spray additive tank, and evaporator bottom holding tank. The design flow rate of 150 gpm is based on the supply requirement for emergency cooling of the pressurizer relief tank.

A block diagram of the reactor make-up water system is shown in Drawing No. 6509.003-P-17.

Chemical and Volume Control System

The chemical and volume control system (CVCS) is designed to maintain required water inventory in the RCS and seal water injection flow to the reactor coolant pumps. The system also controls reactor coolant water chemistry conditions, activity level, soluble chemical neutron absorber concentration, shares emergency core cooling functions, and provides means for filling, draining and pressure testing of the RCS.

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During power operation, a continuous feed-and-bleed is maintained to and from the RCS. Letdown water leaves the RCS and flows through the shell side of the regenerative heat exchanger where it gives up its heat to make-up water being returned to the RCS. The letdown water then flows through orifices where its pressure is reduced, through the letdown heat exchanger, and through a low-pressure letdown valve where a second pressure reduction occurs. After passing through a mixed bed demineralizer, where ionic impurities are removed, the water flows through the reactor coolant filter, and into the volume control tank via a spray nozzle. Alternate paths downstream of the mixed bed demineralizers are used to direct the letdown flow to the boron thermal regeneration system (BTRS) or the boron recycle system (BRS). The vapor space in the volume control tank contains hydrogen which dissolves in the coolant. Any fission gases present are removed from the system by venting of the volume control tank continuously, intermittently, or prior to plant shutdown. Continuous purging of the volume control tank considerably reduces the activity level of the primary coolant.

The charging pumps take the coolant from the volume control tank and direct it along two parallel paths: 1) to the RCS through the tube side of the regenerative heat exchanger, and 2) to the seals of the reactor coolant pumps. The streams directed to the seals divides with some water flowing into the RCS and the remainder leaving the pumps as controlled seal leakage. From the pumps, the controlled leakage water goes to the seal water heat exchanger and then returns to the volume control tank for another circuit. If the normal letdown and charging path through the regenerative heat exchanger is not operable, water is injected into the RCS through the reactor coolant pump seals, and returned to the volume control tank through the excess letdown heat exchanger and seal water heat exchanger.

Surges from the RCS accumulate in the volume control tank unless a high water level in the tank causes flow to be diverted to the boron recycle or waste processing systems.

An alternate flow path downstream from the purification demineralizers directs letdown coolant through the thermal regeneration demineralizers to effect boron concentration changes during load following operations. A throttling valve in the letdown line is used to direct the flow through the demineralizers.

A flow diagram of the CVCS is shown in Dwg. No. 6509.003-P-22.

Boron Recycle System

The boron recycle system (BRS) receives and recycles reactor coolant effluent for reuse of the boric acid and make-up water. The system processes the reactor coolant effluent by means of demineralization and gas stripping, and uses evaporation to separate and recover the boric acid and make-up water.

When water is directed to the BRS, the flow passes first through the recycle evaporator feed demineralizers and filters and then into the recycle holdup tanks. The recycle evaporator feed pumps are used to transfer liquid from one recycle holdup tank to the other if desired. When sufficient water is accumulated to warrant evaporator operation, the recycle evaporator feed pumps take suction from the selected recycle holdup tank. The fluid is directed through the recycle evaporator, where dissolved gases (i.e. hydrogen, fission gases, etc.) are removed in the stripping column before it enters the evaporator shell. These gases are directed to the gaseous waste processing system.

The distillate from the evaporator package flows to the test tanks. A radiation monitor is installed in the line from the distillate cooler to the test tanks. On detection of high activity, the distillate is returned to the recycle holdup tank.

Prior to pumping water from the test tanks to the reactor makeup water storage tank, the contents are thoroughly mixed by the test tank pumps operating in a recirculation mode. If further cleanup is required, the contents are directed through the recycle demineralizers and filters and returned to the test tanks. Excess water is discharged to the environment.

The evaporator concentrates the boric acid solution until a four percent by weight solution is obtained. The accumulated batch is normally transferred directly to the boric acid tanks in the CVCS through the recycle evaporator concentrates filter. Before transferring the boric acid from the evaporator to the boric acid tanks, it is analyzed, and, if it does not meet the required chemical standards, it is diverted back to the recycle holdup tanks for reprocessing.

Connections are provided so that, if necessary, the recycle evaporator can be used as a waste evaporator.

All portions of the BRS which contain concentrated boric acid solution are located within a heated area in order to maintain solution temperature at $\geq$ 65 F. This is 10 F above the solubility limit for the nominal four percent by weight boric acid solution. If a portion of the system which normally contains concentrated boric acid solution is not located in a heated area, it is provided with some other means (e.g. heat tracing) to maintain solution temperature $\geq$ 65 F.

A block diagram of the BRS is shown in Dwg. No. 6509.003-P-24.

Fluid Leak Detection System

Fluid leaks are detected by means of a sump level monitor, and airborne particulate and gas radiation monitors. The system is provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of LOCA fluids, and potential effluent discharge paths for radioactivity that may be released from normal operation, including anticipated operational occurrences, and from postulated accidents. The fluid leak detection system is designed in compliance with General Design Criterion 64 of Appendix A to 10 CFR Part 50.

Nuclear Service Water System

The nuclear service water (NSW) system transfers the surplus heat loads that are not converted to power, from various sources in the primary and the secondary parts of the plant, to the environment. During normal operation, this heat load transfer is achieved via the main cooling tower complex. During loss of offsite power (LOOP) or a postulated LOCA, the two mechanical draft cooling tower cells dissipate the energy to the surrounding air. These towers are called the ultimate heat sink (UHS). The UHS system consists of two independent and completely redundant flow trains. Either loop is capable of transferring 100 percent of the required heat load during all normal or postulated accident conditions. Loss of either loop necessitates plant shutdown.

Normal flow through the system is provided by the balance-of-plant (BOP) service water system. A LOOP or a postulated LOCA results in isolation of the non-safeguards portions of the NSW system, including the connection with the BOP service water system. The UHS cooling towers and NSW system pumps are automatically started The system can function, using the UHS, for seven days, without requiring water makeup to the towers, following such a postulated accident.

A block diagram of the NSW system is shown in Drawing No. 6509.003-P-26.

Primary Component Cooling Water (PCCW) System

The primary component cooling water (PCCW) system transfers the heat loads generated by various components in the nuclear plant, including those performing safeguard functions, to the nuclear service water system under all modes of plant operations. The PCCW system also serves as an intermediate fluid barrier between the nuclear service water system and the reactor coolant pressure boundary. Two completely independent and redundant flow loops are provided to serve safety related components and other nuclear plant equipment, following a postulated LOCA or steam line break (SLB). Loss of either loop necessitates plant shutdown.

During normal operations, the two loops have approximately equal heat transfer requirements.

The two 100 percent pumps in each loop facilitate plant operations and maintenance. Only one pump in a loop can be powered by the corresponding diesel at any given time. In the event of a postulated LOCA or SLB, the non-safeguards portion of the PCCW system is isolated.

A block diagram of the PCCW system is shown in Dwg. No. 6509.003-P-27.

Maintenance Equipment

The maintenance equipment includes remote handling tools, radioactive maintenance facility, portable shielding, tools and equipment for the reactor vessel, core tools and fixtures, decontamination facility, laundry equipment and hot change area facility.

Sampling System

The sampling system provides representative liquid and gas samples for chemical and radio-chemical analyses to evaluate the chemistry of the reactor coolant and liquids from the steam generator, chemical and volume control system, residual heat removal system, and pressurizer.

Two sample lines are connected to the pressurizer, one at the steam end and one at the liquid end. Each line is cooled by two heat exchangers in series, capable of cooling a flow of 0.75 gpm from 650 F to 95 F for a total heat duty of 200,000 Btu/hr. The steam generator sample heat exchangers are capable of cooling 0.75 gpm from 558 F to 109 F, for a total heat duty of 200,000 Btu/hr. Delay coils are not required on the pressurizer sample lines because the pressurizer is assumed to contain a relatively stagnant volume with a sufficient residence time to permit decay of any N-16 content to a safe level.

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Each pressurizer sample line has a capillary tube of sufficient length and size to limit flows to 1.5 gpm with all valves in the line fully open.

The reactor coolant sample lines have coils of sufficient length and size to ensure that it takes the reactor coolant sample of 0.8 gpm at least 45 seconds to flow from the point of sample to the containment wall. This allows short-lived isotopes, primarily N-16 (7.4 seconds half-life) to decay.

ACCOUNT 227 Reactor Plant Instrumentation and Control

The reactor plant instrumentation and controls provide monitoring protection for plant, personnel and equipment and also provide controls to enable the operator to start up, operate, and shut down the reactor plant.

NSSS Control Board

The NSSS control board is in the form of a "U" or "L" shaped duplex control board containing the necessary controllers, switches, indicating, recording and annunciator devices for remote operation of the generating unit. Reactor process systems and components which are monitored and controlled from this board are listed below:

a. High Pressure Safety Injection System

b. Low Pressure Safety Injection System

c. Primary Component Cooling Water System

d. Reactor Coolant System

e. Chemical and Volume Control System

f. Nuclear Instrumentation: Reactor Trip Status Monitoring Lights, Rod Position Indication Display, Rod Control, Reactor Power Indication

g. Engineered Safety Features Actuation

Remote Shutdown Panel

A remote shutdown panel is provided for the orderly shutdown of the reactor to a cold condition from a location remote from the main control room. This panel makes shutdown possible when the main control room becomes inaccessible. The capability is required by 10 CFR 50, Appendix A, General Design Criterion 19.

ACCOUNT 22

Located on this panel are the necessary controls and instrumentation channels that are associated with the major systems in both the primary and secondary sides of the plant. These control and instrumentation devices prevent the reactor from achieving criticality in violation of the Technical Specification. They provide an adequate heat sink such that design and safety limits are not exceeded.

General considerations in the design of this panel are as follows:

a. Both the turbine and the reactor are tripped, locally or at the main control room

b. All automatic systems continue functioning

c. A selector switch is provided to transfer the shutdown controls to the local panel

d. The necessary indications are: water level and pressure for each steam generator, pressurizer water level and pressure, service water and auxiliary feedwater system status.

Major equipment and systems controlled from this panel are as follows:

a. Reactor coolant pumps

b. Auxiliary feedwater pumps

c. Boric acid transfer pumps

d. Charging pumps

e. Service water pumps

f. Component cooling pumps

g. Residual heat removal pumps

h. Controlled steam release and feedwater supply system

i. Reactor coolant inventory control system

j. Pressurizer pressure control system

Heating, Ventilation and Air Conditioning Panels

These panels provide monitoring and control of the HVAC systems for buildings which house the reactor plant systems. Typical HVAC systems controlled from these panels are the control building air handling system, containment air handling system, containment purge systems, diesel generator air handling system and fuel storage building air handling system.

Radwaste Panels and Racks

The complete waste management system consists essentially of three systems: Liquid waste system, gaseous waste system and solid waste system. Overall control of the complete system is exercised from radwaste panels in a local control room located near the waste management facility in the waste process building. For the liquid waste system, the panels control the collection, processing and directing of the processed waste either for re-use or discharge from the site. For the gaseous portion of the system, the panels monitor the removal of gaseous fission products from the reactor coolant letdown and the primary drain tank. The radwaste panels also carry indicating lights to show the status of various sump pumps and equipment. The radwaste system alarm signals are reported through a common annunciation in the main control room. Racks are provided for mounting local instruments. For the solid waste system, solidification, handling and drumming for shipment and storage are performed through local panels nearby the equipment.

Logic Panels and Cabinets

The panels and cabinets provide mounting space for analog devices such as function generators, bistable modules, summers, dividers, analog controllers, selectors, etc. Typical reactor process control loops, which have analog devices in these panels and cabinets are: control rod reference signals, steam dump control, feedwater speed control, pressurizer pressure and level controls, boric acid blend control, volume control tank level control, steam generator level control, etc.

Instrument Racks

The instrument racks take the form of an open rack. They are used to mount local instruments such as pressure transmitters, manifolds, pressure switches, and other pneumatic instruments that connect directly with the process pipes. The rack has a rigid structure, suitably braced, to withstand all stress incidental to shipping, installation and operation without warping or twisting. Arrangement of instruments, conduits on racks, and electrical devices are placed out of the paths of condensation, or water drains from testing or calibrating instruments. Sufficient clearance is provided for maintenance of the instrumentation without interruption of service. There is a provision to collect the drains when the instrument is removed. Suitable engraved plastic nameplates are required for each instrument.

Process Computer

The process computer system is designed to provide real time, on-line data acquisition alarm monitoring, data manipulation, and performance calculation functions while providing data display to the plant operators. Sequence of events and post trip review functions, as well as normal alarm recording data group logs and periodic logs provide additional historical recording functions.

The system combines state-of-the-art computer hardware with color CRT to assemble and display plant performance data and plant status information.

The safe operation of the plant is not dependent on the availability of the process computer system, nor does the process computer perform a control function. The design objectives of the computer are summarized below:

a. Reduce the amount of information that an operator must constantly monitor

b. Reduce the size of the main control board

c. Improve the operator's perception, decision making, and response time

d. Provide dynamic alarm indications

e. Provide graphic display of interrelated system parameters and process trends

f. Provide graphic comparison of design limits against actual plant performance

g. Provide core performance and fuel management data

j. Provide turbine plant performance calculations and displays.

Radiological Data Management System

The radiological data management system is designed to assure compliance with the applicable NRC and licensing requirements, by providing information concerning the radiological environment of the plant. The system enables the health physicist and plant operating personnel to maintain complete awareness, in real-time, of plant radiation levels. Permanent records are automatically produced for regulatory requirements. The system consists of the following:

a. Process Radiation Monitoring System

b. Effluent Radiation Monitoring System

c. Area Radiation Monitoring System

d. Data Acquisition and Processing System

Each monitor channel is complete with detector, preamplifier, digital buffer, microprocessor with alarm outputs, and readout modules. The data acquisition and processing system is a computer-based system that collects the available information from field-mounted detectors, performs the necessary calculations and displays the results on the CRT as required. The system assists in the generation of required NRC reports.

Neutron Monitoring System

The neutron monitoring system consists of:

a. Out-of-core flux detectors

b. Fixed-in-core thermocouples

c. Movable in-core flux detectors

The out-of-core detectors protect the reactor core by monitoring the neutron flux and generating appropriate trips and alarms for various phases of reactor operating and shutdown conditions. They also provide a secondary control function by indicating reactor status during startup and power opeation.

The out-of-core detectors are located in vertical instrument wells adjacent to the four corners of the core cross section. There are three groups of detectors: source range, intermediate range and power range detectors.

The in-core instrumentation provides information on the neutron flux distribution and fuel assembly outlet temperatures at selected core locations. The thermocouples are positioned at preselected locations to measure fuel assembly coolant outlet temperature for use in monitoring the core radial power sharing and coolant enthalpy distribution. The movable in-core flux detectors can traverse the entire length of selected fuel assemblies, thus providing a three-dimensional map of the neutron flux distribution.

Post Accident Monitoring

The post accident monitoring system is designed to assist the operator in accident surveillance. The accident monitors help to determine the nature of the accident, to predict the trend and to ascertain if corrective actions of the engineered safeguards system are functioning as required. In addition, the system provides the plant operator with information necessary to assess possible fuel or system damage. Finally, it provides material evidence for post-accident investigation into the causes and consequences of the event.

Reactor Diagnostic System

The reactor diagnostic system consists of:

a. Loose parts monitoring

b. Vibration monitoring

c. Neutron noise threshold monitoring

d. Data handling and analysis

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Loose parts monitoring is accomplished with an array of strategically located accelerometers mounted external to major reactor components. The system is designed to alarm the presence of unusual noises in the reactor coolant system and to assist in determining the location and energy level of these noises. The information is used to decide the feasibility of continuing plant operation if an abnormal condition occurs.

Vibration monitoring is accomplished by monitoring the acoustic signals and vibration generated by rotating parts. Permanently mounted accelerometers and non-contact probes are used to monitor and alarm excessive vibration of reactor coolant pumps and motors. A portable system is provided for periodic monitoring of all other accessible rotating equipment in both the primary and secondary plant. The vibration monitor provides a warning of impending equipment failure and helps measure vibration frequency trends useful for preventive maintenance and outage planning.

Neutron noise threshold monitoring is accomplished by monitoring signals from power range neutron detectors. An adjustable threshold detector provides an alarm for large cyclical variations in neutron flux on each of the detector channels. Periodic signatures conducted by plant staff using data analysis equipment are used to verify the structural integrity of reactor internals.

Input signals from system sensors are available for audio interpretation by the maintenance personnel and for audio comparison against prerecorded baseline information. Recording permits retention of selected audio signals for subsequent playback to help interpret and analyze data.

Containment Atmospheric Monitoring System

The containment atmospheric monitoring system monitors the hydrogen content, gamma radiation levels and fission products in the containment atmosphere. Alarms are provided for high hydrogen or high radiation level conditions. Permanent records of the measurements are provided on control room recorders.

Containment Leakage Monitoring

The containment leakage monitoring system measures the containment overall integrated leakage rate at the required periodic intervals. The system measures and records the absolute pressure, the dewpoint temperature, and the dry-bulb temperature. Sensors having high accuracy and resolution and good repeatability are utilized, since changes in the measured parameters are small. A data acquisition system is provided to compute the containment leakage based on the measured inputs.

Failed Fuel Detection System

The failed fuel detector is a gamma activity monitoring device. It monitors reactor coolant for fission product gamma activity as a means for detecting leaks in the fuel rod cladding. Output from the radiation channels are recorded to provide trends, and alarmed to alert operations personnel to abnormal radiation levels. Sampling and radiochemical analysis of reactor coolant water is used to verify the fission product activity.

Reactor Power Control System

The reactor power control system is designed to follow load changes as they are made on the turbine. The system automatically adjusts the power level of the reactor to match the power demanded by the turbine. The turbine load determines a reference temperature which corresponds to the reactor power level required to meet the turbine demand. For large and rapid variations, the turbine load signal is also compared to a nuclear power (flux) signal, resulting in a signal which corresponds to the rate at which the load is decreasing or increasing. The rate signal and the reference temperature signal are compared to the auctioneered average temperature generated in the reactor. This comparison results in an error signal proportional to the reactor power increase or decrease required. This error signal is inputed to the rod control system which performs the load change in the reactor.

Reactor Protection System

The reactor protection system receives signals from nuclear instrumentation and process instrumentation bistables, control board pushbuttons, and field-mounted devices, and combines these signals according to prescribed logic to produce actuation signals for reactor trip and engineered safeguards operation. By tripping the reactor, the system automatically keeps the reactor operating within a safe region whenever the limit of the region is approached. The safe operating region is defined by several considerations such as mechanical/hydraulic limitations on equipment, and heat transfer phenomena. Therefore, the protection system keeps surveillance on process variables which are directly related to equipment mechanical limitations, such as pressure, pressurizer water level (to prevent water discharge through safety valves, and uncovering heaters), and also on variables which directly affect the heat transfer capability of the reactor (e.g., flow and reactor coolant temperatures). Typical causes of reactor trips are listed below:

a. Nuclear overpower

b. Core thermal overpower

c. Pressurizer low pressure, high pressure and high water level

d. Reactor coolant system low flow

e. Low feedwater level

f. Low-Low steam generator water level

g. Turbine trip

h. Safety injection signal actuation

i. Manual trip

Engineered Safety Features Actuation System

The engineered safety features actuation system (ESFAS) senses selected plant parameters, determines whether or not predetermined safety limits are being exceeded and, if they are, combines the signals into logic matrices sensitive to combinations indicative of primary or secondary system boundary ruptures. Once the required logic combination is completed, the system sends actuation signals to those engineered safety features components whose aggregate func- best serves the requirements of the accident. The specific functions which rely on the ESFAS for initiation are listed below:

a. A reactor trip

b. Proper sequencing of power demands on the engineered safety features buses

c. Containment isolation and cooling to prevent fission product release to the environs

d. Steam line isolation

e. Main line isolation

f. Starting the emergency diesels to assure a backup supply of power to emergency and supporting systems components

g. Control room intake ducts isolation

h. Containment spray actuation

i. High and low pressure injection to the primary coolant system to maintain core cooling in event of small and large system breaks

The ESFAS is designed to comply with requirements of IEEE 279, 1971.

Reactor Plant Instrument Tubing and Fittings

The scope of supply of instrument tubing begins at the first accessible root valve at the piping and extends to the instrument shutoff valve. Materials and certification of instrument lines which are part of the pressure boundary are in accordance with the Instrument Society of America Standards.

ACCOUNT 23

ACCOUNT 23 TURBINE PLANT EQUIPMENT

The turbine plant equipment includes the steam and power conversion system components of the steam cycle. The thermal energy from the reactor is utilized to produce 1,000 psi of saturated steam within the steam generator.

The main steam lines supply steam to the turbine throttle valves of a tandem-compound six flow-machine which develops the mechanical energy to drive the electrical generator. Normally two thirds of this steam passes through the entire turbine and exhaust into the condenser at a vacuum condition where the waste heat is rejected. The remaining one-third of the flow is extracted at various stages from the turbine for heating the feedwater being pumped back to the steam generators. Some main steam is also supplied to the four moisture separator reheaters which remove water driblets from the exhaust of the high pressure turbine and reheats the steam before entering the three low pressure turbines. In this manner, excessive erosion of the turbine blades is avoided and the thermal efficiency improved.

A turbine bypass system is provided to pass up to 50 percent of full steam flow directly to the condenser to reject heat during startup, shutdown, or other normal transient conditions where part or all of the steam flow must be bypassed.

Condensate is pumped from the condenser hot-wells by three 50 percent capacity condensate pumps through 100 percent flow deep bed polishing demineralizers and the steam packing exhauster. Three 50 percent capacity condensate booster pumps provide the necessary head from that point for the condensate to flow through the five stages of low pressure heaters to the suction of the feedwater pumps. The two 50 percent capacity heater drain pumps take the 5th and 6th stage heater drains from the heater drain tank and return them to the cycle at the feedwater pump suction. Then two 50 percent capacity turbine driven feedwater pumps supply water to the high pressure feedwater heaters to raise the feedwater temperature to 440 F before entering the steam generators. Two emergency feedwater pumps (one motor driven and one turbine driven) and one startup feedwater pump are also provided.

ACCOUNT 231 Turbine Generator

The turbine generator is designed to deliver 1139 MWe net output with throttle steam conditions of 975 psia saturated steam, 165 psia and 519 F reheat, zero percent make-up, 2.5 in-HgA back pressure, turbine drive feedwater pumps, and six stages of feedwater heating.

The turbine is a tandem compound machine with six flow exhaust using 43 inch last stage blades designed for 1800 rpm. The expected throttle flow is 13,717,722 lb of steam/hr.

The cold reheat steam exhausts from the high pressure machine at 172 psia and passes in parallel through four moisture separator reheaters which are horizontal shell and tube heat exchangers with a high efficiency separator incorporated in the design. Main steam is supplied to the tube side for reheating the steam flow before being admitted through the intercept valves to the low pressure machines. The high pressure condensate from the tube side is piped to the highest pressure feedwater heater, while the drains from the moisture separator are directed to the heater drain tank.

ACCOUNT 23

Generator

The generator has a rating of 1350 MVA with 0.90 PF, 25,000 V, 3 phase, 60 H_z output. It has a totally enclosed hydrogen cooled (at 75 psig) rotor. The stator is a liquid conductor-cooled type with deionized water as the liquid coolant.

The generator rotor is furnished with an internal cooling system including: hydrogen coolers, terminal bushings, instruments, grounding pads, seal housing insulation, foundation plates, shims, and special tools.

The generator stator is furnished with the following external equipment: deionized water circulating and cooling unit assembled on a skid and including storage tank, pumps, coolers, deionizer, flow meter, conductivity cells, gauges, piping, valves, filters, instruments, and regulating equipment, stator winding control cabinet assembled and combined with the hydrogen control cabinet including annunciator, generator automatic runback logic and all necessary control devices.

The generator hydrogen system includes: two hydrogen coolers, one skid mounted seal oil unit, hydrogen manifold with one bottle pressure regulator with high and low pressure gauges, pressure switch for hydrogen supply pressure "low" alarm, shutoff valves and bottle connectors, generator hydrogen pressure regulator, hydrogen storage bottles, control cabinet, temperature detectors, and special tools.

The alternator bearings, the silicon diode rectifier assemblies, the main generator collector and the brush rigging are all totally enclosed within the alternator exciter housing with suitable heat exchangers and means for circulating air. The closed ventilation circuit is equipped with water to air coolers located in the exciter frame. The excitation switchgear is an integrated unit of standard low voltage, located indoors, and metal enclosed. The function of the excitation switchgear is to connect, rectify and control excitation to the a-c alternator exciter from the alternator stator, and to provide voltage regulation by adjustment of the generator field voltage (d-c regulator) or the generator terminal voltage (a-c regulator). The excitation switchgear houses the exciter field breaker, the thyristor regulator bridge and the a-c and d-c regulator logic.

Exciter

The exciter is a direct driven alternator and stationary silicon diode rectifier type. It is rated at 2970 kW, 520 volts, 0.5 response ratio, and 1800 rpm.

Turbine Gland Steam Sealing System

The gland steam sealing system provides sealing of the turbine shaft at turbine shell penetrations under all conditions of turbine loading. The shaft packings seal against leakage of air into the condenser (vacuum packings) and prevent steam from blowing out into the turbine room (pressure packings).

The steam sealing system provides the above functions automatically at all loads and consists of the following equipment: oil operated dual feed steam regulator, packing steam exhauster with two blowers, motor operated valves for main steam feed to regulator, auxiliary steam feed regulator, main steam bypass feed, regulator bypass unloading valve, blowdown valve, three-way diverting valves and ventilator valve. During the starting period, steam is supplied from the auxiliary boiler or the main steam bypass supply. During operation at partial loads the gland sealing steam is supplied from the main steam bypass line to the HP and LP turbine glands. As the load increases, the regulator in the main steam bypass supply closes until all steam is finally supplied from the high pressure gland leak-offs. At high loads, the HP turbine glands provide more steam than the LP turbine glands require. The excess steam is relieved to the main condensers through a spillover valve. The steam packing exhauster is designed with stainless steel tubes for 400 psig pressure and 125 F cooling water.

Lubricating Oil System

A main shaft driven oil volute type centrifugal pump supplies the oil required by the high pressure hydraulic control system and the low pressure lubrication system during normal operation, and provides high pressure and low pressure oil for the hydrogen seal oil system of the generators. A motor suction oil pump supplies low pressure lubrication oil to the main shaft pump suction during startup and shutdown. A booster pump driven by an oil turbine powered by oil from the main shaft pump is overtaken at about 90 percent speed by the main shaft pump and removed from operation. A control station at the turbine bench board starts the motor suction pump automatically, provided the switch is not in "lock-off" position, when the main shaft pump reaction pressure drops below 9 psig. The pump continues to run until stopped by the operator.

A small motor driven centrifugal pump provides an additional source of back-up to the bearing oil system. This pump protects the turbine in case of loss of a-c power.

The oil pumping system with oil reservoir contains a screen for removing foreign materials from the oil drained into the reservoir and the following additional equipment: ejector, orifices and check valves, two oil coolers, float-type oil level indicator with high and low alarms, pressure switches with test valves for automatic starting of the turning gear and emergency bearing oil pumps, and one vapor extractor.

Turbine Oil Conditioning System

The lubricating continuous bypass oil conditioning system has a capacity of 2020 gallons per hour of 150 SSU viscosity lubricating oil at 100 F. The clean oil storage capacity in the conditioner is 1500 gallons at turbine shutdown. The system consists of the following equipment: centrifugal type lubrication oil purifier with inlet and discharge pump, necessary instruments, breakover switch, feed/stop valve, electric controller and safety interlocks, 14.2 kW heater, centrifuge driven by an open drip-proof motor, piping and wiring.

The oil purifier is capable of producing a purified oil having a moisture content of 0.1 percent by volume and a solids content of 0.02 percent by volume.

Gas Systems

The carbon dioxide system consists of a four ton liquid carbon dioxide storage unit with refrigeration system, vaporizer, relief valves and two pressure reducing valves. Carbon dioxide is used for purging hydrogen from the generator housing during shutdown, and for purging air from the housing before being filled with hydrogen during startup. Sufficient capacity is provided to twice purge the system of air and once of hydrogen (approximately 26,000 scf).

Hydrogen gas is used to cool the rotor of the generator and is circulated within the generator housing under pressure. Two shell and tube type coolers at the ends of the generator are supplied with cooling water to dissipate the rotor heat and wind losses.

The hydrogen is supplied from a series of bottled containers which are individually connected to a manifold. The manifold is equipped with a relief valve and two pressure regulators with isolation valves.

Enough hydrogen supply is provided to fill and pressurize the generator once and supply the required makeup for a nominal period (approximately 76,000 scf).

Moisture Separator/Reheater

Four moisture separator/reheaters are utilized to recondition the wet steam exhausted from the high pressure turbine, prior to its passing on to the low pressure turbines. The moisture is first removed and then the steam is reheated to a superheated state.

The units consist of a pressure vessel housing a moisture separator at the bottom and a heater in the upper section. Steam enters through the bottom of the vessel and is passed through stainless steel chevron plate type moisture separators. The steam rises vertically through the "U" shaped reheater tube bundle, where it is reheated to superheat conditions. Exiting from the top, the steam flows to the low pressure turbines.

The thermal energy required for reheating is supplied from the main steam line upstream of the turbine stop valve to the tube side of the reheater bundle. The bundle drains to separate drain tanks from where the non-condensibles are vented to the main condenser through an orifice and condensate flows to the No. 6 feedwater heater through a control valve which maintains tank level.

Each moisture separator drains to a drain tank and then to the heater drain tank through a similar control valve. Safety valves are provided on each unit for protection against overpressure. These safety valves discharge to the main condenser.

ACCOUNT 233 Condensing System

Condensing Equipment

The three surface condensers are single stage, two pass design with divided fabricated steel water boxes and shell. The condensers are designed to handle the total heat rejection from the main turbine and the two auxiliary turbine drives for the feedwater pumps at 3.75 in-HgA. Each condenser has a condensing surface of 299,000 sq ft; 19,910 one and 1/8 inch diameter tubes, 51 ft long, and 20 BWG 90-10 CuNi tubes. Cooling water flow in each condenser is 196,000 gpm resulting in a tube velocity of 7.25 ft/sec and a temperature rise at full load of 26 F.

Each condenser shell is floor mounted and connected to the turbine exhaust flange by means of a stainless steel expansion joint to accommodate thermal expansion. The three shells are each interconnected by means of a pressure equalizing duct to limit the maximum allowable temperature differential between shells to 30 F.

The tube sheets are bolted to the shell with provisions for thermal expansion of the tubes. The tubes are rolled into holes of the tube sheets with flared end to reduce entrance and exit losses.

The shell is carbon steel welded construction with 1/16 inch corrosion allowance. The water boxes are fabricated steel construction and are bolted to the condenser shells and designed for easy removal without disturbing the tube sheets.

Three mechanical vacuum pumps are supplied for removing non-condensible gases from the three condenser shells. During startup, all three pumps are operating, hogging the condensers to minimize the time to reach the intermediate pressure at which point the operation begins. The pumps are sized for holding the condenser back pressure at 2.5 in-HgA. To provide system reliability, three half-size pumps are selected, with two normally operating to maintain condenser vacuum. When falling condenser pressure reaches 26 in-HgA vacuum, the standby pump starts automatically.

The vacuum pumps are motor driven rotary two stage units. The seal for the pumps utilize demineralized water and a closed cooling system integrated with each pump assembly.

The total hotwell capacity of the three shells is 66,000 gallons at normal water level. The hotwell is designed to deaerate the condensate to maintain a maximum of five ppm of dissolved O_2 at the steam generator inlet during normal steady state operation.

The condensate pumps are vertical type, suitable for the NPSH requirements of the condenser hotwell service. The pumps develop sufficient head to ensure adequate suction pressure at the condensate booster pumps after overcoming the pressure drop in the condensate piping, steam packing exhauster, and the condensate polishing demineralizers. Three half-size motor driven pumps are supplied. The third pump is redundant and is on standby or isolated for maintenance. The pumps are specified for a four percent flow margin for wear and to have the best efficiency points when operating at 50 percent of full load flow. In addition to the main flow, these pumps supply seal water to various equipment such as the condensate pumps seals, heater drain pumps seals, and steam generator feed pumps glands. The condensate pumps also discharge excess condensate to the condensate storage tanks and supply water to the turbine exhaust hood sprays.

The steam packing exhauster consists of a shell and tube type service condenser and air removal equipment in the form of two full size motor driven blowers. It functions to pull a vacuum on the outer gland of each turbine shaft seal by drawing steam and air into the shell of the condensing portion of the exhauster by a three to five inches of water vacuum created by one of the blowers. With condensate as a coolant, the steam is condensed and drained into the main condenser while the air is removed by the blowers to atmosphere. The steam packing exhauster seals both the main turbine and the feed pump turbine drives. During normal operation of the plant, only a portion of the condensate passes through the tubes. The remaining flow is passed through a variable orifice provided in the water box divider. This permits the total condensate flow to pass through the water connections with a minimum of pressure drop. A minimum flow is maintained through the exhauster by recirculation back to the main condensers whenever necessary.

One complete condensate polishing system is provided that is capable of treating 100 percent of the condensate flow. The system consists of seven individual high flow rate, deep bed type demineralizers operating in parallel. The condensate passes through six demineralizers with the seventh demineralizer serving as a standby. Each demineralizer is rated for a flow rate of 3,500 gpm (49 gpm per square foot of flow area). The bed depth is three feet with 1.5 feet free board. The shells are designed for 200 psig, 130 F, and are lined with rubber with stainless steel internals. The total resin volume consists of 127 cu ft of cation resin and 85 cu ft of anion resin per shell. When the resin is expended, it is regenerated externally. A resin separation tank, cation regeneration tank, anion regeneration tank and resin storage tank are principal parts of the regeneration system. A hot water caustic dilution tank and a control panel complete with instrumentation for automatic regeneration is also provided with this system. A given mixed bed demineralizer is taken out of service when there is an excess pressure drop across the unit, indicating a high accumulation of solids, or an exhaustion of the resin bed, as indicated by high conductivity in the effluent. The intervals of regeneration vary with the operation, with the shortest intervals appearing only during plant startups when large amounts of suspended solids tend to clog the demineralizer beds.

The condensing system is designed to accept up to 50 percent of the main steam flow bypassing the turbine during startup and transient conditions. For this purpose, two 16 inch headers are provided, each with six 8 inch pipelines and a 6 inch dump valve, each of which discharges into the main condensers. The valves are rated to pass 635,000 lb/hr of steam, and have a maximum capability of 1,210,000 lb/hr, at 1,200 psia design. The control of the turbine bypass valves is coordinated with the turbine controls such that minimum transient disturbance is experienced by the nuclear steam supply system.

ACCOUNT 234 Feedheating System

Feedwater Heaters

Six stages of feedwater heaters are utilized to heat the feedwater returning to the steam generators. Heaters are placed in series and operate under increased pressure of various stages of extraction steam from the high pressure and the low pressure turbines. All heaters are of the closed type horizontal U-tube arrangement, using stainless steel tubes. Each heater has an integral drain-cooler section with the exception of the fifth stage heaters which have drains pumped directly into the discharge of the heater. All other heater drains cascade to the next lower heater through a control valve maintaining heater level within the shell. Due to the physical size of heaters required for each stage of feedwater heating, three parallel trains of heaters are utilized for the first four stages. Therefore, each individual heater is sized for one-third capacity. The two highest stages of feedwater heaters are in two trains with each shell sized for 50 percent of the flow. Only the highest stage is in the discharge of the feedwater pump and subject to full system pressure while the remaining heaters are subject only to the discharge pressure of the condensate booster pumps. To allow for maintenance, a bypass valve is provided for every two stages of feedwater heaters. Therefore, there is a bypass valve for the first and second stage, the third and fourth stage, and the fifth and sixth stage, so that individual pairs of heaters may be taken out of service at one time for plugging or maintenance work.

Boiler Feed Pump and Turbine Drive

Two 57 percent capacity turbine driven feed pumps of the centrifugal single stage type are provided. Each feed pump is designed for a flow rate of 17,200 gpm developing a total dynamic head of 2,300 ft when operating at a speed of 5,300 rpm. Calculated brake horsepower is 10,126. Each steam generator feed pump is driven by a dual admission, multi-stage, condensing steam turbine with a design rating of 10,126 horsepower at 5,300 rpm. Each turbine exhausts to the main condenser. The dual admission inlet consists of a high and a low pressure valve, one supplied with main steam, the other supplied with steam from the cross-over piping (high pressure turbine exhaust to the moisture separators) to the low pressure valve. For startup purposes, auxiliary boiler steam is also supplied to the low pressure valve admission inlet. Under normal operating conditions, steam is supplied through the low pressure admission inlet. As the load decreases below 40 percent, steam is then supplied from the main steam line to the high pressure admission inlets to supplement the available low pressure steam.

For startup purposes, a separate motor driven centrifugal six stage feed pump is provided, rated for a flow rate of 1,500 gpm with a total dynamic head of 2,700 ft. The electric motor is rated at 1,500 horsepower.

For emergency conditions, two 100 percent capacity emergency feedwater pumps are provided, rated for a flow rate of 655 gpm and a total dynamic head of 3,000 ft. One of the emergency pumps is driven by a 700 horsepower, 360 rpm motor. The other is driven by a multi-stage turbine exhausting to atmosphere also rated at 700 horsepower, 360 rpm.

ACCOUNT 235 Other Turbine Plant Equipment

Turbine Building Closed Cooling Water System

A closed cooling water system is provided with three 50 percent capacity (4,600 gpm each) motor driven water pumps, air tank and heat exchangers, which dissipates heat to the main cooling towers. The heat exchangers are two 50 percent capacity shell and tube type, designed for a flow rate of 4,600 gpm on both the shell and tube sides. The tubes are 90-10 CuNi material, and supply 95 F water to the system based on a supply water temperature of 85 F from the plant service water system.

Demineralized Water Make-up System

The demineralized water make-up system consists of two independent trains each having the following equipment: an activated charcoal prefilter, cation demineralizer, an anion demineralizer and a mixed bed demineralizer. A common vacuum degasifier serves both trains with water from the cation demineralizers directed to the vacuum degasifier before being admitted to the anion demineralizer. Each demineralizer regenerates in place without sluicing the resins. The make-up demineralizing system supplies the plant make-up requirements, and the effluent is discharged into the 400,000 gallon condensate storage tank. Two outlet connections are provided for the condensate storage tank such that the upper 200,000 gallons capacity i.. utilized for normal make-up requirements and the lower 200,000 gallons capacity is reserved for the emergency feedwater pumps, which supply the emergency make-up requirements of the plant.

Chemical Treatment System

The chemical treatment system is used to maintain the water chemistry of the feedwater and consists of two hydrazine feed pumps, two ammonia feed pumps, one hydrazine storage tank and one ammonia storage tank. The hydrazine chemically removes the dissolved oxygen from the feedwater and the ammonia controls the pH.

Neutralization System

The neutralization system consists of two pumps, one blower and one tank. The neutralization tank is used to chemically neutralize the spent regenerant from the demineralization system and condensate polishing system to acceptable levels prior to discharge.

ACCOUNT 236 Turbine Plant Instrumentation and Control

Turbine Plant Main Control Board

The turbine plant main control board is an extension of the duplex board which is described in section 227. This portion of the duplex board provides the monitoring and control of the turbine plant systems below:

a. Feedwater System

b. Main Steam System

c. Condenser System

d. Circulating Water System

e. Service Water System

f. Turbine Supervisory and Control System

g. Heat Vents and Drains System

h. Instrument and Service Air Systems

Turbine Supervisory Panel

The turbine supervisory panel contains recorders mounted on the main control board. These are the multi-point vibration recorded for shaft vibration, the eccentricity, speed and position recorder, the multipoint expansion and temperature recorder. An indicator is provided for turbine shaft vibration phase angle.

Electro-Hydraulic Control Cabinet

The electro-hydraulic control (EHC) cabinet contains the control and indicating equipment required for the startup, normal operation and testing of the turbine. This cabinet is normally mounted as a subpanel on the main control board. Typical control functions available are listed below:

a. Selection of starting rates: slow, medium or fast

b. Setting of turbine speed at startup

c. Setting of load limit, and loading rate limit

d. Chest/shell warming

e. Turbine trip

f. Selection of operating mode: standby, manual or remote

g. Selection of load: increase or decrease

Typical indicating functions available are listed below:

a. Turbine speed

b. Percentage of warming rate

c. Throttle steam pressure, first stage pressure, intermediate pressure

d. Generator output, MW

e. Acceleration, rpm/minute

f. Valve positions for main stop valves, control valves and intermediate valves.

Typical testing functions available are listed below:

a. Thrust bearing wear detector test

b. Backup overspeed trip test

c. Electrical trip test

d. Mechanical overspeed and piston trip test

e. Testing of main stop valves, control valves and intermediate valves.

Turbine Accessory Panels

Turbine accessory panels contain the instrumentation and control devices for various turbine auxiliary systems. These panels are field mounted or control room mounted. Typical auxiliary systems are hydrogen and cooling water, turning gear motor control, excitation control, reheater protection piping control. Control panels for these systems are located in the field. There are turbine panels located in the control room, such as the turbine control panels and turbine supervisory instrument cabinet. These control room panels contain the circuitry for the turbine control devices and turbine supervisory instruments, and are mounted on the main control board.

Turbine Plant Heating, Ventilation and Air Conditioning Panels

These panels provide monitoring and control of the HVAC systems for buildings which house the turbine plant systems. Typical HVAC systems controlled from these panels are turbine building air handling system, intake structure ventilation system and administration building ventilation system.

Logic Panels and Cabinets

These panels and cabinets provide mounting space for analog devices such as function generators, bistable modules, summers, dividers, analog controllers, selectors, etc. Typical turbine plant systems, which have analog devices in these panels and cabinets, are the auxiliary boiler systems, condensate and feedwater system, circulating water system, heater vents and drain system, main steam system.

Instrument Racks

These racks are similar in construction to those described previously under the same heading in the reactor plant instrumentation and control section, 227.

Electro Hydraulic Control System

The electro hydraulic control (EHC) system consists of the speed control unit, the load control unit and the flow control units. The speed control unit compares actual turbine speed with the speed reference, or actual acceleration with acceleration reference, and provides a speed error signal for the load control unit. The load control unit combines the speed error signal with the load reference signal, limits and biases to determine the desired steam flow signals for the stop valves, control valves and intercept valves. Finally, the valve flow control units accurately position the appropriate valves to obtain the desired steam flows through the turbine. A high pressure fluid system is provided to convert the low power level signals from the EHC circuits to high powered level mechanical outputs for positioning steam valves. This system consists of a fluid reservoir, two independent pumping systems, fluid coolers, accumulators, a fluid transfer and filter unit.

Process Computer

The computer for the turbine plant is the same computer used for the reactor plant. See the reactor plant instrumentation and control section, 227.

Turbine Plant Instrument Tubing, Fittings

The material requirements of turbine plant instrument tubing, fittings are similar to those for the reactor plant. See reactor plant instrumentation and control section, 227.

ACCOUNT 24 ELECTRIC PLANT EQUIPMENT

The electric plant equipment conveys the electric power generated in the plant to the low voltage bushings of the generator step-up (GSU) transformers, controls and meters the electric energy, and protects the components through which the power flows. It is the source of power for the plant auxiliaries and the plant control, protection and surveillance systems during normal operation, and for the plant protection system and engineered safety features during normal operation, abnormal conditions, and accident conditions.

Continuous ratings of equipment and interrupting ratings of protective and disconnecting devices are based on equipment load tabulations, fault studies and voltage regulation studies. Equipment continuous current ratings are based on the maximum continuous load plus the largest spare auxiliary, and the effects of diversity. Short time intermittent loads are not included.

The electric plant design features are as follows:

a. The plant auxiliary distribution system design is based on a source voltage variation of $\pm$ 5 percent.

b. The main generator, the three single phase generator step-up (GSU) transformers and the two three phase unit auxiliary transformers (UAT) are interconnected with isolated phase bus. (Note: The GSU transformers the connections to the switchyard and the switchyard equipment and materials are not included in the equipment list or base cost estimate for this study. However, provisions have been made in the plant design for location of the GSU transformers and routing of the connection to the switchyard. The GSU transformers and switchyard are shown on the drawings for clarity and completeness).

c. The generator is provided with a load break switch in the mains between the generator and the UAT tap to disconnect the generator from the offsite power system.

d. Two fifty percent 3-winding unit auxiliary transformers (UAT), each 24.5 kV to 13.8 - 4.16 kV, are connected to the generator main leads between the generator load break switch and the GSU transformers.

e. Two fifty percent 3-winding reserve auxiliary transformers (RAT), each 230 kV to 13.8 - 4.16 kV, are connected to an offsite transmission system.

f. The balance-of-plant (BOP) medium voltage a-c distribution system is nominally 13.8 kV and 4.16 kV. Two separate and independent BOP buses are provided for each voltage level. The two 13.8 kV buses are fed from the "X" windings and the two 4.16 kV buses are fed from the "Y" windings of the UAT's and RAT's.

g. The Class 1E medium voltage a-c distribution system is a nominal 4.16 kV. Two separate and independent Class 1E buses are provided. Each Class 1E bus is fed from the "Y" windings of the UAT's and RAT's through a tap in the BOP 4.16 kV buses incoming lines.

h. The low voltage a-c distribution systems are a nominal 480 volts. Twenty-seven buses are provided for the BOP systems and eight buses are provided for the Class 1E systems. The low voltage a-c distribution system is divided into two separate and independent groups of buses.

i. Four separate and independent Class 1E, 120 volt nominal, uninterruptible a-c instrumentation and control power supplies and distribution buses fed from the Class 1E 480 volt buses are provided.

j. Two separate and independent Non-Class 1E, 120 volt nominal, uninterruptible power supplies fed from the BOP 480 volt buses are provided. One supplies power to BOP instrumentation and control and the other to the plant computer.

k. The Class 1E d-c distribution and supply systems are nominally 125 volts. Four separate and independent station batteries and distribution buses are provided.

l. The Non-Class 1E d-c distribution and supply system is nominally 125/250 volts, with center-tapped battery systems. One center-tapped station battery and distribution system is provided.

m. One Class 1E 125 volt battery charger is provided for each Class 1E battery. One Non-Class 1E 125 volt battery charger is provided for each of the two 125 volt sections of the 125/250 volt Non-Class 1E center-tapped battery.

n. Two redundant Class 1E, 100 percent, 6083 kW diesel generator units are provided as the standby power supply for the Class 1E buses, and are automatically connected to their respective buses when the normal and preferred power supplies are not available.

Motor starting voltage and frequency and allowable operational variations, at which the required starting and operating torques are developed, are as follows:

a. Continuous operation of a-c motors

   1) Voltage: $\pm$ 10 percent of rated

   2) Frequency: $\pm$ 5 percent of rated

b. Starting and short time (approx. 30 seconds) operation of a-c motors:

   1) Class 1E (Voltage): 75 percent of rated

   2) Non-Class 1E (Voltage): 80 percent of rated

c. d-c Motors (Voltage): 210 to 280 volts

All Class 1E loads are furnished with a-c or d-c power from one of the following: the Class 1E a-c emergency buses, the Class 1E uninterruptible instrumentation and control a-c power supplies and the Class 1E d-c buses.

The normal power supply for the plant electric auxiliaries is from the main generator through the unit auxiliary transformers. The preferred emergency power supply is from the 230 kV offsite power supply via the reserve auxiliary transformers. The alternate access power supply is from the 500 kV offsite power supply via the generator step-up transformers and the unit auxiliary transformers, when the generator load break switch is open. The standby emergency power supply is from one of the two redundant diesel generator units to the corresponding Class 1E medium voltage bus.

The power and control circuits, including circuit breakers and cabling, to all Class 1E loads are qualified, channeled and separated to meet Class 1E requirements. Protective devices are coordinated on the basis that protection of the Class 1E systems is the primary goal.

The safety related design bases for the electric power system are tabulated in Table 2-3.

Table 2-4 presents allowable ranges of temperature and limits for exposure to radiation for electric equipment. Design ambient conditions for spaces housing electric equipment are based on these ranges and limits plus a minimum of 5 percent for margin.

matically connect selected engineered safety features to those buses after load shedding, and re-energizing the buses from the diesel generator units. Overcurrent protection is provided for all circuits. Differential protection, overload protection and zero sequence overcurrent ground protection is provided for all medium voltage motor circuits.

Non-Class 1E and Class 1E 460 volt motor control centers are provided for power distribution to motors 100 hp and below, lighting loads and miscellaneous loads such as motor-operated valves, resistance heaters, heat tracing and motor space heaters.

ACCOUNT 242 Station Service Equipment

Two half-size unit auxiliary transformers (UAT) and two half-size reserve auxiliary transformers (RAT) are provided to furnish power to the plant auxiliary power system. Each pair of transformers is sized with sufficient margin to carry the plant auxiliary load under the heaviest load conditions. Transformer impedances are based on limiting fault current availability to switchgear capability considering voltage regulation. Each transformer is protected with differential protection schemes and sudden internal overpressure devices.

Unit substations are provided to transform the medium distribution voltages to the low distribution voltage for Non-Class 1E and Class 1E low voltage loads. Motors rated 125 hp through 200 hp are connected to the unit substations. Unit substation transformer impedances are based on matching switchgear capability to fault current availability considering voltage regulation.

Overcurrent protection is provided for all circuits. Overload protection is provided for motor circuits. The unit substations for the cooling towers are fed from a loop feeder.

The battery systems comprise the plant Non-Class 1E and Class 1E batteries and battery chargers. Each Class 1E d-c bus is supplied from a Class 1E battery and a Class 1E battery charger. The Non-Class 1E 125/250 volt d-c bus is supplied from a 125/250 volt center tapped battery and two 125 volt battery chargers, one for each 125 volt section of the 125/250 volt battery. During normal operation d-c power is supplied from the battery chargers. During emergency operation d-c power is supplied from the batteries. During startup and shutdown d-c power is supplied from whichever source is available.

Two redundant diesel generators are provided to furnish the onsite source of emergency a-c power to the Class 1E 4.16 kV buses.

Each diesel generator unit is provided with redundant automatic air starting systems that are initiated when loss of offsite power, loss of power to engineered safety features or when reactor trip occurs. The rating for the diesel generator units was chosen so that each unit has the capability to continuously operate all protection systems and engineered safety features that are necessary for a safe and orderly shutdown following a loss of coolant accident concurrent with loss of offsite power. Minimum voltage that can be experienced at the diesel generator terminals during motor starting is 80 percent. Rating, configuration and switching of the diesel generator units are designed to prevent their use for any purpose other than that of standby power supply in accordance with preferred practice.

ACCOUNT 24

Four Class 1E and two Non-Class 1E dual input solid state inverters are provided to serve as uninterruptible power sources for miscellaneous vital and non-vital a-c and plant instrumentation loads. The inverters are supplied with power from the a-c buses through regulating transformers or directly from the station batteries.

ACCOUNT 243 Switchboards

Four Class 1E and two Non-Class 1E a-c power distribution panels are provided to distribute a-c power from the inverters to the 120 volt or 120/240 volt uninterruptible loads. They are configured as one panel per inverter for both Class 1E and Non-Class 1E equipment.

Four Class 1E and one Non-Class 1E d-c power distribution switchgear lineups are provided to distribute d-c power from the batteries and their associated chargers. There is one lineup per station battery/charger combination.

Sixteen feet of control benchboard is provided in the main control board lineup for control and data acquisition of the main generator and the auxiliary electric power system.

One electric system relay panel lineup is provided for protection and metering of the main generator, the generator step-up transformers and the unit and reserve auxiliary transformers. The main generator is protected by high speed differential, ground current, loss-of-field, negative sequence overcurrent, and voltage restrained overcurrent relays. The main generator, the generator step-up transformers and the unit auxiliary transformers are protected by power directional overall differential relays. The reserve auxiliary transformer is protected by power directional differential relays.

ACCOUNT 246 Power and Control Wiring

Isolated phase bus is provided to interconnect generator terminals, GSU transformer low voltage terminals and UAT high voltage terminals. This bus is force-cooled with redundant active components in the cooling unit.

The plant wire and cable consists of three conductor and triplexed single conductor power cable, multi-conductor control cable, coaxial, triaxial, shielded twisted pair and multi-shielded twisted pair and shielded quad instrument wire and containment electrical penetrations. Materials for insulation systems (ethylene-propylene rubber insulation with chloro-sulfonated polyethylene based jacket) are selected to provide optimum system performance in the areas of physical stability, tensile strength, flexibility, aging characteristics, resistance to abrasion, ozone (where required), water absorption, heat distortion, solvent extraction, irradiation, self-extinguishing and non-propagating fire characteristics and resistance to corona effects where required. Wires and cables are assigned to load groups, whether safety releated or not, in order to reduce the hazard of non-safety related cables being inadvertently routed between two redundant load groups. The same cable that is qualified for use in Class 1E systems is used in Non-Class 1E systems to reduce the

the hazard of non-safety related cables being inadvertently routed between two redundant load groups. The same cable that is qualified for use in Class 1E systems is used in Non-Class 1E systems to reduce the hazard of unqualified cables being inadvertently installed in Class 1E systems. In addition to separation by load groups, wire and cable is also separeted by energy level to reduce heating and arcing fault problems.

Wire and cable routing is governed by the following:

a. Requirements for the power supply, control network and/or instrumentation signals

b. Requirements for loading

c. Requirements for physical separation of redundant circuits

d. Avoidance of high hazard areas (e.g., areas subject to high ambient temperatures, missiles, fires, and irradiation)

e. Areas having high ambient temperatures (e.g., areas near uninsulated, main-steam pressure and relief valves)

f. Protection from missiles, fire, and/or irradiation, when required

g Single failure criterion and the effects of common failure modes

h. Simplicity of layout

i. Ease of installation

j. Ease of access

TABLE 2-3

SAFETY RELATED DESIGN BASES FOR THE ELECTRIC POWER SYSTEM
1. Subsystems, equipment and components which are required to achieve a protective function, to perform a protective action or to provide power for engineered safety features are Class 1E design as defined below.
2. Class 1E Design: a. Considers interactive effects of plant conditons and natural phenomena to the extent that power required by the plant protection system and engineered safety features are available during abnormal and accident conditions. b. Is based on the safe shutdown earthquake (SSE) in order to assure safe reactor shutdown and removal and dissipation of reactor stored energy and decay heat for an indefinite period in the event of an SSE. c. Includes provisions to minimize failures due to flame or fire damage and to detect, confine and promptly extinguish any fire which might occur. d. Includes provisions to allow periodic inspection and testing of systems and equipment.
3. Class 1E power sources, power supplies, distribution systems and load groups, have sufficient separation and independence so that loss of any group does not prevent the minimum safety actions from being performed.
4. Class 1E load groups are provided with separate and independent power supplies in order to prevent a common failure mode from being established among the load groups.
5. The degree of physical separation required for redundant Class 1E equipment, including cable and raceways containing cable, is based upon the hazards which exist in the vicinity of the equipment and which would constitute a common failure mode between the redundant equipment if no separation existed.

TABLE 2-4

DESIGN AMBIENT CONDITIONS FOR ELECTRIC EQUIPMENT

		Ambient Temperature Limit (^{o}F)		Ambient Radiation Limit (Rads)	
Type of Equipment	Limit	Equipment	Equipment Space	Equipment	Equipment Space
Battery	Max	90	N/A	N/A	N/A
Battery	Min	77	80	N/A	N/A
Cable	Max	104	100	1×10^8	1×10^7
Cable	Min	N/A	N/A	N/A	N/A
All Other **	Max	104	100	N/A	N/A
All Other **	Min	40*	50*	N/A	N/A

* Or above dewpoint temperature, whichever is higher

** Sensitive relays and other electrical devices are placed in controlled environment spaces such as the control room, electronic equipment room, computer room, or battery room, as applicable

TABLE 2-5

Type	ACCEPTABLE PHYSICAL AND ELECTRICAL SEPARATION	
	Designation	Used for Protection From:
A	Physical	Low Energy Missiles Mechanical Protection
B	Physical	High Energy Missiles Radiation
C,D,E	Physical	Heat Fire
F,G,H	Electrical	Common Failure Mode

Type	DETAILED DESCRIPTION	
	Barrier	Example
A	Metal	Sheet metal on rigid frame Rigid steel sleeve or plate Rigid steel conduit
B	Concrete	Concrete block wall Concrete foundation Reinforced concrete wall
C	Flame Resistant	Mineral, wool or fiberglass Ablative coating Asbestos cement sheet supported on light steel frame
D	Air Space	1'-0"** or 3'-0" in horizontal direction 3'-0"** or 5'-0" in vertical direction
E	Minimum Air Space	6" in horizontal direction* 6" in vertical direction*
F	Prohibition of sharing among redundant circuits unless electrical isolation is provided by buffers	
G	Prohibition of automatic transfer of redundant safety circuits between Class 1E power supplies or power sources	
H	Prohibition of automatic transfer of Class 1E power supplies or power sources between redundant safety circuits	

* In conjunction with a barrier of Type A, B or C

** In cable spreading areas only

ACCOUNT 25 MISCELLANEOUS PLANT EQUIPMENT

Miscellaneous plant equipment includes systems for maintenance or general supply of plant equipment requirements. Included are cranes and hoists, air, water and steam services, auxiliary boiler and associated equipment, and plant fuel oil system.

ACCOUNT 251 Transportation and Lifting Equipment

Cranes and Hoists

Three major cranes are provided within the plant. Servicing the reactor building is a 420 ton overhead polar gantry crane with a 50 ton auxiliary hoist. Within the turbine building an overhead travelling bridge crane is used with main hoist capacity of 210 tons and an auxiliary hook capacity of 30 tons. The bridge span is 128 feet and covers the main operating floor area. A separate 100 ton bridge crane is provided for the heater bay area.

In addition to the above major cranes, there are two five ton overhead travelling bridge cranes and ten monorail hoists with capacities in the 5 to 10 ton range to serve the diesel building and other plant areas.

ACCOUNT 252 Air, Water and Steam Service System

Compressed Air System

The compressed air system is composed of two separate subsystems; the plant compressed air system, and the containment building instrument air system.

The plant compressed air system supplies service and instrument air throughout the plant, excluding the containment building. The system consists of three 50 percent capacity (350 scfm each) oil-free reciprocating compressors complete with intake filters, aftercoolers, air receivers and two 100 percent air dryers.

The containment building instrument air system supplies all instrument air in the containment building. The system consists of two 100 percent capacity (50 scfm each) oil-free compressor packages with two 100 percent capacity air dryers.

Service Water System

The service water system supplies cooling water from the main condenser heat rejection (MCHR) system to the turbine plant closed cooling water (TPCCW) system and the primary component cooling water (PCCW) system during normal plant operation. The system has three 50 percent capacity (11,000 gpm each) vertical wet pit pumps which are located in the circulating water pumphouse. Make-up water to the MCHR system is discharged near the suction of these pumps to lower the average temperature of the service water.

In the event that cooling water is not available from the service water system, the nuclear service water system supplies cooling water to the PCCW system utilizing mechanical wet evaporative cooling towers (ultimate heat sink).

Fire Protection System

The fire protection system is designed to minimize the probability and effect of the occurrence of an in-plant fire. The system has four 50 percent capacity (2,500 gpm each) fire pumps, two diesel driven and two motor driven, two 100 percent capacity (300,000 gallons each) water storage tanks, and one 50 gpm jockey pump.

The jockey pump normally operates to maintain system pressure. One of the motor driven fire pumps is utilized in the event that the jockey pump cannot maintain system pressure. The second motor driven pump is started if the system pressure continues to drop, and the engine driven pumps are started in sequence to maintain system pressure. All pumps take suction from the two 300,000 gallon storage tanks.

Potable Water System

Potable water is required for drinking, sanitary, and washing purposes at the plant. This water is supplied by the local municipal water supply system.

Auxiliary Steam System

The auxiliary steam system consists of two 100 percent capacity (150 psig, 80,000 lb/hr) pressurized furnace water tube saturated steam boilers. During normal operation, the boilers are shut-down and main steam supplies the required steam for the auxiliary steam system. The auxiliary boilers are used during start-up and shut-down of the nuclear plant main steam system, but they have the capability of continuous operation at rated capacities.

ACCOUNT 253 Communications System

Local Communications System

The communications system consists of an intercommunication and paging system, a telephone system, and a sound-powered telephone system. These systems are designed to provide communication between various parts of the plant for all conditions of operation.

ACCOUNT 254 Furnishings and Fixtures

Instrument Shop Apparatus

Instrument shop apparatus are provided for testing, calibration, repairing, and routine maintenance of the plant instrumentation and control devices.

A typical list of instrument shop apparatus is provided below:

a. Dead weight tester

b. Pneumatic calibrator equipment

c. Decade resistance box

d. Digital volt meter

e. Variable voltage and current sources

f. Potentiometer

g. Oscilloscope

h. Electronic counter

i. Stop watch

j. Resistance and impedance bridges

k. Megger

l. Pressure gauges

m. Meters: d-c (MA, Amp, Volts), a-c (Amp, Volts)

Off Site Radiological Monitoring System

The off site radiological monitoring system consists of both preoperational and post operational programs. It provides data for individual and population exposure calibrations, for analysis of the possible buildup of environmental radioactivity and for public information. The post operational program, in conjunction with the radiological data management system described in section 227, provide data required for estimation of the population dose during normal operation and design level releases. A rapid monitoring program provides fast and accurate data on population exposure during accident conditions.

ACCOUNT 25

The preoperational program is a radiation surveillance program implemented prior to plant startup. The program identifies critical exposure pathways, defines critical population groups, selects sample media and sampling site locations, collects and analyzes environmental samples and interprets data.

The post operational program provides the necessary radiological data to demonstrate compliance with technical specification and effluent limits. The program requires measurement of gross radioactivity, specific radionuclides and other pertinent data for NRC semiannual reports as specified in Regulatory Guide 1.21.

The rapid monitoring program is part of the emergency procedure plan. It provides the personnel, organization and equipment necessary to enact prompt counter measures for protection of the public in cases of reactor accidents.

Meteorological Monitoring System

The meteorological monitoring system provides all equipment essential for the monitoring and recording of the atmospheric parameters of the plant prior to, during construction and over the life of the plant. The equipment for the system consists of a meteorological tower and various meteorological monitoring instruments. Data from this system are used for dose calculations performed in the radiological monitoring system.

Water Quality Monitoring System

The water quality monitoring system monitors the rates and concentrations of contaminant in the plant effluent discharge. Typical variables measured are chlorine, suspended solids, pH, oil and grease. Sampling techniques are established to yield representative batches or flows of the effluent discharge. Analytical data are recorded in proper form for immediate as well as future interpretation and use.

Thermal Effluent Monitoring System

This system monitors the temperature of the effluent discharged from the plant. It provides basic data to evaluate the thermal effect of the plant effluent.

Seismic Monitoring System

The Seismic Monitoring System is implemented for the following purposes:

a. Furnish to the control room information on the presence of any seismic event so that immediate administrative procedures or decisions can be made.
b. Provide basic data to determine the conservatism used in the modeling and design assumptions made for the structures, and the design input motion to the supported systems and components.
c. Provide information to determine the advisability of continuing the operation of the plant following an earthquake.

Quantity of instrumentation and location of the sensors are in accordance with Regulatory Guide 1.12.

ACCOUNT 26 MAIN CONDENSER HEAT REJECTION SYSTEM

The main heat rejection system is a circulating water system which consists of structures and mechanical equipment which serve the main condensers and service water system to reject the plant heat through three mechanical draft wet cooling towers. Make-up water extracted from the North River initially passes through traveling screens. The raw water is then clarified, and chemicals are injected for pH and fouling control. Fouling within the towers is controlled by continuous blowdown to the river in order to maintain the concentration at less than ten times that of the make-up water.

ACCOUNT 261 Structures

Make-up Water Intake and Discharge Structures

The make-up water intake and discharge structures are Non-Seismic Category I, and are located along the riverbank west of the main plant structures. The intake basin is 20 ft wide, 40 ft long and 32 ft deep and is entirely below plant grade. The volume of the basin is approximately 30,000 cu ft. The structure is reinforced concrete with foundation mat bearing on rock. There are two intake chambers and two make-up water pumps supported from the reinforced concrete basin roof slab. The intakes are protected by bar racks, trash rakes, stop logs, traveling screens and a trash pit. Fish escapes are also provided. A channel is excavated in the river bottom from the ship channel to the intake structure to ensure an adequate supply of water during low tide conditions. Interior walls are reinforced and masonry concrete. A battery and switchgear room are located at grade adjacent to the basin and supported on spread footings. The floor, roof, exterior walls and interior walls are reinforced concrete.

The blowdown discharge is provided by concrete pipes running between the circulating water pumps discharge and the river.

Circulating Water Pump House

The circulating water pump house is a Non-Seismic Category I reinforced concrete structure located between the turbine building and the cooling towers and supported on a three ft thick reinforced concrete foundation. The circulating water pump basin foundation is supported on rock 28 ft below grade sloping upwards to the cooling tower water basins four ft below grade. The circulating water basin is approximately 70 ft wide, 77 ft long and 33 ft high to the operating floor. Attached to the west end of the four-bay circulating water pump basin is a service water pump basin founded 14 ft below grade. The basin is 16 ft wide, 21 ft long and 18 ft high to the operating floor. The foundation also slopes upwards to the cooling tower water basins. The approximate volume of the two basins is 200,000 cu ft.

The exterior walls, base mat, operating floor slab and interior columns supporting the operating floor are reinforced concrete. Portions of the operating floor are grating. The intake areas are protected by panel screens and stop logs. A 50 ft square electrical equipment room 13 ft high is located on the reinforced concrete portion of the operating slab. The equipment room is masonry construction with a built-up roof on metal deck.

Make-up Water Pretreatment Building

The make-up water pretreatment building is a Non-Seismic Category I structure located west of the main plant structures. The building is a two story steel framed structure 50 ft wide, 150 ft long and 30 ft high. It is supported on reinforced concrete spread footings on rock. The reinforced concrete ground floor is located six ft below grade. The intermediate floor is reinforced concrete supported on metal deck on steel framing. The roof is concrete channel plank covered with a roofing membrane. The exterior walls are insulated metal siding and the interior walls are concrete block. The building volume is approximately 270,000 cu ft.

The building has a heating and ventilation system which consists of four 25,000 cfm roof ventilators for cooling and four electric unit heaters for heating.

The building houses the sand filters, carbon filters, chemical feeds, sludge dewatering equipment and all other equipment and accessories required for a complete water pretreatment system.

ACCOUNT 262 Mechanical Equipment

Circulating Water Pumps

There are four 25 percent capacity circulating water pumps, of the mixed flow vertical type, provided. Each pump is designed for a flow rate of 147,500 gpm with a total dynamic head of 105 ft. Circulating water pump motors are 5000 hp each, operating at a synchronous speed of 320 rpm. The pumps are located within a pump house well where the water flows from the individual cooling tower basins by gravity. The pumps discharge the water to the main condensers, where heat is absorbed. The water is then returned to the distribution system of the towers. Water flow is controlled by the number of pumps placed in service at a given time. Flow from each individual cooling tower is controlled simply by an overflow from the tower basin.

ACCOUNT 26

Cooling Towers

There are three main mechanical draft wet cooling towers, each sized for one third of the requirements. Each tower is designed to cool 196,000 gpm of water from 118 F to 92 F when operating at a wet bulb temperature of 74 F. Each tower employs a reinforced concrete-filled structure combined with components for water distribution, fill splash service, support system, drift eliminators, louvers and fan deck. The fan deck provides a stable base for the 12 fan cylinders and mechanical equipment. Each fan is 33 ft in diameter and operates in an 18 ft high glass reinforced polyester velocity recovery fan stack. The hot water distribution system includes a circular flume distribution basin and metering orifice which uniformly distributes the hot water over the fill. The distribution basin is divided into thirds by means of concrete dividers. This design allows one third of the tower to be removed from service with the full flow distributed over the remainder of the tower.

Main Cooling Tower Make-up and Blowdown Systems

Two 100 percent mixed flow vertical type pumps are provided for the make-up system. Each pump is rated at 18,000 gpm developing a total dynamic head of 40 ft and is driven by a 250 hp motor. The pumps are located at the intake structure adjacent to the river. Two six ft wide by 33 ft high traveling screens are provided, each suitable for 50 percent of the flow requirements with an approach velocity of 1/2 ft per second. Serving the traveling screens are two 100 percent capacity screen wash pumps with a flow rate of 500 gpm and a total dynamic head of 100 ft to wash the screens when they require cleaning. Two screen speeds are provided, a high and low speed, for removal of materials. Vertical trash racks with automatic rake are provided ahead of the traveling screens to remove debris.

Make-up Water Pretreatment Plant

The source of make-up water is from the North River. The purpose of this system is to precondition the raw river water which is used principally as make-up to the circulating water system. However, a small portion of the clarified water is used as make-up to the demineralizer.

The primary objective is to remove debris and suspended solids characteristically present in river water. The amount of solids and debris contained in the raw influent is subject to wide fluctuation primarily due to seasonal changes and natural river environment.

Initially the influent water is clarified within a rectangular vessel. Various chemicals are used to achieve optimum settling and removal of solid particulates. The clarified effluent is then used directly as make-up to the circulating water system.

Chlorination is included in the clarification step to oxidize naturally occurring organic matters. Chlorination is also applied directly to the recirculating cooling water on an intermittent basis to minimize biological fouling within the condenser and throughout the piping system. Sulfuric acid is also used for pH control to minimize formation of scale on the heat exchanger surfaces.

Accordingly, any serious operational and/or maintenance problems as a result of plugging, clogging, or the development of bacteriological growths throughout the plant piping and cooling systems, are practically eliminated.

ACCOUNT 26

The water used as make-up to the demineralizer is first filtered and dechlorinated. In addition, the clarified water is used for the initial filling of the fire protection system and for general use throughout the power plant.

2.4 CONSTRUCTION SUPPORT ACTIVITIES DESCRIPTION

The description associated with accounts 91 through 93 addresses the construction support activities. This portion of the cost estimate (Volume 1, Section 3) is called the "indirect cost".

ACCOUNT 91 CONSTRUCTION SERVICES

The services, functions, expenses, taxes and other indirect costs are contained in the listed code of accounts.

ACCOUNT 911 Temporary Construction Facilities

The costs for temporary construction and facilities are costs of all temporary structures, janitorial services and maintenance of temporary facilities, guards and security, roads, parking lots, laydown areas, etc., and temporary electrical and piping, temporary heat, air, steam and water systems, general cleanup, etc.

ACCOUNT 912 Construction Tools and Equipment

The costs for construction tools and equipment are the cost of rental and/or purchase of construction equipment, small tools, consumables (fuel, lubricants, etc.) and maintenance of construction equipment.

ACCOUNT 913 Payroll Insurance and Taxes

These include insurance and taxes related to craft labor such as Social Security taxes and state unemployment taxes at 9.3 percent of the cost of total craft labor. Workmen's Compensation Insurance and Public Liability and Property Damage Insurance are included at 4.9 percent of the cost of total craft labor.

ACCOUNT 91-92

ACCOUNT 914 Permits Insurance and Local Taxes

Includes builders all-risk insurance, local fees and permits state and local taxes and nuclear liability insurance.

Builders all-risk insurance is an allowance based upon in-house experience for the cost of their item during the project construction phase.

ACCOUNT 92 HOME OFFICE ENGINEERING AND SERVICES

ACCOUNT 921 Home Office Services

These services are associated with home office engineering and design, procurement and expediting activities, estimating and cost control, engineering planning and scheduling, home office reproduction services as well as expenses associated with performance of the above functions (i.e., telephone, postage, computer use, travel, etc.). These costs include salaries of personnel, direct payroll-related costs (DPC), overhead loading, expenses and fee for these services consistent with contractual terms.

ACCOUNT 922 Home Office Quality Assurance

This includes the services of home office quality assurance engineers and staff personnel engaged in work on the project. Services include reviews, audits, vendor surveillance, etc. as required for design and construction of the nuclear safety-related portion of the facility. Costs included are salaries, DPC, overhead loading and expenses (i.e., travel) of these individuals. Manhours required for these services and their costs are based upon UE&C experience in this area.

ACCOUNT 923 Home Office - Construction Management

These services include those of the construction manager and his assistants. Services of construction planning and scheduling, construction methods, labor relations, safety and security personnel are utilized as required. Costs include salaries, DPC, overhead loading, and expenses.

ACCOUNT 93 FIELD OFFICE ENGINEERING AND SERVICE

ACCOUNT 931 Field Office Expenses

These expenses include costs associated with purchase and/or rental of furniture and equipment (including reproduction), communication charges, postage, stationery, other office supplies, first aid and medical expenses.

ACCOUNT 932 Field Job Supervision

This management function includes the resident construction superintendent and his assistants, craft labor supervisors, field accounting, payroll and administrative personnel, field construction schedulers, field purchasing personnel, warehousemen, survey parties, stenographers and clerical personnel. Costs include salaries, DPC, overhead loading, relocation costs of key personnel, and fee. The estimates assume that size of supervisory forces is a function of total direct employed craft labor. For fossil plants, the supervision requirement was calculated to be the number of manhours equal to about 10 percent of 85 percent of total craft labor. For the nuclear plant, supervision was calculated to be about 12 percent of 85 percent of total craft labor.

ACCOUNT 92-93

ACCOUNT 933 Field - Quality Assurance

These services include those of personnel located at the job site engaged in equipment inspection, required documentation of nuclear safety-related equipment and inspection of construction activities. Costs included are salaries, DPC, and overhead loading.

ACCOUNT 934 Test and Startup Engineering

These services are associated with preparation of startup and plant operation manuals and test procedures, direction and supervision of all testing of equipment and systems as the plant nears completion and direction of startup of the facility. Costs include salaries, DPC, overhead loading, and miscellaneous related expenses. Costs of any craft labor required for startup and testing activities are included in the appropriate Direct Cost line items.

Indirect accounts 913, 921, 922, 923, 932, 933 and 934 are included under factory costs in the cost estimate to differentiate them from site related craft labor and material costs.

SECTION 3

DETAILED COST ESTIMATE

3.1 INTRODUCTION

This section contains the details of the total base construction cost estimate for the pressurized water reactor (PWR) plant described in Section 2. The criteria used to govern the development of the cost estimate are specified in Sections 1 and 2. The cost estimate reflects the reference plant design at the "Middletown" hypothetical site described in Section 6 entitled "Site Description".

The total base construction cost for the 1139 MWe PWR is $568,831,011 or $499/kW based on July 1, 1976 prices. The detailed cost estimate presented in this section is summarized at the two and three digit level of accounting detail in Tables 1-1 and 1-2 respectively. The cost estimate presented here is a total base construction cost that does not include contingency, interest during construction or escalation.

The total base construction cost is organized in accordance with the expanded AEC Code of Accounts (USAEC Report NUS-531). Therefore, it corresponds in structure to the Plant Description (Section 2) and the Equipment List (Section 5). This is done for the reader's convenience in relating the material presented in the different sections of the report.

The total base construction cost consists of "direct" and "indirect" costs. The "direct cost" (accounts 20 through 26) encompasses the cost of the power plant structures and systems. The "indirect cost" (accounts 91 through 93) consists of the costs of the construction support activities.

A breakdown of the NSSS equipment scope is shown in account number 220A, and a lump sum cost is shown in account 220A.1. The installation costs for the NSSS equipment are distributed throughout accounts 221 to 226.

It should be noted that certain factory and site material quantities in the cost estimate are listed in two successive accounts rather than in one account. This situation occurs because the computer program is designed to handle material quantities that exceed six digits in this manner.

3.2 COST ESTIMATE EXCLUSIONS

The list of items excluded from the cost estimate is shown in Table 3-1. Generally, these items are sensitive to the particular policies and preferences of the individual utility and to the specific plant and site being considered.

A list of abbreviations is provided in Table 3-2 entitled "Glossary of Significant Abbreviations".

TABLE 3-1

1139 MWe PWR COST ESTIMATE EXCLUSIONS

1. Main Transformer, Switchyard and Transmission Facility Costs
2. Owner's Costs, Including Consultants, Site Selection, etc.
3. Waste Disposal Costs
4. Fees and Permits - Federal, State, Local
5. State and Local Taxes
6. Spare Parts
7. Nuclear Liability and Other Insurance (Except As Noted)
8. Initial Fuel Loading
9. Interest During Construction
10. Escalation
11. Contingency

TABLE 3-2

GLOSSARY OF SIGNIFICANT ABBREVIATIONS

AC	Acre
A/C	Air Conditioning
a-c	Alternating Current
AUX	Auxiliary
BD	Board
Btu	British Thermal Unit
BU	Built Up
CHRG	Charging
CI	Cast Iron
CLG	Cooling
CLNG	Cleaning
CRDM	Control Rod Drive Mechanism
CS	Carbon Steel
CU	Copper
CY	Cubic Yards
d-c	Direct Current
DETER	Detergent
D-G	Diesel-Generator
DISPL	Displacement
DRNS	Drains
EA	Each
EFP	Emergency Feed Pump
EMG	Emergency
EQ	Equipment
EVAC	Evacuating
EVAP	Evaporative
EXH	Exhaust
FDTN	Foundation
FL	Fuel
FSB	Fuel Storage Building
FT	Feet
FWH	Feed Water Heater
FX	Fixtures
GALV	Galvanized
GEN	Generator
GPM	Gallons Per Minute
GR	Gear
GSKT	Gasket
HP	High Pressure
HVAC	Heating Ventilation and Air Conditioning
HW	Hot Water
HX	Heat Exchanger
IC	Instrument Control
I & C	Instrumentation & Control
IN	Inches
INJ	Injection
INS	Insurance
INSUL	Insulation
Kg	Kilo Gram
kW	Kilo Watt
LB	Pounds
LD	Load
LF	Linear Feet
LP	Low Pressure
LS/LT	Lump Sum/Lot
MBFP	Main Boiler Feed Pump
MCC	Master Control Center
MCR	Main Control Room
MER	Mechanical Equipment Room
MISC	Miscellaneous
MN	Main
MON	Monitor
MS	Moisture Separator
MTR	Motor
MU	Make-up
MWe	Megawatt Electric
NNS	Non-Nuclear Safety
NSSS	Nuclear Steam Supply System
NUC	Nuclear
OA	Outside Air
PAB	Primary Auxiliary Building
PC	Public Liability
PD	Property Damage
PL	Pool
P&M	Pump and Motor

PMP	Pump	TB	Turbine Building
POS	Positive	T-G	Turbine-Generator
PSIA	Pounds Per Square Inch Absolute	TK	Tank
		TN	Tons
PURIF	Purification		
PVC	Poly Vinyl Chloride	U	Uranium
		UHS	Ultimate Heat Sink
QA	Quality Assurance		
QA/QC	Quality Assurance/Quality Control	V	Volt
		WTR	Water
RC	Recycle		
REGEN	Regenerating	XCHGR	Exchanger
RES	Restraint	XFER	Transfer
RHR	Residual Heat Removal	XFMR	Transformer
RM	Room	XPORT	Transport
R/O	Reverse Osmosis		
SC	Safety Class		
SEQ	Sequence		
SF	Square Feet		
SI	Safety Injection		
SKMAR	Skimmer		
SPNT	Spent		
SS	Stainless Steel		
STA	Storage		
STL	Steel		
SW	Switch		

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2 .	TOTAL DIRECT COSTS							
20 .	LAND AND LAND RIGHTS			500 AC			2,000,000	
21 .	STRUCTURES + IMPROVEMENTS							
211.	YARDWORK							
211.1	GENERAL YARDWORK							
211.11	GENERAL CUT + FILL							
211.111	CUT + FILL BEYOND OPEN CUT			142000 CY	5680 MH	66,399	85,200	
211.112	CLEARING + GRUBBING			71 AC	4260 MH	41,992	35,500	
211.113	FINE GRADING			39400 SY	394 MH	4,569	9,850	
211.114	LANDSCAPING			8 AC	4240 MH	41,795	80,000	
	211.11 GENERAL CUT + FILL				14574 MH	154,755	210,550	365,305
211.12	ROADS, WALKS + PARKING ARE							
211.121	SUBGRADE PREPARATION			60350 SY	1207 MH	12,355	60,350	
211.122	ON-SITE ROADS+PARKING AREA							
211.1221	ROADS-ASPHALT			53960 SY	13490 MH	138,089	404,700	
211.1222	PARKING AREAS-ASPHALT			4970 SY	1242 MH	12,713	37,275	
211.1223	CURBS-CONCRETE			1420 LF	568 MH	6,099	4,970	
	211.122 ON-SITE ROADS+PARKING AREA				15300 MH	156,901	446,945	603,846
211.123	WALKS-CONCRETE			355 LF	71 MH	762	1,775	
	211.12 ROADS, WALKS + PARKING ARE				16578 MH	170,018	509,070	679,088

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
211.14	FENCING + GATES							
211.141	PERMANENT FENCE			7200 LF	2160 MH	20,131	46,800	
211.142	GATE HOUSE			1 LS	2800 MH	34,226	12,000	
	211.14 FENCING + GATES				4960 MH	54,357	58,800	113,157
211.15	SANITARY SEWER FACILITY							
211.151	SEWAGE TRTMNT FACILITY	1 LS	115,500	1 LT	1541 MH	19,935	1,994	
211.152	SANITARY PIPING							
211.1521	2 IN + SMALLER							
211.1522	2.5 IN + LARGER							
211.15221	CI BELL+SPIGOT/NNS			10700 LF	5028 MH	64,443	64,200	
	211.1522 2.5 IN + LARGER				5028 MH	64,443	64,200	128,643
	211.152 SANITARY PIPING				5028 MH	64,443	64,200	128,643
211.153	OIL SEPARATORS	1 LS	53,900	1 LT	772 MH	9,986	979	
	211.15 SANITARY SEWER FACILITY		169,400		7341 MH	94,364	67,193	330,957
211.16	YARD DRAINAGE STORM SEWERS							
211.161	DRAINS			78 EA	7800 MH	99,965	78,000	
211.162	PIPING							
211.1621	2 IN + SMALLER							
211.1622	2.5 IN + LARGER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
211.16221	GALV/NNS			12500 LF	6000 MH	77,762	408,750	
	211.1622 2.5 IN + LARGER				6000 MH	77,762	408,750	486,512
	211.162 PIPING				6000 MH	77,762	408,750	486,512
	211.16 YARD DRAINAGE STORM SEWERS				13800 MH	177,727	486,750	664,477
211.17	ROADWAY + YARD LIGHTING			140 EA	21000 MH	258,204	210,000	
211.19	SETTLING BASINS							
211.191	EARTH EXCAVATION			17750 CY	1775 MH	20,749	17,750	
211.192	ROCK EXCAVATION							
211.193	BACKFILL							
211.194	PUMPING							
211.195	FORMWORK			568 SF	454 MH	5,014	568	
211.196	REINF. STEEL			10 TN	351 MH	4,531	4,000	
211.197	CONCRETE			213 CY	320 MH	3,268	7,455	
211.198	SHEET PILING			213 TN	2130 MH	29,224	74,550	
211.199	RIP-RAP (12 IN. THICK)			17 CY	25 MH	248	170	
	211.19 SETTLING BASINS				5055 MH	63,034	104,493	167,527
	211.1 GENERAL YARDWORK		169,400		83308 MH	972,459	1,646,856	2,788,715
211.4	RAILROADS							
211.41	CUT + FILL			20960 CY	839 MH	9,807	12,576	
211.42	GRADING			46500 SY	465 MH	5,393	11,625	
211.43	TRACK (BALLAST, TIES, RAIL			31440 LF	78600 MH	774,776	817,440	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
211.45	SWITCHES+BUMPERS							
211.451	TURNOUTS (NO. 8)			6 EA	1200 MH	11,829	18,000	
211.452	BUMPERS			4 EA	200 MH	1,971	4,000	
	211.45 SWITCHES+BUMPERS				1400 MH	13,800	22,000	35,800
211.46	RIP RAP (24 IN. THICK)			262 CY	393 MH	3,912	2,620	
	211.4 RAILROADS				81697 MH	807,688	866,261	1,673,949
211.7	STRUCTURE ASSOCIATED YORK							
211.71	CUT + FILL							
211.711	OPEN CUT							
211.7111	DEWATERING			1 LT	4500 MH	41,940	10,000	
211.7112	EARTH EXCAVATION			153600 CY	15360 MH	179,559	153,600	
211.7113	ROCK EXCAVATION			253500 CY	202800 MH	2,172,069	1,014,000	
	211.711 OPEN CUT				222660 MH	2,393,568	1,177,600	3,571,168
211.712	FILL + BKFILL (PLACE/COMP)							
211.7121	CATEGORY I FILL			5700 CY	456 MH	5,330	8,550	
211.7122	NON-CATEGORY I FILL			104310 CY	8345 MH	97,554	104,310	
211.7123	AREAL FILL			233700 CY	4675 MH	54,650	233,700	
211.7124	CONCRETE FILL			17500 CY	17500 MH	178,710	560,000	
	211.712 FILL + BKFILL (PLACE/COMP)				30976 MH	336,244	906,560	1,242,804
	211.71 CUT + FILL				253636 MH	2,729,812	2,084,160	4,813,972

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	211.7 STRUCTURE ASSOCIATED YDWK				253636 MH	2,729,812	2,084,160	4,813,972
	211. YARDWORK		169,400		418641 MH	4,509,959	4,597,277	9,276,636
212.	REACTOR CONTAINMENT BLDG							
212.1	BUILDING STRUCTURE							
212.11	EXCAVATION WORK							
212.111	EARTH EXCAVATION							
212.112	ROCK EXCAVATION							
212.113	CONCRETE FILL							
212.114	FILL + BACKFILL							
212.115	DEWATERING							
	212.11 EXCAVATION WORK							
212.13	SUBSTRUCTURE CONCRETE							
212.131	FORMWORK			18000 SF	14400 MH	159,010	18,000	
212.132	REINF. STEEL			1700 TN	59500 MH	768,342	680,000	
212.133	CONCRETE			8300 CY	14525 MH	148,330	290,500	
212.134	EMBEDDED STEEL							
212.135	FLOOR FINISH							
212.136	WATERPROOFING			22500 SF	450 MH	4,194	2,250	
212.137	CADWELDS			1600 EA	5600 MH	72,314	25,600	
212.138	CONSTRUCTION JOINTS			8000 SF	8000 MH	88,340	8,000	
212.139	WELDED WIRE FABRIC			36000 SF	720 MH	9,299	4,320	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	212.13 SUBSTRUCTURE CONCRETE				103195 MH	1,249,829	1,028,670	2,278,499
212.14	SUPERSTRUCTURE							
212.141	CONCRETE WORK							
212.1411	CONTAINMENT SHELL							
212.14111	FORMWORK			73000 SF	91250 MH	1,007,619	146,000	
212.14112	REINFORCING STEEL			4100 TN	205000 MH	2,647,227	1,640,000	
212.14113	CONCRETE			12000 CY	48000 MH	490,176	420,000	
212.14114	EMBEDDED STEEL			20 TN	3000 MH	36,081	30,000	
212.14115	RUBBING SURFACES			70000 SF	2100 MH	21,445	700	
212.14116	WATERPROOFING			30500 SF	610 MH	5,685	3,050	
212.14117	CADWELDS			15200 EA	53200 MH	686,988	243,200	
212.14118	CONSTRUCTION JOINTS			63250 SF	63250 MH	698,431	63,250	
	212.1411 CONTAINMENT SHELL				466410 MH	5,593,652	2,546,200	8,139,852
212.1412	CONTAINMENT DOME							
212.14121	FORMWORK			25000 SF	31250 MH	345,075	50,000	
212.14122	REINF. STEEL			1300 TN	91000 MH	1,175,110	520,000	
212.14123	CONCRETE			4300 CY	17200 MH	175,646	150,500	
212.14124	EMBEDDED STEEL							
212.14125	RUBBING SURFACES			25000 SF	751 MH	7,670	250	
212.14126	WATERPROOFING							
212.14127	CADWELDS			4200 EA	14700 MH	189,825	67,200	
212.14128	CONSTRUCTION JOINTS			10000 SF	10000 MH	110,424	10,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	212.1412 CONTAINMENT DOME				164901 MH	2,003,750	797,950	2,801,700
212.1413	INTERIOR CONCRETE							
212.14131	FORMWORK							
212.141311	FORMWORK-WOOD			110000 SF	165000 MH	1,821,996	110,000	
212.141312	FORMWORK-METAL			4500 SF	360 MH	4,687	4,050	
	212.14131 FORMWORK				165360 MH	1,826,683	114,050	1,940,733
212.14132	REINFORCING STEEL			2400 TN	96000 MH	1,239,676	960,000	
212.14133	CONCRETE			10000 CY	45000 MH	459,540	350,000	
212.14134	EMBEDDED STEEL			230 TN	34500 MH	414,924	345,000	
212.14135	RUBBING SURFACES			80000 SF	2400 MH	24,509	800	
212.14136	REACTOR CAV LINER PLATE			11000 SF	39600 MH	547,272	374,000	
212.14137	CADWELDS			2500 EA	8751 MH	113,003	40,000	
212.14138	CONSTRUCTION JOINTS			10000 SF	10000 MH	110,424	10,000	
212.14139	MAJOR SUPPORT EMBEDMENTS	1 LT	1,300,000	1 LT	16834 MH	202,458	20,246	
	212.1413 INTERIOR CONCRETE		1,300,000		418445 MH	4,938,482	2,214,096	8,452,585
	212.141 CONCRETE WORK		1,300,000		1049756 MH	12,535,891	5,558,246	19,394,137
212.142	STRUCTURAL + MISC. STEEL							
212.1421	STRUCTURAL STEEL			225 TN	4500 MH	58,579	168,750	
212.1422	MISC. FRAMES, ETC.			45 TN	2700 MH	35,147	54,000	
212.1423	FLOOR GRATING (GALV)			6000 SF	1200 MH	15,621	18,000	
212.1424	STAIR TREADS			350 EA	350 MH	4,556	12,250	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.1425	HANDRAIL			1000 LF	750 MH	9,763	10,000	
	212.142 STRUCTURAL + MISC. STEEL				9500 MH	123,666	263,000	386,666
212.146	CONTAINMENT LINER							
212.1461	LINER PLATE,STFNRS,PENET			1 LT	300000 MH	4,146,000	6,381,706	
	212.146 CONTAINMENT LINER				300000 MH	4,146,000	6,381,706	10,527,706
212.149	PAINTING							
212.1491	CONCRETE			25000 SF	500 MH	4,785	2,500	
212.1492	STEELWORK			270 TN	1350 MH	12,920	1,620	
212.1493	HANDRAILS			1000 LF	200 MH	1,914	100	
212.1494	LINER PLATE			1 LS	50000 MH	478,500	100,000	
212.1496	METAL DECK			4500 SF	90 MH	861	450	
	212.149 PAINTING				52140 MH	498,980	104,670	603,650
	212.14 SUPERSTRUCTURE		1,300,000		1411396 MH	17,304,537	12,307,622	30,912,159
	212.1 BUILDING STRUCTURE		1,300,000		1514591 MH	18,554,366	13,336,292	33,190,658
212.2	BUILDING SERVICES							
212.21	PLUMBING + DRAINS							
212.211	ROOF DRAINS + PIPING							
212.2111	DRAINS							
212.2115	PIPING							
	212.211 ROOF DRAINS + PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.212	FLOOR DRAINS + PIPING							
212.2121	DRAINS							
212.2125	PIPING							
	212.212 FLOOR DRAINS + PIPING							
	212.21 PLUMBING + DRAINS							
212.22	HEATING,VENT + AIR COND							
212.221	PRE-ENTRY PURGE SYSTEM							
212.2211	ROTATING MACHINERY							
212.22111	SUPPLY FAN + MOTOR	1 EA	3,500	1 LT	72 MH	931	93	
212.221111	SUPPLY FAN							
212.221112	SUPPLY FAN MOTOR							
	212.22111 SUPPLY FAN + MOTOR		3,500		72 MH	931	93	4,524
212.22112	EXHAUST FAN + MOTOR	1 EA	7,000	1 LT	100 MH	1,293	129	
212.221121	EXHAUST FAN							
212.221122	EXHAUST FAN MOTOR							
	212.22112 EXHAUST FAN + MOTOR		7,000		100 MH	1,293	129	8,422
	212.2211 ROTATING MACHINERY		10,500		172 MH	2,224	222	12,946
212.2215	PIPING + DUCTWORK							
212.22153	DUCTWORK			10000 LB	2200 MH	25,740	10,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	212.2215 PIPING + DUCTWORK				2200 MH	25,740	10,000	35,740
212.2216	VALVES + DAMPERS							
212.22169	SPECIAL VALVES							
212.221691	THREE - WAY							
	212.22169 SPECIAL VALVES							
	212.2216 VALVES + DAMPERS							
212.2218	INSTRUMENTATION + CONTROL	1 LT	5,380	1 LT	40 MH	490	25	
212.2219	SKIDS + FOUNDATIONS							
212.22191	EXHAUST FILTRATION UNIT	1 LT	76,350	1 LT	2610 MH	33,767	3,377	
	212.2219 SKIDS + FOUNDATIONS		76,350		2610 MH	33,767	3,377	113,494
	212.221 PRE-ENTRY PURGE SYSTEM		92,230		5022 MH	62,221	13,624	168,075
212.222	REFUELING PURGE SYSTEM							
212.2221	ROTATING MACHINERY							
212.22211	SUPPLY FAN + MOTOR	1 EA	10,000	1 LT	100 MH	1,293	129	
212.222111	SUPPLY FAN							
212.222112	SUPPLY FAN MOTOR							
	212.22211 SUPPLY FAN + MOTOR		10,000		100 MH	1,293	129	11,422
212.22212	EXHAUST FAN + MOTOR	1 EA	10,000	1 LT	100 MH	1,293	129	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.222121	EXHAUST FAN							
212.222122	EXHAUST FAN MOTOR							
	212.22212 EXHAUST FAN + MOTOR		10,000		100 MH	1,293	129	11,422
	212.2221 ROTATING MACHINERY		20,000		200 MH	2,586	258	22,844
212.2225	PIPING + DUCTWORK							
212.22253	DUCTWORK			75000 LB	16500 MH	193,050	75,000	
	212.2225 PIPING + DUCTWORK				16500 MH	193,050	75,000	268,050
212.2226	VALVES + DAMPERS							
212.22266	BUTTERFLY	4 EA	48,000	1 LT	800 MH	10,369	1,037	
	212.2226 VALVES + DAMPERS		48,000		800 MH	10,369	1,037	59,406
	212.222 REFUELING PURGE SYSTEM		68,000		17500 MH	206,005	76,295	350,300
212.223	CONTM RECIRC FILTER SYSTEM							
212.2231	ROTATING MACHINERY							
212.22311	RECIRCULATING FANS + MOTOR	2 EA	5,000	1 LT	121 MH	1,564	156	
212.223111	RECIRCULATING FAN							
212.223112	RECIRCULATING FAN MOTOR							
	212.22311 RECIRCULATING FANS + MOTOR		5,000		121 MH	1,564	156	6,720
	212.2231 ROTATING MACHINERY		5,000		121 MH	1,564	156	6,720
212.2235	PIPING + DUCTWORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.22353	DUCTWORK			31000 LB	6820 MH	79,794	31,000	
	212.2235 PIPING + DUCTWORK				6820 MH	79,794	31,000	110,794
212.2236	VALVES + DAMPERS							
212.22366	BUTTERFLY	4 EA	10,000	1 LT	200 MH	2,340	234	
	212.2236 VALVES + DAMPERS		10,000		200 MH	2,340	234	12,574
212.2238	INSTRUMENTATION + CONTROLS	1 LT	25,170	1 LT	200 MH	2,445	122	
212.2239	SKIDS + FOUNDATIONS							
212.22391	RECIRC FILTRATION UNIT	2 EA	61,200	1 LT	1259 MH	16,290	1,629	
	212.2239 SKIDS + FOUNDATIONS		61,200		1259 MH	16,290	1,629	79,119
	212.223 CNTM RECIRC FILTER SYSTEM		101,370		8600 MH	102,433	33,141	236,944
212.224	CRDM COOLING SYSTEM							
212.2241	ROTATING MACHINERY							
212.22411	SUPPLY FANS + MOTORS	4 EA	25,000	1 LT	321 MH	4,151	415	
212.224111	SUPPLY FAN							
212.224112	SUPPLY FAN MOTOR							
	212.22411 SUPPLY FANS + MOTORS		25,000		321 MH	4,151	415	29,566
	212.2241 ROTATING MACHINERY		25,000		321 MH	4,151	415	29,566
	212.224 CRDM COOLING SYSTEM		25,000		321 MH	4,151	415	29,566
212.225	RECIRC COOLING SYSTEM							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS.	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.2251	ROTATING MACHINERY							
212.22511	CHILLERS	2 EA	500,000	1 LT	4000 MH	51,748	5,175	
212.225111	CHILLER							
212.225112	CHILLER MOTOR							
	212.22511 CHILLERS		500,000		4000 MH	51,748	5,175	556,923
212.22512	CHILLED WATER PUMP + MOTOR	4 EA	20,000	1 LT	559 MH	7,388	739	
212.225121	CHILLED WATER PUMP							
212.225122	CHILLED WATER PUMP MOTOR							
	212.22512 CHILLED WATER PUMP + MOTOR		20,000		559 MH	7,388	739	28,127
	212.2251 ROTATING MACHINERY		520,000		4559 MH	59,136	5,914	585,050
212.2253	TANKS + PRESSURE VESSELS							
212.22531	COMPRESSION TANKS	2 EA	3,000	1 LT	100 MH	1,308	131	
212.22532	AIR SEPARATORS	2 EA	3,000	1 LT	100 MH	1,293	129	
	212.2253 TANKS + PRESSURE VESSELS		6,000		200 MH	2,601	260	8,861
212.2255	PIPING							
212.22551	2IN + SMALLER.							
212.225511	CS/NNS			400 LB	193 MH	2,499	520	
	212.22551 2IN + SMALLER.				193 MH	2,499	520	3,019
212.22552	2.5IN + LARGER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.225521	CS/NNS	59900 LB	89,850	1 LT	14376 MH	186,320	18,632	
	212.22552 2.5IN + LARGER		89,850		14376 MH	186,320	18,632	294,802
	212.2255 PIPING		89,850		14569 MH	188,819	19,152	297,821
212.2256	VALVES	106 EA	50,000					
212.22561	GATE							
212.22562	CHECK							
212.22563	GLOBE							
212.22565	SAFETY/RELIEF							
212.22568	PLUG							
212.22569	SPECIAL VALVES							
212.225691	3-WAY MIXING							
	212.22569 SPECIAL VALVES							
	212.2256 VALVES		50,000					50,000
212.2257	PIPING - MISC. ITEMS							
212.22571	HANGERS	12000 LB	18,000					
	212.2257 PIPING - MISC. ITEMS		18,000					18,000
212.2258	INSTRUMENTATION + CONTROLS	1 LT	2,000	1 LT	16 MH	196	10	
212.2259	SKIDS + FOUNDATIONS							
212.22591	FAN/COIL COOLING UNIT MTR	6 EA	480,000	1 LT	1700 MH	21,993	2,199	
212.225911	FAN/COIL COOLG UNIT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
212.225912	FAN/COIL COOLG UNIT MOTOR							
	212.22591 FAN/COIL COOLING UNIT MTR		480,000		1700 MH	21,993	2,199	504,192
	212.2259 SKIDS + FOUNDATIONS		480,000		1700 MH	21,993	2,199	504,192
	212.225 RECIRC COOLING SYSTEM		1,165,850		21044 MH	272,745	27,535	1,466,130
	212.22 HEATING,VENT + AIR COND		1,452,450		52487 MH	647,555	151,010	2,251,015
212.24	LIGHTING+SERVICE POWER			31000 SF	5891 MH	72,433	74,400	
212.25	ELEVATOR							
212.251	ELEVATOR EQUIPMENT	1 LS	50,000	1 LT	1800 MH	23,286	2,329	
212.252	ELEVATOR ENCLOSURE			3000 SF	451 MH	5,514	4,500	
	212.25 ELEVATOR		50,000		2251 MH	28,800	6,829	85,629
	212.2 BUILDING SERVICES		1,502,450		60629 MH	748,788	232,239	2,483,477
	212. REACTOR CONTAINMENT BLDG		2,802,450		1575220 MH	19,303,154	13,568,531	35,674,135
213.	TURBINE ROOM + HEATER BAY							
213.1	BUILDING STRUCTURE							
213.11	EXCAVATION WORK							
213.111	EARTH EXCAVATION							
213.112	ROCK EXCAVATION							
213.113	CONCRETE FILL							
213.114	FILL + BACKFILL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.115	DEWATERING							
	213.11 EXCAVATION WORK							
213.13	SUBSTRUCTURE CONCRETE							
213.131	FORMWORK			67000 SF	53600 MH	591,873	67,000	
213.132	REINFORCING STEEL			700 TN	24500 MH	316,376	280,000	
213.133	CONCRETE			8700 CY	15225 MH	155,478	304,500	
213.134	EMBEDDED STEEL			45 TN	6750 MH	81,182	67,500	
213.135	FLOOR FINISH			57000 SF	1140 MH	11,641	570	
213.136	WATERPROOFING							
213.137	CONSTRUCTION JOINTS			1000 SF	1000 MH	11,042	1,000	
213.138	RUBBING CONCRETE SURFACE			3000 SF	91 MH	930	30	
213.139	WIRE FABRIC							
	213.13 SUBSTRUCTURE CONCRETE				102306 MH	1,168,522	720,600	1,889,12
213.14	SUPERSTRUCTURE							
213.141	CONCRETE WORK							
213.1411	FORMWORK							
213.14111	FORMWORK-WOOD			5400 SF	4860 MH	53,664	5,400	
213.14112	FORMWORK-METAL			40000 SF	3200 MH	41,656	36,000	
	213.1411 FORMWORK				8060 MH	95,320	41,400	136,720
213.1412	REINFORCING STEEL			110 TN	4951 MH	63,932	44,000	
213.1413	CONCRETE			1000 CY	2000 MH	20,424	35,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.1414	EMBEDDED STEEL							
213.1415	FLOOR FINISH			40000 SF	800 MH	8,170	400	
213.1416	WATERPROOFING							
213.1417	RUBBING CONCRETE SURFACES			4000 SF	120 MH	1,226	40	
213.1418	CONSTRUCTION JOINTS			1000 SF	1000 MH	11,042	1,000	
	213.141 CONCRETE WORK				16931 MH	200,114	121,840	321,954
213.142	STRUCTURAL + MISC. STEEL							
213.1421	STRUCTRUAL STEEL			5700 TN	114000 MH	1,484,007	4,275,000	
213.1422	FLR + PLATFORM SUPPORTS							
213.1423	MISC. FRAMES, ETC.			50 TN	3000 MH	39,053	60,000	
213.1424	CHECKERED PLATE							
213.1425	FLOOR GRATING (GALV)			60000 SF	12000 MH	156,211	180,000	
213.1426	STAIR TREADS			500 EA	500 MH	6,509	17,500	
213.1427	HANDRAIL			4000 LF	3000 MH	39,053	40,000	
	213.142 STRUCTURAL + MISC. STEEL				132500 MH	1,724,833	4,572,500	6,297,333
213.143	EXTERIOR WALLS							
213.1431	CONCRETE WALLS							
213.1432	MASONRY WALLS			11000 SF	2750 MH	31,378	30,800	
213.1433	METAL INSULATED SIDING			100000 SF	20000 MH	260,352	400,000	
	213.143 EXTERIOR WALLS				22750 MH	291,730	430,800	722,530
213.144	ROOF DECK							
213.1441	METAL ROOF DECK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.1442	CONCRETE PLANK			65000 SF	5200 MH	67,691	84,500	
213.1443	CONCRETE FILL			900 CY	1800 MH	18,332	28,800	
213.1444	REINFORCING STEEL			50 TN	2251 MH	29,066	20,000	
	213.144 ROOF DECK				9251 MH	115,139	133,300	248,439
213.145	ROOFING + FLASHING							
213.1451	B.U. ROOF INSUL. + FLASH							
213.1452	ELASTOMERIC ROOFING			65000 SF	4550 MH	61,334	58,500	
	213.145 ROOFING + FLASHING				4550 MH	61,334	58,500	119,834
213.146	INTERIOR WALLS + PARTITION							
213.1461	CONCRETE WALLS							
213.1462	CONCRETE BLOCK WALLS			12000 SF	3000 MH	34,230	18,000	
213.1463	METAL PARTITIONS			7000 SF	420 MH	4,872	10,500	
	213.146 INTERIOR WALLS + PARTITION				3420 MH	39,102	28,500	67,602
213.147	DOORS + WINDOWS							
213.1471	ROLLING STEEL DOORS			600 SF	360 MH	4,687	8,400	
213.1472	PERSONNEL DOORS			550 SF	440 MH	5,104	6,600	
213.1473	SASH + GLAZING			15000 SF	7500 MH	87,000	180,000	
	213.147 DOORS + WINDOWS				8300 MH	96,791	195,000	291,791
213.149	PAINTING							
213.1491	CONCRETE			23000 SF	460 MH	4,402	2,300	
213.1492	STEELWORK			5750 TN	28750 MH	275,138	34,500	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.1493	METAL DECK			40000 SF	800 MH	7,656	4,000	
213.1494	HANDRAIL			4000 LF	800 MH	7,656	400	
	213.149 PAINTING				30810 MH	294,852	41,200	336,052
	213.14 SUPERSTRUCTURE				228512 MH	2,823,895	5,581,640	8,405,535
	213.1 BUILDING STRUCTURE				330818 MH	3,992,417	6,302,240	10,294,657
213.2	BUILDING SERVICES							
213.21	PLUMBING + DRAINS							
213.211	ROOF DRAINS + PIPING							
213.2111	DRAINS			12 EA	121 MH	1,565	2,400	
213.2115	PIPING							
213.21151	2IN + SMALLER							
213.21152	2.5 IN + LARGER							
213.211521	GALV. STEEL/NNS	34200 LB	58,140	1 LT	8207 MH	106,368	10,637	
	213.21152 2.5 IN + LARGER		58,140		8207 MH	106,368	10,637	175,145
	213.2115 PIPING		58,140		8207 MH	106,368	10,637	175,145
	213.211 ROOF DRAINS + PIPING		58,140		8328 MH	107,933	13,037	179,110
213.212	FLOOR DRAINS + PIPING							
213.2121	DRAINS			100 EA	1000 MH	12,960	20,000	
213.2125	PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
213.21251	2 IN + SMALLER							
213.21252	2.5IN + LARGER							
213.212521	CI/NNS	167280 LB	36,802	1 LT	3345 MH	43,353	4,335	
213.212522	CS/NNS	12960 LB	19,440	1 LT	3110 MH	40,309	4,031	
213.212523	PVC/NNS	800 LF	6,800	1 LT	384 MH	4,977	498	
	213.21252 2.5IN + LARGER		63,042		6839 MH	88,639	8,864	160,545
	213.2125 PIPING		63,042		6839 MH	88,639	8,864	160,545
	213.212 FLOOR DRAINS + PIPING		63,042		7839 MH	101,599	28,864	193,505
213.213	PUMPS.							
213.2131	DRAIN PUMP + MOTOR			2 EA	100 MH	1,322	3,000	
213.21311	DRAIN PUMP							
213.21312	DRAIN PUMP MOTOR							
	213.2131 DRAIN PUMP + MOTOR				100 MH	1,322	3,000	4,322
213.2132	FIRE PROTECT PUMP + MOTOR			2 EA	200 MH	2,643	4,000	
213.21321	FIRE PROTECT PUMP							
213.21322	FIRE PROTECT PUMP MOTOR							
	213.2132 FIRE PROTECT PUMP + MOTOR				200 MH	2,643	4,000	6,643
	213.213 PUMPS.				300 MH	3,965	7,000	10,965
213.214	SANITARY DRAINS + PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.2141	SANITARY FIXTURES			9 EA	100 MH	1,223	1,500	
213.2145	PIPING							
213.21451	2IN + SMALLER							
213.214511	CI/NNS			840 LB	25 MH	323	210	
213.214512	COPPER/NNS			200 LF	40 MH	517	520	
	213.21451 2IN + SMALLER				65 MH	840	730	1,570
213.21452	2.5IN + LARGER							
213.214521	CI/NNS	1980 LB	436	1 LT	40 MH	517	52	
	213.21452 2.5IN + LARGER		436		40 MH	517	52	1,005
	213.2145 PIPING		436		105 MH	1,357	782	2,575
	213.214 SANITARY DRAINS + PIPING		436		205 MH	2,580	2,282	5,298
	213.21 PLUMBING + DRAINS		121,618		16672 MH	216,077	51,183	388,878
213.22	HEATING, VENT, + AIR COND.							
213.221	GENERAL BLDG. VENT							
213.2211	ROTATING MACHINERY							
213.22111	ROOF VENTILATORS + MOTORS	10 EA	70,000	1 LT	2000 MH	25,874	2,587	
213.221111	ROOF VENTILATOR							
213.221112	ROOF VENTILATOR MOTOR							
	213.22111 ROOF VENTILATORS + MOTORS		70,000		2000 MH	25,874	2,587	98,461

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	213.2211 ROTATING MACHINERY		70,000		2000 MH	25,874	2,587	98,461
213.2216	VALVES + DAMPERS							
213.22169	SPECIAL VALVES + DAMPESS							
213.221691	INTAKE LOUVERS	20 EA	37,500	1 LT	1252 MH	16,197	1,620	
	213.22169 SPECIAL VALVES + DAMPERS		37,500		1252 MH	16,197	1,620	55,317
	213.2216 VALVES + DAMPERS		37,500		1252 MH	16,197	1,620	55,317
	213.221 GENERAL BLDG. VENT		107,500		3252 MH	42,071	4,207	153,778
213.222	HEATER BAY VENT							
213.2221	ROTATING MACHINERY							
213.22211	ROOF VENTILATORS + MOTORS	10 EA	70,000	1 LT	2000 MH	25,874	2,587	
213.222111	ROOF VENTILATOR							
213.222112	ROOF VENTILATOR MOTOR							
	213.22211 ROOF VENTILATORS + MOTORS		70,000		2000 MH	25,874	2,587	98,461
	213.2221 ROTATING MACHINERY		70,000		2000 MH	25,874	2,587	98,461
	213.222 HEATER BAY VENT		70,000		2000 MH	25,874	2,587	98,461
213.223	GENERAL BLDG HEAT							
213.2232	HEAT TRANSFER EQUIPMENT							
213.22321	STEAM HEATER UNITS	24 EA	12,000	1 LT	479 MH	6,200	620	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	213.2232 HEAT TRANSFER EQUIPMENT		12,000		479 MH	6,200	620	18,820
213.2235	PIPING							
213.22351	2IN + SMALLER							
213.223511	CS/NNS			5180 LB	2486 MH	32,221	6,734	
	213.22351 2IN + SMALLER				2486 MH	32,221	6,734	38,955
213.22352	2.5IN + LARGER							
213.223521	CS/NNS	20800 LB	31,200	1 LT	4993 MH	64,710	6,471	
	213.22352 2.5IN + LARGER		31,200		4993 MH	64,710	6,471	102,381
	213.2235 PIPING		31,200		7479 MH	96,931	13,205	141,336
213.2236	VALVES	100 EA	14,000					
213.22361	GATE							
213.22362	CHECK							
	213.2236 VALVES		14,000					14,000
213.2237	PIPING - MISC. ITEMS							
213.22371	HANGERS + SUPPORTS	5200 LB	7,800					
213.22372	INSULATION			3300 LF	825 MH	10,742	6,600	
	213.2237 PIPING - MISC. ITEMS		7,800		825 MH	10,742	6,600	25,142
	213.223 GENERAL BLDG HEAT		65,000		8783 MH	113,873	20,425	199,298
213.224	LUBE OIL RM VENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
213.2241	ROTATING MACHINERY							
213.22411	FANS + MOTORS	1 EA	3,000	1 LT	21 MH	270	27	
213.224111	FAN							
213.224112	MOTOR							
	213.22411 FANS + MOTORS		3,000		21 MH	270	27	3,297
	213.2241 ROTATING MACHINERY		3,000		21 MH	270	27	3,297
	213.224 LUBE OIL RM VENT		3,000		21 MH	270	27	3,297
213.226	ELV MACH ROOM							
213.2261	ROTATING MACHINERY							
213.22611	FANS + MOTORS	1 EA	3,000	1 LT	21 MH	270	27	
213.226111	FAN							
213.226112	MOTOR							
	213.22611 FANS + MOTORS		3,000		21 MH	270	27	3,297
	213.2261 ROTATING MACHINERY		3,000		21 MH	270	27	3,297
213.2266	VALVES + DAMPERS							
213.22669	SPECIAL VALVES + DAMPERS							
213.226691	DAMPER							
	213.22669 SPECIAL VALVES + DAMPERS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	213.2266 VALVES + DAMPERS							
	213.226 ELV MACH ROOM		3,000		21 MH	270	27	3,297
213.228	INSTRUMENTATION + CONTROL	1 LT	4,000	1 LT	32 MH	390	20	
	213.22 HEATING, VENT, + AIR COND.		252,500		14109 MH	182,748	27,293	462,541
213.23	FIRE PROTECTION							
213.231	HOSE + SPRAY EQUIPMENT							
213.2311	HOSE REELS			16 EA	540 MH	5,033	5,400	
213.2312	SPRAY HEADS			24 EA	121 MH	1,565	600	
	213.231 HOSE + SPRAY EQUIPMENT				661 MH	6,598	6,000	12,598
213.235	PIPING							
213.2352	2.5IN + LARGER							
213.23521	CS/NNS	44730 LB	67,095	1 LT	10735 MH	139,131	13,913	
	213.2352 2.5IN + LARGER		67,095		10735 MH	139,131	13,913	220,139
	213.235 PIPING		67,095		10735 MH	139,131	13,913	220,139
213.236	VALVES							
213.2369	SPECIAL VALVES							
213.23691	DELUGE VALVE	12 EA	7,200					
	213.2369 SPECIAL VALVES		7,200					7,200

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
	213.236 VALVES		7,200					7,200
	213.23 FIRE PROTECTION		74,295		11396 MH	145,729	19,913	239,937
213.24	LIGHTING+SERVICE POWER			70000 SF	21000 MH	258,204	126,000	
213.25	ELEVATOR							
213.251	ELEVATOR EQUIP	1 EA	50,000	1 LT	1800 MH	23,286	2,329	
	213.25 ELEVATOR		50,000		1800 MH	23,286	2,329	75,615
	213.2 BUILDING SERVICES		498,413		64977 MH	826,044	226,716	1,551,175
	213. TURBINE ROOM + HEATER BAY		498,413		395795 MH	4,818,461	6,528,958	11,845,832
215.	PRIM AUX BLDG + TUNNELS							
215.1	BUILDING STRUCTURE							
215.11	EXCAVATION WORK							
215.111	EARTH EXCAVATION							
215.112	ROCK EXCAVATION							
215.113	CONCRETE FILL							
215.114	FILL + BACKFILL							
215.115	DEWATERING							
	215.11 EXCAVATION WORK							
215.13	SUBSTRUCTURE CONCRETE							
215.131	FORMWORK				17700 SF	14160 MH	156,359	17,700	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.132	REINF. STEEL			240 TN	8400 MH	108,472	96,000	
215.133	CONCRETE			2000 CY	3500 MH	35,742	70,000	
215.134	EMBEDDED STEEL			5 TN	750 MH	9,020	7,500	
215.135	FLOOR FINISH			15000 SF	300 MH	3,064	150	
215.136	WATERPROOFING			15000 SF	300 MH	2,796	1,500	
215.137	CONSTRUCTION JOINTS			1500 SF	1500 MH	16,564	1,500	
215.138	WIRE FABRIC			22000 SF	440 MH	5,682	2,640	
215.139	RUBBING CONCRETE SURFACES							
	215.13 SUBSTRUCTURE CONCRETE				29350 MH	337,699	196,990	534,689
215.14	SUPERSTRUCTURE							
215.141	CONCRETE WORK							
215.1411	FORMWORK							
215.14111	FORMWORK-WOOD			205000 SF	164000 MH	1,810,954	205,000	
215.14112	FORMWORK-METAL			53000 SF	4240 MH	55,194	47,700	
	215.1411 FORMWORK				168240 MH	1,866,148	252,700	2,118,848
215.1412	REINFORCING STEEL			2050 TN	82000 MH	1,058,891	820,000	
215.1413	CONCRETE			14700 CY	29400 MH	300,233	514,500	
215.1414	EMBEDDED STEEL			17 TN	2550 MH	30,668	25,500	
215.1415	FLOOR FINISH			57500 SF	1151 MH	11,754	575	
215.1416	WATERPROOFING			35000 SF	700 MH	6,524	3,500	
215.1417	RUBBING CONCRETE SURFACE			95000 SF	2851 MH	29,115	950	
215.1418	CONSTRUCTION JOINTS			15000 SF	15000 MH	165,636	15,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.1419	REMOVABLE PLUGS			20 EA	1300 MH	13,276	5,000	
	215.141 CONCRETE WORK				303192 MH	3,482,245	1,637,725	5,119,970
215.142	STRUCTURAL + MISC. STEEL							
215.1421	STRUCTURAL STEEL			700 TN	14000 MH	182,247	525,000	
215.1422	FLOOR + PLATFORM SPTS.			40 TN	2400 MH	31,242	48,000	
215.1423	MISC. FRAMES, ETC.							
215.1425	FLOOR GRATING (GALV.)			5000 SF	1000 MH	13,017	15,000	
215.1426	STAIR TREADS			250 EA	250 MH	3,255	8,750	
215.1427	HANDRAIL			800 LF	600 MH	7,811	8,000	
	215.142 STRUCTURAL + MISC. STEEL				18250 MH	237,572	604,750	842,322
215.143	EXTERIOR WALLS							
215.1431	CONCRETE							
	215.143 EXTERIOR WALLS							
215.144	ROOF DECK							
215.1441	METAL ROOF DECK							
	215.144 ROOF DECK							
215.145	ROOFING + FLASHING							
215.1451	B.U. ROOF, INSUL + FLASHIN							
215.1452	B.U. ROOF + FLASH (NO INSU			11500 SF	575 MH	7,751	11,500	
	215.145 ROOFING + FLASHING				575 MH	7,751	11,500	19,251

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.146	INTERIOR WALLS + PARTITION							
215.1461	CONCRETE WALLS							
215.1462	MASONRY WALLS							
215.1463	METAL PARTITIONS			9000 SF	540 MH	6,264	13,500	
	215.146 INTERIOR WALLS + PARTITION				540 MH	6,264	13,500	19,764
215.147	DOORS + WINDOWS							
215.1471	ROLLING STEEL DOOR			100 SF	60 MH	782	1,400	
215.1472	PERSONNEL DOORS			1250 SF	1000 MH	11,600	15,000	
215.1473	SASH & GLAZING							
	215.147 DOORS + WINDOWS				1060 MH	12,382	16,400	28,782
215.149	PAINTING							
215.1491	CONCRETE			75000 SF	1500 MH	14,355	7,500	
215.1492	STEELWORK			740 TN	3700 MH	35,409	4,440	
215.1493	METAL DECK			53000 SF	1060 MH	10,144	5,300	
215.1494	HANDRAIL			800 LF	160 MH	1,531	80	
	215.149 PAINTING				6420 MH	61,439	17,320	78,759
	215.14 SUPERSTRUCTURE				330037 MH	3,807,653	2,301,195	6,108,848
	215.1 BUILDING STRUCTURE				359387 MH	4,145,352	2,498,185	6,643,537
215.2	BUILDING SERVICES							
215.21	PLUMBING + DRAINS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.211	ROOF DRAINS + PIPING							
215.2111	DRAINS			9 EA	91 MH	1,176	1,800	
215.2115	PIPING							
215.21152	2.5 IN + LARGER							
215.211521	GALV STEEL/NNS	13680 LB	23,256	1 LT	3283 MH	42,552	4,255	
	215.21152 2.5 IN + LARGER		23,256		3283 MH	42,552	4,255	70,063
	215.2115 PIPING		23,256		3283 MH	42,552	4,255	70,063
	215.211 ROOF DRAINS + PIPING		23,256		3374 MH	43,728	6,055	73,039
215.212	FLOOR DRAINS + PIPING							
215.2121	DRAINS			6 EA	60 MH	778	1,200	
215.2125	PIPING							
215.21252	2.5IN + LARGER							
215.212521	CI/NNS	4900 LB	1,078	1 LT	1077 MH	13,960	1,396	
	215.21252 2.5IN + LARGER		1,078		1077 MH	13,960	1,396	16,434
	215.2125 PIPING		1,078		1077 MH	13,960	1,396	16,434
	215.212 FLOOR DRAINS + PIPING		1,078		1137 MH	14,738	2,596	18,412
215.213	SUMP PUMPS + MOTORS			2 EA	200 MH	2,643	2,000	
215.2131	SUMP PUMPS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.2132	SUMP PUMP MOTORS							
	215.213 SUMP PUMPS + MOTORS				200 MH	2,643	2,000	4,643
	215.21 PLUMBING + DRAINS		24,334		4711 MH	61,109	10,651	96,094
215.22	HEATING, VENT, + AIR COND							
215.221	HOT WTR HEAT SYS							
215.2211	ROTATING MACHINERY	5 EA	9,000	1 LT	200 MH	2,643	264	
215.22111	HOT WTR COIL CIRC PUMP+MTR							
215.221111	HOT WTR COIL CIRC PUMP+MTR							
215.221112	HOT WTR COIL CIRC PUMP+MTR							
	215.22111 HOT WTR COIL CIRC PUMP+MTR							
215.22112	PAB REHEAT COIL PUMP + MTR							
215.221121	PAB REHEAT COIL PUMP + MTR							
215.221122	PAB REHEAT COIL PUMP MOTOR							
	215.22112 PAB REHEAT COIL PUMP + MTR							
215.22113	FILTER RM CIRC PUMP + MTR							
215.221131	FILTER RM CIRC PUMP + MTR							
215.221132	FILTER RM CIRC PUMP MOTOR							
	215.22113 FILTER RM CIRC PUMP + MTR							
	215.2211 ROTATING MACHINERY		9,000		200 MH	2,643	264	11,907

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.2212	HEAT TRANSFER EQUIP	1 LS	20,000	1 LT	400 MH	5,175	518	
215.22121	MAIN HEAT HOT WATER COILS							
215.22122	UNIT HEATERS							
215.22123	REHEAT DUCT COIL							
215.22124	HOT WATER HEAT EXCHANGER							
	215.2212 HEAT TRANSFER EQUIP		20,000		400 MH	5,175	518	25,693
215.2213	TANKS + PRESSURE VESSELS	1 LS	1,500	1 LT	81 MH	1,060	106	
215.22131	COMPRESSION TANKS							
215.22132	AIR SEPARATORS							
	215.2213 TANKS + PRESSURE VESSELS		1,500		81 MH	1,060	106	2,666
215.2215	PIPING							
215.22151	2IN + SMALLER							
215.221511	CS/NNS			4145 LB	1990 MH	25,789	5,389	
	215.22151 2IN + SMALLER				1990 MH	25,789	5,389	31,178
215.22152	2.5IN + LARGER							
215.221521	CS/NNS	40870 LB	61,305	1 LT	9808 MH	127,119	12,712	
	215.22152 2.5IN + LARGER		61,305		9808 MH	127,119	12,712	201,136
	215.2215 PIPING		61,305		11798 MH	152,908	18,101	232,314
215.2216	VALVES	117 EA	29,999					

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.22161	GATE							
215.22162	CHECK							
215.22163	GLOBE							
215.22165	SAFETY/RELIEF							
215.22168	PLUG							
215.22169	SPECIAL VALVES							
215.221691	THREE-WAY							
215.221692	PRESSURE REGULATING							
	215.22169 SPECIAL VALVES							
	215.2216 VALVES		29,999					29,999
215.2217	PIPING-MISC. ITEMS							
215.2218								
	215.221 HOT WTR HEAT SYS		121,804		12479 MH	161,786	18,989	302,579
215.222	ELEC. HEAT SYS.							
215.2222	HEAT TRANSFER EQUIPMENT							
215.22221	UNIT HEATERS	2 EA	1,000	1 LT	41 MH	529	53	
	215.2222 HEAT TRANSFER EQUIPMENT		1,000		41 MH	529	53	1,582
	215.222 ELEC. HEAT SYS.		1,000		41 MH	529	53	1,582
215.223	GENERAL SUPPLY + EXHAUST							
215.2231	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.22311	SUPPLY FAN + MOTOR	3 EA	55,000	1 LT	452 MH	5,847	585	
215.223111	SUPPLY FAN + MOTOR							
215.223112	SUPPLY FAN MOTOR							
	215.22311 SUPPLY FAN + MOTOR		55,000		452 MH	5,847	585	61,432
215.22312	EXHAUST FAN + MOTOR	3 EA	33,000	1 LT	393 MH	5,083	508	
215.223121	EXHAUST FAN + MOTOR							
215.223122	EXHAUST FAN MOTOR							
	215.22312 EXHAUST FAN + MOTOR		33,000		393 MH	5,083	508	38,591
215.22313	FILT. ROOM FAN + MOTOR	2 EA	7,500	1 LT	100 MH	1,293	129	
215.223131	FILT. ROOM FAN + MOTOR							
215.223132	FILT. ROOM FAN MOTOR							
	215.22313 FILT. ROOM FAN + MOTOR		7,500		100 MH	1,293	129	8,922
	215.2231 ROTATING MACHINERY		95,500		945 MH	12,223	1,222	108,945
215.2234	GENERAL FILTRATION EQUIP.							
215.22341	AIR INTAKE FILTERS	1 EA	2,500	1 LT	52 MH	671	67	
	215.2234 GENERAL FILTRATION EQUIP.		2,500		52 MH	671	67	3,238
215.2235	PIPING + DUCTWORK							
215.22353	DUCTWORK			180000 LB	39600 MH	463,320	180,000	
	215.2235 PIPING + DUCTWORK				39600 MH	463,320	180,000	643,320

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.2236	VALVES + DAMPERS							
215.22369	SPECIAL VALVES + DAMPERS							
215.223691	PAB INTAKE LOUVER	1 EA	12,000	1 LT	159 MH	2,059	206	
215.223692	FILT RM INTAKE LOUVER	2 EA	2,000	1 LT	41 MH	529	53	
215.223693	NORM VENT EXH FAN DAMPER	3 EA	8,000	1 LT	400 MH	5,175	518	
	215.22369 SPECIAL VALVES + DAMPERS		22,000		600 MH	7,763	777	30,540
	215.2236 VALVES + DAMPERS		22,000		600 MH	7,763	777	30,540
	215.223 GENERAL SUPPLY + EXHAUST		120,000		41197 MH	483,977	182,066	786,043
215.224	ATM CLEANUP SYSTEM							
215.2241	ROTATING MACHINERY							
215.22411	EXHAUST FAN + MOTOR	2 EA	43,000	1 LT	400 MH	5,175	518	
215.224111	EXHAUST FAN							
215.224112	EXHAUST FAN MOTOR							
	215.22411 EXHAUST FAN + MOTOR		43,000		400 MH	5,175	518	48,693
	215.2241 ROTATING MACHINERY		43,000		400 MH	5,175	518	48,693
215.2246	VALVES + DAMPERS							
215.22469	SPECIAL VALVES + DAMPERS							
215.224691	CLEANUP SYS EXHAUST LOUVER	2 EA	5,000	1 LT	100 MH	1,293	129	
	215.22469 SPECIAL VALVES + DAMPERS		5,000		100 MH	1,293	129	6,422

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	215.2246 VALVES + DAMPERS		5,000		100 MH	1,293	129	6,422
215.2249	SKIDS + FOUNDATIONS							
215.22491	CLEANUP EXH FILTER UNIT	2 EA	249,000	1 LT	2400 MH	31,049	3,105	
	215.2249 SKIDS + FOUNDATIONS		249,000		2400 MH	31,049	3,105	283,154
	215.224 ATM CLEANUP SYSTEM		297,000		2900 MH	37,517	3,752	338,269
215.225	PUMP ROOM SUPPLY SYSTEM							
215.2251	ROTATING MACHINERY							
215.22511	SUPPLY FAN + MOTOR	2 EA	8,000	1 LT	100 MH	1,293	129	
215.225111	SUPPLY FAN							
215.225112	SUPPLY FAN MOTOR							
	215.22511 SUPPLY FAN + MOTOR		8,000		100 MH	1,293	129	9,422
	215.2251 ROTATING MACHINERY		8,000		100 MH	1,293	129	9,422
215.2256	VALVES + DAMPERS							
215.22569	SPECIAL VALVES + DAMPER							
215.225691	AIR INTAKE LOUVER	1 EA	800	1 LT	31 MH	402	40	
215.225692	FAN INTAKE DAMPER	2 EA	600	1 LT	100 MH	1,293	129	
215.225693	FAN EXHAUST DAMPER	2 EA	600	1 LT	100 MH	1,293	129	
	215.22569 SPECIAL VALVES + DAMPER		2,000		231 MH	2,988	298	5,286
	215.2256 VALVES + DAMPERS		2,000		231 MH	2,988	298	5,286

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	215.225 PUMP ROOM SUPPLY SYSTEM		10,000		331 MH	4,281	427	14,708
215.228	INSTRUMENTATION + CONTROL	1 LT	4,100	1 LT	32 MH	390	20	
	215.22 HEATING, VENT, + AIR COND		553,904		56980 MH	688,480	205,307	1,447,691
215.23	FIRE PROTECTION							
215.231	HOSE + SPRAY EQUIPMENT							
215.2311	SPRAY HEADS			100 EA	500 MH	6,480	2,500	
	215.231 HOSE + SPRAY EQUIPMENT				500 MH	6,480	2,500	8,980
215.235	PIPING							
215.2351	2IN + SMALLER							
215.23511	CS/NNS			1660 LB	797 MH	10,329	2,158	
	215.2351 2IN + SMALLER				797 MH	10,329	2,158	12,487
215.2352	2.5IN + LARGER							
215.23521	CS/NNS	700 LB	1,050	1 LT	167 MH	2,164	216	
	215.2352 2.5IN + LARGER		1,050		167 MH	2,164	216	3,430
	215.235 PIPING		1,050		964 MH	12,493	2,374	15,917
215.236	VALVES	2 EA	1,000					
215.2361	GATE							
215.2369	SPECIAL VALVES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
215.23691	DELUGE							
	215.2369 SPECIAL VALVES							
	215.236 VALVES		1,000					1,000
215.237	PIPING - MISC ITEMS							
215.2371	HANGERS + SUPPORTS	400 LB	600					
	215.237 PIPING - MISC ITEMS		600					600
	215.23 FIRE PROTECTION		2,650		1464 MH	18,973	4,874	26,497
215.24	LIGHTING & SERVICE POWER			45000 SF	13500 MH	165,989	81,000	
	215.2 BUILDING SERVICES		580,868		76655 MH	934,551	301,832	1,817,271
	215. PRIM AUX BLDG + TUNNELS		580,888		436042 MH	5,079,903	2,800,017	8,460,808
216.	WASTE PROCESS BUILDING							
216.1	BUILDING STRUCTURE							
216.11	EXCAVATION WORK							
216.111	EARTH EXCAVATION							
216.112	ROCK EXCAVATION							
216.113	CONCRETE FILL							
216.114	FILL + BACKFILL							
216.115	DEWATERING							
	216.11 EXCAVATION WORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.13	SUBSTRUCTURE CONCRETE							
216.131	FORMWORK			3315 SF	2652 MH	29,284	3,315	
216.132	REINFORCING STEEL			255 TN	8925 MH	115,251	102,000	
216.133	CONCRETE			1870 CY	3273 MH	33,426	65,450	
216.134	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
216.135	FLOOR FINISH			7650 SF	153 MH	1,564	77	
216.136	WATERPROOFING			15300 SF	306 MH	2,852	1,530	
216.137	CONSTRUCTION JOINTS			1360 SF	1360 MH	13,016	1,360	
216.138	RUBBING CONCRETE SURF.							
216.139	WIRE FABRIC			28050 SF	561 MH	7,245	3,366	
	216.13 SUBSTRUCTURE CONCRETE				17380 MH	206,442	178,598	385,040
216.14	SUPERSTRUCTURE							
216.141	CONCRETE WORK							
216.1411	FORMWORK							
216.14111	FORMWORK-WOOD			264000 SF	237600 MH	2,623,674	264,000	
216.14112	FORMWORK-METAL			28900 SF	2312 MH	30,099	26,010	
	216.1411 FORMWORK				239912 MH	2,653,773	290,010	2,943,783
216.1412	REINF. STEEL			1370 TN	54800 MH	707,649	548,000	
216.1413	CONCRETE			13000 CY	26000 MH	265,512	455,000	
216.1414	EMBEDDED STEEL			21 TN	3150 MH	37,885	31,500	
216.1415	FLOOR FINISH			21250 SF	425 MH	4,341	213	
216.1416	WATERPROOFING			27200 SF	544 MH	5,070	2,720	

UNITED ENGINEERS & CONSTRUCTORS INC.
2.5 IN HG AV - MIDDLETOWN,USA
1139 MWE PRESSURIZED WATER REACTOR

PLANT CODE 148 — COST BASIS 07/76 — 04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.1417	RUBBING CONCRETE SURFACES			290000 SF	8700 MH	88,844	2,900	
216.1418	CONSTRUCTION JOINTS			14450 SF	14450 MH	159,562	14,450	
216.1419	REMOVABLE PLUGS			15 EA	900 MH	9,191	3,825	
	216.141 CONCRETE WORK				348881 MH	3,931,827	1,348,618	5,280,445
216.142	STRUCT. + MISC. STEEL							
216.1421	STRUCTURAL STEEL			1020 TN	20400 MH	265,559	765,000	
216.1423	MISC. FRAMES, ETC.			12 TN	1800 MH	23,432	14,400	
216.1425	FLOOR GRATING (GALV.)			2550 SF	510 MH	6,640	7,650	
216.1426	STAIR TREADS			276 EA	277 MH	3,603	9,660	
216.1427	HANDRAIL			1275 LF	956 MH	12,446	12,750	
	216.142 STRUCT. + MISC. STEEL				23943 MH	311,680	809,460	1,121,140
216.143	EXTERIOR WALLS							
216.1431	CONCRETE WALLS							
216.1432	MASONRY WALLS							
216.1433	METAL INSUL SIDING			27500 SF	550 MH	7,160	110,000	
	216.143 EXTERIOR WALLS				550 MH	7,160	110,000	117,160
216.144	ROOF DECK							
216.1441	METAL ROOF DECK			7000 SF	560 MH	7,290	7,000	
216.1442	CONCRETE PLANK			11200 SF	896 MH	11,663	14,560	
216.1443	CONCRETE FILL			370 CY	740 MH	7,557	11,840	
216.1444	REINFORCING STEEL			20 TN	800 MH	10,331	8,000	
	216.144 ROOF DECK				2996 MH	36,841	41,400	78,241

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.145	ROOFING + FLASHING							
216.1451	B.U. ROOF INSUL FLASH			7000 SF	490 MH	6,605	8,750	
216.1452	B.U.ROOF + FLASH END INSUL			16800 SF	840 MH	11,323	16,800	
	216.145 ROOFING + FLASHING				1330 MH	17,928	25,550	43,478
216.146	INTERIOR WALLS + PARTITION							
216.1461	CONCRETE WALLS							
216.1462	MASONRY WALLS							
216.1463	METAL PARTITIONS			170 SF	10 MH	116	255	
	216.146 INTERIOR WALLS + PARTITION				10 MH	116	255	371
216.147	DOORS + WINDOWS							
216.1471	ROLLING STEEL DOORS			170 SF	102 MH	1,329	2,380	
216.1472	PERSONNEL DOORS			935 SF	748 MH	8,677	11,220	
216.1473	SASH + GLAZING							
	216.147 DOORS + WINDOWS				850 MH	10,006	13,600	23,606
216.148	WALL, FLR, + CEILING FINIS							
216.1481	ACID PROOF TILES			35 SF	140 MH	1,548	128	
	216.148 WALL, FLR, + CEILING FINIS				140 MH	1,548	128	1,676
216.149	PAINTING							
216.1491	CONCRETE			110500 SF	2210 MH	21,150	11,050	
216.1492	STEELWORK			1030 TN	5150 MH	49,286	6,180	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.1493	METAL DECK			3600 SF	72 MH	689	360	
216.1494	HANDRAIL			1275 LF	255 MH	2,440	128	
	216.149 PAINTING				7687 MH	73,565	17,718	91,283
	216.14 SUPERSTRUCTURE				386387 MH	4,390,671	2,366,729	6,757,400
	216.1 BUILDING STRUCTURE				403767 MH	4,597,113	2,545,327	7,142,440
216.2	BUILDING SERVICES							
216.21	PLUMBING + DRAINS							
216.211	ROOF DRAINS + PIPING							
216.2111	DRAINS			12 EA	121 MH	1,565	2,400	
216.2115	PIPING							
216.21152	2.5 IN + LARGER							
216.211521	GALV/NNS	13600 LB	23,120	1 LT	3264 MH	42,299	4,230	
	216.21152 2.5 IN + LARGER		23,120		3264 MH	42,299	4,230	69,649
	216.2115 PIPING		23,120		3264 MH	42,299	4,230	69,649
	216.211 ROOF DRAINS + PIPING		23,120		3385 MH	43,864	6,630	73,614
216.212	FLOOR DRAINS + PIPING							
216.2121	DRAINS							
216.2125	PIPING							
	216.212 FLOOR DRAINS + PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.213	EMERGENCY SHOWERS			2 EA	121 MH	1,565	1,600	
216.214	SANITARY DRAINS							
	216.21 PLUMBING + DRAINS		23,120		3506 MH	45,42?	8,230	76,779
216.22	HEATING, VENT + AIR COND							
216.221	AIR SUPPLY + HEATING SYS							
216.2212	HEAT TRANSFER EQUIPMENT							
216.22121	BORON WASTE CMPT UNIT HTR	2 EA	1,500	1 LT	100 MH	1,293	129	
	216.2212 HEAT TRANSFER EQUIPMENT		1,500		100 MH	1,293	129	2,922
216.2215	PIPING + DUCTWORK							
216.22153	DUCTWORK			47000 LB	10340 MH	120,978	47,000	
	216.2215 PIPING + DUCTWORK				10340 MH	120,978	47,000	167,978
216.2219	FOUNDATIONS/SKIDS							
216.22191	AIR SUPPLY UNIT + MOTOR	2 EA	30,000	1 LT	200 MH	2,586	259	
216.221911	AIR SUPPLY UNIT							
216.221912	AIR SUPPLY UNIT MOTOR							
	216.22191 AIR SUPPLY UNIT + MOTOR		30,000		200 MH	2,586	259	32,845
	216.2219 FOUNDATIONS/SKIDS		30,000		200 MH	2,586	259	32,845
	216.221 AIR SUPPLY + HEATING SYS		31,500		10640 MH	124,857	47,388	203,745
216.222	AIR EXHAUST SYSTEM							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
216.2221	ROTATING MACHINERY							
216.22211	EXHAUST FAN + MOTOR	2 EA	60,000	1 LT	79 MH	1,024	102	
216.222111	EXHAUST FAN							
216.222112	EXHAUST FAN MOTOR							
	216.22211 EXHAUST FAN + MOTOR		60,000		79 MH	1,024	102	61,126
	216.2221 ROTATING MACHINERY		60,000		79 MH	1,024	102	61,126
216.2225	PIPING + DUCTWORK							
216.22253	DUCTWORK			50000 LB	10500 MH	122,850	50,000	
	216.2225 PIPING + DUCTWORK				10500 MH	122,850	50,000	172,850
216.2229	FOUNDATIONS/SKIDS							
216.22291	EXHAUST FILTRATION UNIT			1 LT	331 MH	4,282	100	
	216.2229 FOUNDATIONS/SKIDS				331 MH	4,282	100	4,382
	216.222 AIR EXHAUST SYSTEM		60,000		10910 MH	128,156	50,202	238,358
216.228	INSTRUMENTATION + CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	216.22 HEATING, VENT + AIR COND		93,500		21566 MH	253,209	97,600	444,309
216.24	LIGHTING & SERVICE POWER			50000 SF	15000 MH	184,431	100,000	
216.25	ELEVATOR							
216.251	ELEVATOR EQUIPMENT	1 LS	50,000	1 LT	1800 MH	23,286	2,329	
	216.25 ELEVATOR		50,000		1800 MH	23,286	2,329	75,615

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	216.2 BUILDING SERVICES		166,620		41872 MH	506,355	208,159	881,134
	216. WASTE PROCESS BUILDING		166,620		445639 MH	5,103,463	2,753,486	8,023,574
217.	FUEL STORAGE BLDG							
217.1	BLDG STRUCTURE							
217.11	EXCAVATION WORK							
217.111	EARTH EXCAVATION							
217.112	ROCK EXCAVATION							
217.113	CONCRETE FILL							
217.114	FILL + BACKFILL							
217.115	DEWATERING							
	217.11 EXCAVATION WORK							
217.13	SUBSTRUCTURE CONCRETE							
217.131	FORMWORK			2200 SF	1760 MH	19,434	2,200	
217.132	REINF. STEEL			140 TN	4900 MH	63,275	56,000	
217.133	CONCRETE			1200 CY	2100 MH	21,445	42,000	
217.134	EMBEDDED STEEL			5 TN	750 MH	9,020	7,500	
217.135	FLOOR FINISH			3500 SF	71 MH	726	35	
217.136	WATERPROOFING			7000 SF	140 MH	1,305	700	
217.137	CONSTRUCTION JOINTS			900 SF	900 MH	9,938	900	
217.138	WIRE FABRIC			12000 SF	240 MH	3,098	1,440	
217.139	STORAGE POOL LINER-S.S.			15000 SF	60000 MH	829,200	555,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	217.13 SUBSTRUCTURE CONCRETE				70861 MH	957,441	665,775	1,623,216
217.14	SUPERSTRUCTURE							
217.141	CONCRETE WORK							
217.1411	FORMWORK							
217.14111	FORMWORK-WOOD			75000 SF	67500 MH	745,362	75,000	
217.14112	FORMWORK-METAL			19000 SF	1520 MH	19,789	17,100	
	217.1411 FORMWORK				69020 MH	765,151	92,100	857,251
217.1412	REINF. STEEL			600 TN	24000 MH	309,920	240,000	
217.1413	CONCRETE			6535 CY	13171 MH	134,503	230,475	
217.1414	EMBEDDED STEEL			15 TN	2250 MH	27,062	22,500	
217.1415	FLOOR FINISH			19000 SF	380 MH	3,880	190	
217.1416	WATERPROOFING			18000 SF	360 MH	3,355	1,800	
217.1417	RUBBING CONCRETE SURFACES			55000 SF	1651 MH	16,860	550	
217.1418	CONSTRUCTION JOINTS			7000 SF	7000 MH	77,296	7,000	
	217.141 CONCRETE WORK				117832 MH	1,338,027	594,615	1,932,642
217.142	STRUCT. + MISC. STEEL							
217.1421	STRUCT. STEEL			250 TN	5000 MH	65,088	187,500	
217.1423	MISC. FRAMES, ETC.			10 TN	600 MH	7,811	12,000	
217.1425	FLOOR GRATING (GALV.)			900 SF	180 MH	2,341	2,700	
217.1426	STAIR TREADS			165 EA	165 MH	2,149	5,775	
217.1427	HANDRAIL			700 LF	526 MH	6,845	7,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	217.142 STRUCT. + MISC. STEEL				6471 MH	84,234	214,975	299,209
217.145	ROOFING + FLASHING							
217.1452	B.U.ROOF+FLASH (NO INSUL)			8100 SF	405 MH	5,459	8,100	
	217.145 ROOFING + FLASHING				405 MH	5,459	8,100	13,559
217.147	DOORS + WINDOWS							
217.1471	ROLLING STEEL DOORS			400 SF	240 MH	3,124	5,600	
217.1472	PERSONNEL DOORS			150 SF	120 MH	1,392	1,800	
	217.147 DOORS + WINDOWS				360 MH	4,516	7,400	11,916
217.149	PAINTING							
217.1491	CONCRETE			30000 SF	600 MH	5,742	3,000	
217.1492	STEELWORK			260 TN	1300 MH	12,441	1,560	
217.1493	METAL DECK			19000 SF	380 MH	3,637	1,900	
217.1494	HANDRAIL			700 LF	140 MH	1,340	70	
	217.149 PAINTING				2420 MH	23,160	6,530	29,690
	217.14 SUPERSTRUCTURE				127483 MH	1,455,396	831,620	2,287,016
	217.1 BLDG STRUCTURE				198349 MH	2,412,837	1,497,395	3,910,232
217.2	BUILDING SERVICES							
217.21	PLUMBING + DRAINS							
217.211	ROOF DRAINS + PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
217.2111	DRAINS			8 EA	79 MH	1,028	1,600	
217.2115	PIPING							
217.21152	2.5 IN + LARGER							
217.211521	GALV STEEL/VNS	13100 LB	22,270	1 LT	3144 MH	40,748	4,075	
*	217.21152 2.5 IN + LARGER		22,270		3144 MH	40,748	4,075	67,093
	217.2115 PIPING		22,270		3144 MH	40,748	4,075	67,093
	217.211 ROOF DRAINS + PIPING		22,270		3223 MH	41,776	5,675	69,721
217.212	FLOOR DRAINS + PIPING							
217.2121	DRAINS							
217.2125	PIPING							
	217.212 FLOOR DRAINS + PIPING							
217.213	SUMP PUMP + MOTOR			2 EA	100 MH	1,322	2,000	
217.2131	SUMP PUMP							
217.2132	SUMP PUMP MOTOR							
	217.213 SUMP PUMP + MOTOR				100 MH	1,322	2,000	3,322
217.214	SANITARY DRAINS							
	217.21 PLUMBING + DRAINS		22,270		3323 MH	43,098	7,675	73,043
217.22	HEATING, VENT, + AIR COND							
217.221	BUILDING HEATING SYSTEM							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
217.2211	ROTATING MACHINERY							
217.22111	H.W. CIRC PUMP + MOTOR	1 EA	1,000	1 LT	59 MH	779	78	
217.221111	H.W. CIRC PUMP							
217.221112	H.W. CIRC PUMP MOTOR							
	217.22111 H.W. CIRC PUMP + MOTOR		1,000		59 MH	779	78	1,857
	217.2211 ROTATING MACHINERY		1,000		59 MH	779	78	1,857
217.2212	HEAT TRANSFER EQUIPMENT							
217.22121	H.W. UNIT HEATER	10 EA	5,000	1 LT	200 MH	2,586	259	
	217.2212 HEAT TRANSFER EQUIPMENT		5,000		200 MH	2,586	259	7,845
217.2215	PIPING							
217.22151	2 IN + SMALLER							
217.221511	CS/NNS			2915 LB	1399 MH	18,131	3,790	
	217.22151 2 IN + SMALLER				1399 MH	18,131	3,790	21,921
	217.2215 PIPING				1399 MH	18,131	3,790	21,921
217.2216	VALVES	36 EA	4,201					
217.22161	GATE							
217.22162	CHECK							
217.22163	GLOBE							
217.22168	PLUG							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
217.22169	SPECIAL VALVES							
217.221691	THREE - WAY							
	217.22169 SPECIAL VALVES							
	217.2216 VALVES		4,201					4,201
217.2217	PIPING - MISC ITEMS							
	217.221 BUILDING HEATING SYSTEM		10,201		1658 MH	21,496	4,127	35,824
217.222	FSB SUPPLY AIR SYS							
217.2226	VALVES + DAMPERS							
217.22269	SPECIAL VALVES + DAMPERS							
217.222691	SUPPLY AIR DAMPERS	2 EA	3,000	1 LT	121 MH	1,564	156	
	217.22269 SPECIAL VALVES + DAMPERS		3,000		121 MH	1,564	156	4,720
	217.2226 VALVES + DAMPERS		3,000		121 MH	1,564	156	4,720
	217.222 FSB SUPPLY AIR SYS		3,000		121 MH	1,564	156	4,720
217.223	FSB EXHAUST AIR SYSTEM							
217.2235	PIPING + DUCTWORK							
217.22353	DUCTWORK			24000 LB	5040 MH	58,968	24,000	
	217.2235 PIPING + DUCTWORK				5040 MH	58,968	24,000	82,968
217.2236	VALVES + DAMPERS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
217.22369	SPECIAL VALVES + DAMPERS							
217.223691	SHUTOFF DAMPERS	1 EA	1,500	1 LT	41 MH	529	53	
	217.22369 SPECIAL VALVES + DAMPERS		1,500		41 MH	529	53	2,082
	217.2236 VALVES + DAMPERS		1,500		41 MH	529	53	2,082
217.2239	FOUNDATIONS/SKIDS							
217.22391	CLEANUP + EXH UNIT + MOTOR	1 EA	270,000	1 LT	872 MH	11,281	1,128	
217.223911	CLEANUP + EXH UNIT							
217.223912	CLEANUP + EXH UNIT MOTOR							
	217.22391 CLEANUP + EXH UNIT + MOTOR		270,000		872 MH	11,281	1,128	282,409
	217.2239 FOUNDATIONS/SKIDS		270,000		872 MH	11,281	1,128	282,409
	217.223 FSB EXHAUST AIR SYSTEM		271,500		5953 MH	70,778	25,181	367,459
217.228	INSTRUMENTATION + CONTROL	1 LT	21,000	1 LT	171 MH	2,089	104	
	217.22 HEATING, VENT, + AIR COND		305,701		7903 MH	95,927	29,568	431,196
217.24	LIGHTING & SERVICE POWER			14000 SF	4200 MH	51,641	25,200	
	217.2 BUILDING SERVICES		327,971		15426 MH	190,666	62,443	581,080
	217. FUEL STORAGE BLDG		327,971		213775 MH	2,603,503	1,559,838	4,491,312
218A.	CONTROL RM/D-G BUILDING							
218A.1	BUILDING STRUCTURE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.11	EXCAVATION WORK							
218A.111	EARTH EXCAVATION							
218A.112	ROCK EXCAVATION							
218A.113	CONCRETE FILL							
218A.114	FILL + BACKFILL							
218A.115	DEWATERING							
	218A.11 EXCAVATION WORK							
218A.13	SUBSTRUCTURE CONCRETE							
218A.131	FORMWORK			16600 SF	13280 MH	146,643	16,600	
218A.132	REINF. STEEL			700 TN	24500 MH	316,375	280,000	
218A.133	CONCRETE			3600 CY	6300 MH	64,336	126,000	
218A.134	EMBEDDED STEEL			5 TN	750 MH	9,020	7,500	
218A.135	FLOOR FINISH			12000 SF	240 MH	2,451	120	
218A.136	WATERPROOFING			17000 SF	340 MH	3,169	1,700	
218A.137	CONSTRUCTION JOINTS			2700 SF	2700 MH	29,815	2,700	
218A.138	WIRE FABRIC			34000 SF	680 MH	8,780	4,080	
	218A.13 SUBSTRUCTURE CONCRETE				48790 MH	580,590	438,700	1,019,290
218A.14	SUPERSTRUCTURE							
218A.141	CONCRETE WORK							
218A.1411	FORMWORK							
218A.14111	FORMWORK-WOOD			230000 SF	207000 MH	2,285,776	230,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.14112	FORMWORK-METAL			75000 SF	6000 MH	78,105	67,500	
	218A.1411 FORMWORK				213000 MH	2,363,881	297,500	2,661,381
218A.1412	REINF. STEEL			1120 TN	44800 MH	578,515	448,000	
218A.1413	CONCRETE			12520 CY	25040 MH	255,708	438,200	
218A.1414	EMBEDDED STEEL			20 TN	3000 MH	36,081	30,000	
218A.1415	FLOOR FINISH			54000 SF	1080 MH	11,030	540	
218A.1416	WATERPROOFING			13000 SF	260 MH	2,423	1,300	
218A.1417	RUBBING CONCRETE SURFACES			180000 SF	5400 MH	55,145	1,800	
218A.1418	CONSTRUCTION JOINTS			12000 SF	12000 MH	132,503	12,000	
	218A.141 CONCRETE WORK				304580 MH	3,435,292	1,229,340	4,664,632

218A.142 STRUCT. + MISC. STEEL

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.1421	STRUCTURAL STEEL			980 TN	19600 MH	255,145	735,000	
218A.1422	FLOOR + PLATFORM SUPPORTS			13 TN	780 MH	10,152	15,600	
218A.1423	MISC. FRAMES, ETC.							
218A.1425	FLOOR GRATING (GALV.)			3200 SF	640 MH	8,333	9,600	
218A.1426	STAIR TREADS			410 EA	410 MH	5,338	14,350	
218A.1427	HANDRAIL			1300 LF	976 MH	12,702	13,000	
	218A.142 STRUCT. + MISC. STEEL				22406 MH	291,667	787,550	1,079,217

218A.143 EXTERIOR WALLS

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.1431	CONCRETE WALLS							
	218A.143 EXTERIOR WALLS							

218A.145 ROOFING + FLASHING

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.1451	B.U. ROOF, INSL. + FLASH							
218A.1452	B.U. ROOF.+FLASH(NO INSUL)			20000 SF	1000 MH	13,480	20,000	
	218A.145 ROOFING + FLASHING				1000 MH	13,480	20,000	33,480
218A.146	INTERIOR WALLS + PARTITION							
218A.1461	CONCRETE WALLS							
218A.1462	MASONRY WALLS			500 SF	125 MH	1,426	1,400	
218A.1463	METAL PARTITIONS			13000 SF	780 MH	9,048	19,500	
218A.1464	GLASS PARTITIONS			800 SF	120 MH	1,392	8,000	
	218A.146 INTERIOR WALLS + PARTITION				1025 MH	11,866	28,900	40,766
218A.147	DOORS + WINDOWS							
218A.1471	SLIDING DOOR			30 SF	20 MH	232	420	
218A.1472	PERSONNEL DOORS			1320 SF	1056 MH	12,250	15,840	
218A.1473	SASH + GLAZING							
	218A.147 DOORS + WINDOWS				1076 MH	12,482	16,260	28,742
218A.148	WALL, FLR, + CEIL. FINISH							
218A.1481	VINYL TILE FLOOR			8500 SF	680 MH	7,888	12,750	
218A.1482	SUSPENDED CEILING			10000 SF	1000 MH	11,600	5,000	
218A.1483	SANDWICH PANELS			500 SF	75 MH	870	3,000	
218A.1484	CERAMIC TILE FLOOR			225 SF	34 MH	374	563	
218A.1485	CERAMIC TILE WALL FINISH			300 SF	46 MH	508	750	
218A.1486	RAISED FLOOR (COMPUTER RM)			1500 SF	675 MH	7,830	2,325	
	218A.148 WALL, FLR, + CEIL. FINISH				2510 MH	29,070	24,388	53,458

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.149	PAINTING							
218A.1491	CONCRETE			80000 SF	1600 MH	15,312	8,000	
218A.1492	STEELWORK			993 TN	4965 MH	47,515	5,958	
218A.1493	METAL DECK			75000 SF	1500 MH	14,355	7,500	
218A.1494	HANDRAILS			1300 LF	260 MH	2,488	130	
	218A.149 PAINTING				8325 MH	79,670	21,588	101,258
	218A.14 SUPERSTRUCTURE				340922 MH	3,873,527	2,128,026	6,001,553
	218A.1 BUILDING STRUCTURE				389712 MH	4,454,117	2,566,726	7,020,843
218A.2	BUILDING SERVICES							
218A.21	PLUMBING + DRAINS							
218A.211	ROOF DRAINS + PIPING							
218A.2111	DRAINS			6 EA	60 MH	778	1,200	
218A.2115	PIPING (ALL 2.5 IN + LGR)							
218A.21152	GALV STEEL/NNS	13000	22,100	1 LT	3121 MH	40,446	4,045	
	218A.2115 PIPING (ALL 2.5 IN + LGR)		22,100		3121 MH	40,446	4,045	66,591
	218A.211 ROOF DRAINS + PIPING		22,100		3181 MH	41,224	5,245	68,569
218A.212	FLOOR DRAINS + PIPING							
218A.2121	DRAINS			24 EA	240 MH	3,110	4,800	
218A.2125	PIPING (ALL 2.5 IN + LGR)							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.21252	CI/NNS	28180 LB	6,200	1 LT	564 MH	7,307	731	
	218A.2125 PIPING (ALL 2.5 IN + LGR)		6,200		564 MH	7,307	731	14,238
	218A.212 FLOOR DRAINS + PIPING		6,200		804 MH	10,417	5,531	22,148
218A.213	PLUMBING + FIXTURES							
218A.2131	FIXTURES			6 EA	120 MH	1,468	900	
218A.2135	PIPING							
218A.21351	2 IN + SMALLER - CS/NNS			510 LB	245 MH	3,176	663	
218A.21352	2.5 IN + LARGER - CS/NNS	3100 LB	4,650	1 LT	744 MH	9,643	964	
	218A.2135 PIPING		4,650		989 MH	12,819	1,627	19,096
	218A.213 PLUMBING + FIXTURES		4,650		1109 MH	14,287	2,527	21,464
218A.214	SUPPLY WATER SYSTEM							
218A.2145	SUPPLY WATER PIPING							
218A.21451	2 IN + SMALLER- COPPER/NNS			300 LF	91 MH	1,176	507	
	218A.2145 SUPPLY WATER PIPING				91 MH	1,176	507	1,683
	218A.214 SUPPLY WATER SYSTEM				91 MH	1,176	507	1,683
	218A.21 PLUMBING + DRAINS		32,950		5185 MH	67,104	13,810	113,864
218A.22	HEATING, VENT, + AIR CONC							
218A.221	CONTROL ROOM COMPLEX VENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.2211	ROTATING MACHINERY							
218A.22111	OUTSIDE AIR SUPLY FAN +MTR	2 EA	6,400	1 LT	79 MH	1,024	102	
218A.22112	EXHAUST FAN + MOTOR	1 EA	300	1 LT	41 MH	529	53	
	218A.2211 ROTATING MACHINERY		6,700		120 MH	1,553	155	8,408
218A.2212	HEAT TRANSFER EQUIPMENT							
218A.22121	CONTROL ROOM UNIT HEATERS	4 EA	2,000	1 LT	121 MH	1,564	156	
	218A.2212 HEAT TRANSFER EQUIPMENT		2,000		121 MH	1,564	156	3,720
218A.2215	PIPING + DUCTWORK							
218A.22151	2 IN + SMALLER- COPPER/NNS			450 LF	107 MH	1,383	1,215	
218A.22152	2.5 IN + LARGER-COPPER/NNS	300 LF	2,670	1 LT	141 MH	1,826	183	
218A.22153	GENERAL DUCTWORK			46000 LB	10120 MH	118,404	46,000	
218A.22154	EMERG O.A. DUCT - CS/SC 3	205200 LB	205,200	1 LT	30779 MH	398,911	39,891	
	218A.2215 PIPING + DUCTWORK		207,870		41147 MH	520,529	87,289	815,688
218A.2216	VALVES + DAMPERS							
218A.22169	SHUTOFF DAMPERS	2 EA	4,800	1 LT	100 MH	1,293	129	
	218A.2216 VALVES + DAMPERS		4,800		100 MH	1,293	129	6,222
218A.2217	PIPING - MISC. ITEMS							
218A.2219	SKIDS + FOUNDATIONS							
218A.22191	FILTER + CLEANUP UNIT	1 EA	21,000	1 LT	600 MH	7,761	776	
218A.22192	CONT RM A/C + COND UNITS	2 EA	150,000	1 LT	500 MH	6,469	647	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.22193	COMP RM A/C + COND UNITS	1 EA	15,000	1 LT	252 MH	3,260	326	
	218A.2219 SKIDS + FOUNDATIONS		186,000		1352 MH	17,493	1,749	205,239
	218A.221 CONTROL ROOM COMPLEX VENT		407,370		42840 MH	542,429	89,478	1,039,277
218A.222	EMG SWITCH GEAR RM VENT							
218A.2221	ROTATING MACHINERY							
218A.22211	SUPPLY FAN + MOTOR	2 EA	32,200	1 LT	79 MH	1,024	102	
218A.22212	RETURN AIR FAN + MOTOR	2 EA	29,000	1 LT	79 MH	1,024	102	
	218A.2221 ROTATING MACHINERY		61,200		158 MH	2,048	204	63,452
218A.2225	PIPING + DUCTWORK							
218A.22253	DUCTWORK			17500 LB	3675 MH	42,998	17,500	
	218A.2225 PIPING + DUCTWORK				3675 MH	42,998	17,500	60,498
	218A.222 EMG SWITCH GEAR RM VENT		61,200		3833 MH	45,046	17,704	123,950
218A.223	CABLE SPREADING AREA VENT							
218A.2231	ROTATING MACHINERY							
218A.22311	SUPPLY FAN + MOTOR	1 EA	4,000	1 LT	59 MH	764	76	
218A.22312	RETURN AIR FAN + MOTOR	1 EA	4,000	1 LT	59 MH	764	76	
	218A.2231 ROTATING MACHINERY		8,000		118 MH	1,528	152	9,680
218A.2235	PIPING + DUCTWORK							
218A.22353	DUCTWORK			16000 LB	3360 MH	39,312	16,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218A.2235 PIPING + DUCTWORK				3360 MH	39,312	16,000	55,312
	218A.223 CABLE SPREADING AREA VENT		8,000		3478 MH	40,840	16,152	64,992
218A.224	BATTERY ROOM VENT							
218A.2241	ROTATING MACHINERY							
218A.22411	EXHAUST FANS + MOTORS	2 EA	8,000	1 LT	121 MH	1,564	156	
	218A.2241 ROTATING MACHINERY		8,000		121 MH	1,564	156	9,720
218A.2242	HEAT TRANSFER EQUIPMENT							
218A.22421	REHEAT COILS	2 EA	3,200	1 LT	100 MH	1,293	129	
	218A.2242 HEAT TRANSFER EQUIPMENT		3,200		100 MH	1,293	129	4,622
218A.2245	PIPING + DUCTWORK							
218A.22453	DUCTWORK			4800 LB	1008 MH	11,794	4,800	
	218A.2245 PIPING + DUCTWORK				1008 MH	11,794	4,800	16,594
	218A.224 BATTERY ROOM VENT		11,200		1229 MH	14,651	5,085	30,936
218A.225	ELECTRICAL TUNNEL VENT							
218A.2251	ROTATING MACHINERY							
218A.22511	EXHAUST FAN + MOTOR	1 EA	2,500	1 LT	41 MH	529	53	
	218A.2251 ROTATING MACHINERY		2,500		41 MH	529	53	3,082
	218A.225 ELECTRICAL TUNNEL VENT		2,500		41 MH	529	53	3,082

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.226	DG ROOM VENT							
218A.2261	ROTATING MACHINERY							
218A.22611	SUPPLY FAN + MOTOR	2 EA	55,000	1 LT	141 MH	1,823	182	
218A.22612	EXHAUST FAN + MOTOR	2 EA	50,000	1 LT	141 MH	1,823	182	
	218A.2261 ROTATING MACHINERY		105,000		282 MH	3,646	364	109,010
218A.2265	PIPING + DUCTWORK							
218A.22653	DUCTWORK			4200 LB	882 MH	10,319	4,200	
	218A.2265 PIPING + DUCTWORK				882 MH	10,319	4,200	14,519
	218A.226 DG ROOM VENT		105,000		1164 MH	13,965	4,564	123,529
218A.227	OUTSIDE AIR INTAKE SYSTEM							
218A.2274	GENERAL FILTER EQUIPMENT							
218A.22741	AUTOMATIC ROLL FILTERS	2 EA	24,000	1 LT	252 MH	3,260	326	
	218A.2274 GENERAL FILTER EQUIPMENT		24,000		252 MH	3,260	326	27,586
218A.2276	VALVES + DAMPERS							
218A.22769	AIR INTAKES	2 EA	28,000	1 LT	200 MH	2,586	259	
	218A.2276 VALVES + DAMPERS		28,000		200 MH	2,586	259	30,845
	218A.227 OUTSIDE AIR INTAKE SYSTEM		52,000		452 MH	5,846	585	58,431
218A.228	HOT WATER HEATING SYSTEM							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.2281	ROTATING MACHINERY							
218A.22811	CIRC PUMPS + MOTOR	5 EA	1,500	1 LT	200 MH	2,643	264	
	218A.2281 ROTATING MACHINERY		1,500		200 MH	2,643	264	4,407
218A.2282	HEAT TRANSER EQUIPMENT							
218A.22821	STEAM TO H.W. GENERATOR	1 EA	5,000	1 LT	100 MH	1,308	131	
218A.22822	REHEAT COIL -CABLE SPREAD.	1 EA	800	1 LT	100 MH	1,293	129	
218A.22823	UNIT HEATERS + MOTOR	14 EA	8,400	1 LT	559 MH	7,233	723	
	218A.2282 HEAT TRANSER EQUIPMENT		14,200		759 MH	9,834	983	25,017
218A.2283	TANKS + PRESSURE VESSELS							
218A.22831	H.W. EXPANSION TANKS	1 EA	350	1 LT	40 MH	523	52	
218A.22832	AIR SEPARATORS	1 EA	300	1 LT	41 MH	529	53	
	218A.2283 TANKS + PRESSURE VESSELS		650		81 MH	1,052	105	1,807
218A.2285	PIPING							
218A.22851	2 IN + SMALLER - CS/NNS			7630 LB	3662 MH	47,463	9,919	
218A.22852	2.5 IN + LARGER - CS/NNS	7300 LB	10,950	1 LT	1753 MH	22,718	2,272	
	218A.2285 PIPING		10,950		5415 MH	70,181	12,191	93,322
218A.2286	VALVES	39 EA	16,002					
218A.22861	GATE							
218A.22862	CHECK							
218A.22863	GLOBE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218A.22865	SAFETY RELIEF							
218A.22868	PLUG							
218A.2286V	SPECIAL VALVES							
	218A.2286 VALVES		16,002					16,002
218A.2287	PIPING - MISC ITEMS							
218A.22871	HANGERS	3000 LB	4,500					
	218A.2287 PIPING - MISC ITEMS		4,500					4,500
	218A.228 HOT WATER HEATING SYSTEM		47,802		6455 MH	83,710	13,543	145,055
	218A.22 HEATING, VENT, + AIR COND		695,072		59492 MH	747,016	147,164	1,589,252
218A.24	LIGHTING & SERVICE POWER			60000 SF	24000 MH	295,089	150,000	
218A.28	INSTRUMENTATION + CONTROLS	1 LT	26,970	1 LT	220 MH	2,688	134	
	218A.2 BUILDING SERVICES		754,992		88897 MH	1,111,897	311,108	2,177,997
	218A. CONTROL RM/D-G BUILDING		754,992		478609 MH	5,556,014	2,877,834	9,198,840
218B.	ADMINISTRATION+SERVICE BLG							
218B.1	BUILDING STRUC.							
218B.11	EXCAVATION WORK							
218B.111	EARTH EXCAVATION							
218B.112	ROCK EXCAVATION							
218B.113	CONCRETE FILL							
218B.114	FILL + BACKFILL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.115	DEWATERING							
	2188.11 EXCAVATION WORK							
2188.13	SUBSTRUCTURE CONCRETE							
2188.131	FORMWORK			11600 SF	9280 MH	102,473	11,600	
2188.132	REINF. STEEL			155 TN	5425 MH	70,054	62,000	
2188.133	CONCRETE			3000 CY	5251 MH	53,624	105,000	
2188.134	EMBEDDED STEEL			2 TN	300 MH	3,608	3,000	
2188.135	FLOOR FINISH			47600 SF	952 MH	9,722	476	
2188.136	WATERPROOFING			47600 SF	952 MH	8,873	4,760	
2188.137	CONSTRUCTION JOINTS			500 SF	500 MH	5,522	500	
2188.138	RUBBING CONCRETE SURF.			2000 SF	60 MH	612	20	
	2188.13 SUBSTRUCTURE CONCRETE				22720 MH	254,488	187,356	441,844
2188.14	SUPERSTRUCTURE							
2188.141	CONCRETE WORK							
2188.1411	FORMWORK							
2188.14111	FORMWORK-WOOD			1300 SF	1170 MH	12,920	1,300	
2188.14112	FORMWORK-METAL			25000 SF	2000 MH	26,035	22,500	
	2188.1411 FORMWORK				3170 MH	38,955	23,800	62,755
2188.1412	REINF. STEEL			40 TN	1800 MH	23,244	16,000	
2188.1413	CONCRETE			550 CY	1100 MH	11,233	19,250	
2188.1414	EMBEDDED STEEL			2 TN	300 MH	3,608	3,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.1415	FLOOR FINISH			25000 SF	500 MH	5,106	250	
2188.1416	WATERPROOFING							
2188.1417	RUBBING CONCRETE SURFACES							
2188.1418	CONSTRUCTION JOINTS			150 SF	150 MH	1,656	150	
	2188.141 CONCRETE WORK				7020 MH	83,802	62,450	146,252
2188.142	STRUCT. + MISC. STEEL							
2188.1421	STRUCT. STEEL			900 TN	18000 MH	234,317	675,000	
2188.1423	MISC. FRAMES, ETC.			3 TN	180 MH	2,341	3,600	
2188.1425	FLOOR GRATING (GALV.)			1000 SF	200 MH	2,603	3,000	
2188.1426	STAIR TREADS			170 EA	170 MH	2,215	5,950	
2188.1427	HANDRAIL			300 LF	226 MH	2,940	3,000	
	2188.142 STRUCT. + MISC. STEEL				18776 MH	244,416	690,550	934,966
2188.143	EXTERIOR WALLS							
2188.1431	CONCRETE WALLS							
2188.1432	MASONRY WALLS							
2188.1433	METAL INSULATED SIDING			20000 SF	4000 MH	52,071	80,000	
2188.1434	WINDOW WALL			1050 SF	526 MH	6,845	6,300	
	2188.143 EXTERIOR WALLS				4526 MH	58,916	86,300	145,216
2188.144	ROOF DECK							
2188.1441	METAL ROOF DECK							
2188.1442	PRECAST CONCRETE PANELS			48000 SF	3840 MH	49,987	62,400	
2188.1443	CONCRETE FILL			600 CY	1200 MH	12,254	19,200	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.1444	REINF. STEEL			30 TN	1200 MH	15,496	12,000	
	2188.144 ROOF DECK				6240 MH	77,737	93,600	171,337
2188.145	ROOFING + FLASHING							
2188.1451	B.U.ROOF INSUL+FLASH							
2188.1452	B.U. ROOF+FLASH (NO INSUL)			48000 SF	2400 MH	32,352	48,000	
	2188.145 ROOFING + FLASHING				2400 MH	32,352	48,000	80,352
2188.146	INTERIOR WALLS + PARTITION							
2188.1461	CONCRETE WALLS							
2188.1462	CONCRETE BLOCK			75600 SF	18900 MH	215,649	113,400	
2188.1463	METAL PARTITIONS			10000 SF	600 MH	6,960	15,000	
2188.1464	PLASTER BD PARTITIONS			3500 SF	350 MH	4,060	350	
	2188.146 INTERIOR WALLS + PARTITION				19850 MH	226,669	128,750	355,419
2188.147	DOORS + WINDOWS							
2188.1471	ROLLING STEEL DOORS			880 SF	528 MH	6,872	12,320	
2188.1472	PERSONNEL DOORS			3250 SF	2600 MH	30,160	39,000	
2188.1473	SASH + GLAZING			2300 SF	1150 MH	13,340	27,600	
	2188.147 DOORS + WINDOWS				4278 MH	50,372	78,920	129,292
2188.148	WALLS, FLOOR+CEIL. FINISHS							
2188.1481	VINYL FLOOR TILE			13500 SF	1080 MH	12,528	20,250	
2188.1482	CERAMIC TILE FLOOR			1400 SF	210 MH	2,318	3,500	
2188.1483	CARPET			1500 SY	600 MH	6,960	22,500	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.1484	CERAMIC TILE WALL FINISH							
2188.1485	SUSPENDED CEILING			40000 SF	4000 MH	46,400	20,000	
	2188.148 WALLS, FLOOR+CEIL. FINISHS				5890 MH	68,206	66,250	134,456
2188.149	PAINTING							
2188.1491	CONCRETE			61000 SF	1220 MH	11,675	6,100	
2188.1492	STEELWORK			727 TN	3635 MH	34,787	4,362	
2188.1493	METAL DECK			25000 SF	500 MH	4,785	2,500	
2188.1494	SPECIAL METALLIC PAINT			14000 SF	280 MH	2,680	7,000	
2188.1495	HANDRAIL			300 LF	60 MH	574	30	
2188.1496	EPOXY			63000 SF	1890 MH	18,087	31,500	
	2188.149 PAINTING				7585 MH	72,588	51,492	124,080
	2188.14 SUPERSTRUCTURE				76565 MH	915,058	1,306,312	2,221,370
	2188.1 BUILDING STRUC.				99285 MH	1,169,546	1,493,668	2,663,214
2188.2	BLDG. SERVICES							
2188.21	PLUMBING + DRAINS							
2188.211	ROOF DRAINS + PIPING							
2188.2111	DRAINS			12 EA	121 MH	1,565	2,400	
2188.2115	PIPING (ALL 2.5 IN+LARGER)							
2188.21151	GALV STL/NNS	22800 LB	38,760	1 LT	5473 MH	70,932	7,093	
	2188.2115 PIPING (ALL 2.5 IN+LARGER)		38,760		5473 MH	70,932	7,093	116,785

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	2188.211 ROOF DRAINS + PIPING		38,760		5594 MH	72,497	9,493	120,750
2188.212	FLOOR DRAINS + PIPING							
2188.2121	DRAINS			24 EA	240 MH	3,110	4,800	
2188.2125	PIPING (ALL 2.5IN+LARGER)							
2188.21251	CS/NNS	17900 LB	26,850	1 LT	4297 MH	55,689	5,569	
2188.21252	CI/NNS	14600 LB	3,212	1 LT	293 MH	3,796	380	
	2188.2125 PIPING (ALL 2.5IN+LARGER)		30,062		4590 MH	59,485	5,949	95,496
	2188.212 FLOOR DRAINS + PIPING		30,062		4830 MH	62,595	10,749	103,406
2188.213	PLUMBING FIXTURES + PIPING							
2188.2131	FIXTURES			21 EA	420 MH	5,137	3,501	
2188.2132	DOMESTIC WATER HTRS			2 EA	79 MH	1,028	1,100	
2188.2135	PIPING							
2188.21351	2 IN + SMALLER - CS/NNS			1330 LB	639 MH	8,280	1,729	
2188.21352	2 IN + SMALLER-COPPER/NNS			500 LF	110 MH	1,427	1,300	
2188.21353	2.5 IN + LARGER - CS/NNS	7780 LB	11,670	1 LT	1867 MH	24,197	2,420	
	2188.2135 PIPING		11,670		2616 MH	33,904	5,449	51,023
	2188.213 PLUMBING FIXTURES + PIPING		11,670		3115 MH	40,069	10,050	61,789
	2188.21 PLUMBING + DRAINS		80,492		13539 MH	175,161	30,292	285,945
2188.22	HVAC							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.221	AIR CONDITIONING SYSTEMS							
2188.2219	FOUNDATIONS/SKIDS							
2188.22191	RCA AREA AIR COND UNIT	1 EA	6,000	1 LT	200 MH	2,586	259	
2188.22192	NON RCA AREA AIR COND UNIT	1 EA	20,000	1 LT	200 MH	2,586	259	
2188.22193	ADMIN. OFF. AIR COND UNIT	1 EA	12,000	1 LT	200 MH	2,586	259	
2188.22194	Q.A. STORES AIR COND UNIT	1 EA	8,000	1 LT	152 MH	1,966	197	
	2188.2219 FOUNDATIONS/SKIDS		46,000		752 MH	9,724	974	56,698
	2188.221 AIR CONDITIONING SYSTEMS		46,000		752 MH	9,724	974	56,698
2188.222	SUPPLY AIR SYSTEM							
2188.2229	SKIDS + FOUNDATIONS							
2188.22291	LOCKER ROOM SUPPLY UNIT	1 EA	5,000	1 LT	152 MH	1,966	197	
2188.22292	LAB.SUPPLY UNIT	1 EA	2,500	1 LT	152 MH	1,966	197	
2188.22293	STORE RM SUPPLY UNIT	1 EA	8,500	1 LT	152 MH	1,966	197	
2188.22294	AUX BOILER RM SUPPLY UNIT	1 EA	6,000	1 LT	100 MH	1,293	129	
2188.22295	BOILER COMBUSTION AIR SUP	1 EA	15,000	1 LT	200 MH	2,586	259	
	2188.2229 SKIDS + FOUNDATIONS		37,000		756 MH	9,777	979	47,756
	2188.222 SUPPLY AIR SYSTEM		37,000		756 MH	9,777	979	47,756
2188.223	EXHAUST AIR SYSTEM							
2188.2231	ROTATING MACHINERY							
2188.22311	GEN. EXHAUST FANS + MOTOR	2 EA	11,000	1 LT	100 MH	1,293	129	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.22312	HOOD EXHAUST FANS + MOTOR	3 EA	6,000	1 LT	121 MH	1,564	156	
2188.22313	SHOP EXHAUST FANS + MOTOR	1 EA	2,000	1 LT	41 MH	529	53	
2188.22314	MISC.SPACE EXH FANS+MOTORS	13 EA	15,250	1 LT	152 MH	1,966	197	
2188.22315	AUX BOILER RM EXH FAN +MTR	1 EA	960	1 LT	41 MH	529	53	
2188.22316	AUX BOIL RM SUMMER EXH FAN	1 EA	720	1 LT	31 MH	402	40	
2188.22317	AUX BOIL WTR TR RM EXH FAN	1 EA	720	1 LT	31 MH	402	40	
	2188.2231 ROTATING MACHINERY		36,650		517 MH	6,685	668	44,003
2188.2239	FOUNDATIONS/SKIDS							
2188.22391	GEN EXHAUST FILTER UNIT	1 EA	21,300	1 LT	225 MH	2,910	291	
2188.22392	HOOD EXHAUST FILTER UNIT	1 EA	12,900	1 LT	131 MH	1,695	170	
2188.22393	SHOP EXHAUST FILTER UNIT	1 EA	3,800	1 LT	41 MH	529	53	
	2188.2239 FOUNDATIONS/SKIDS		38,000		397 MH	5,134	514	43,648
	2188.223 EXHAUST AIR SYSTEM		74,650		914 MH	11,819	1,182	87,651
2188.224	REFRIG. CHILLED WTR SYS							
2188.2241	ROTATING MACHINERY							
2188.22411	CHILLER	1 EA	43,000	1 LT	180 MH	2,379	238	
2188.22412	CHILLED WATER PUMP + MOTOR	2 EA	3,800		100 MH	1,322		
2188.22413	CONDENSER CIRC PUMP + MTR	2 EA	4,600		100 MH	1,322		
	2188.2241 ROTATING MACHINERY		51,400		380 MH	5,023	238	56,661
2188.2242	HEAT TRANSFER EQUIPMENT							
2188.22421	COOLING TOWER	1 EA	18,000		200 MH	2,616		

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	2188.2242 HEAT TRANSFER EQUIPMENT		18,000		200 MH	2,616		20,616
2188.2245	PIPING							
2188.22451	2 IN + SMALLER - CS/NNS			3040 LB	1459 MH	18,909	3,952	
2188.22452	2.5 IN + LARGER - CS/NNS	22440 LB	33,660	1 LT	5385 MH	69,792	6,979	
	2188.2245 PIPING		33,660		6844 MH	88,701	10,931	133,292
2188.2246	VALVES	62 EA	16,002					
2188.22461	GATE							
2188.22462	CHECK							
2188.22463	GLOBE							
2188.22465	SAFETY/RELIEF							
2188.22468	PLUG							
2188.22469	SPECIAL VALVES							
	2188.2246 VALVES		16,002					16,002
2188.2247	PIPING-MISC. ITEMS							
2188.22471	HANGERS	5000 LB	7,500					
	2188.2247 PIPING-MISC. ITEMS		7,500					7,500
	2188.224 REFRIG. CHILLED WTR SYS		126,562		7[illegible]24 MH	96,340	11,169	234,071
2188.225	BUILDING HEATING SYSTEMS							
2188.2251	ROTATING MACHINERY							
2188.22511	PRI.H.W. CIRC PUMP	2 EA	2,100	1 LT	200 MH	2,643	264	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.22512	RCA REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22513	NON-RCA REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22514	ADMIN OFF REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22515	QA STORES REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22516	LOCK ROOM REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22517	UNIT HEATER LOOP CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22518	STOREROOM REHEAT CIRC PUMP	1 EA	200	1 LT	41 MH	542	54	
2188.22519	AUX BOIL RM CIRC PUMPS	2 EA	400	1 LT	80 MH	1,057	106	
	2188.2251 ROTATING MACHINERY		3,900		567 MH	7,494	748	12,142
2188.2252	HEAT TRANSFER EQUIPMENT							
2188.22521	STEAM TO H.W. HEAT EX	1 EA	2,300	1 LT	52 MH	678	68	
2188.22522	GEN.BLDG UNIT HEATERS	12 EA	7,200	1 LT	479 MH	6,200	620	
2188.22523	AUX BOIL RM UNIT HTR/ONE	1 EA	2,000	1 LT	52 MH	671	67	
2188.22524	AUX BOIL RM UNIT HTR/TWO	1 EA	2,000	1 LT	52 MH	671	67	
	2188.2252 HEAT TRANSFER EQUIPMENT		13,500		635 MH	8,220	822	22,542
2188.2253	TANKS + PRESSURE VESSELS							
2188.22531	H.W. EXPANSION TANK	1 EA	300	1 LT	31 MH	403	40	
2188.22532	AIR SEPARATOR	1 EA	300	1 LT	31 MH	402	40	
	2188.2253 TANKS + PRESSURE VESSELS		600		62 MH	805	80	1,485
2188.2255	PIPING							
2188.22551	2 IN + SMALLER - CS/NNS			20600 LB	9888 MH	128,150	26,780	
2188.22552	2.5 IN + LARGER - CS/NNS	42000 LB	63,000	1 LT	10079 MH	130,632	13,063	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	2188.2255 PIPING		63,000		19967 MH	258,782	39,843	361,625
2188.2256	VALVES							
2188.22561	GATE							
2188.22562	CHECK							
2188.22563	GLOBE							
2188.22565	SAFETY/RELIEF							
2188.22568	PLUG							
2188.22569	SPECIAL VALVES							
	2188.2256 VALVES							
2188.2257	PIPING - MISC ITEMS							
2188.22571	HANGERS	12500 LB	18,750					
	2188.2257 PIPING - MISC ITEMS		18,750					18,750
	2188.225 BUILDING HEATING SYSTEMS		99,750		21231 MH	275,301	41,493	416,544
2188.226	DUCTWORK			34500 LB	7590 MH	88,803	34,500	
2188.228	INSTRUMENTATION & CONTROL	1 LT	3,000	1 LT	24 MH	294	15	
	2188.22 HVAC		386,962		38691 MH	492,058	90,312	969,332
2188.23	FIRE PROTECTION							
2188.231	FIRE HOSE CABINETS			20 EA	600 MH	7,776	6,700	
2188.232	SPRINKLERS			85 EA	4251 MH	55,092	8,500	
	2188.23 FIRE PROTECTION				4851 MH	62,868	15,200	78,068

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2188.24	LIGHTING & SERVICE POWER			81000 SF	32400 MH	398,371	202,500	
2188.25	ELEVATOR							
2188.251	ELEVATOR EQUIPMENT	1 EA	50,000	1 LT	1800 MH	23,286	2,329	
	2188.25 ELEVATOR		50,000		1800 MH	23,286	2,329	75,615
	2188.2 BLDG. SERVICES		517,454		91281 MH	1,151,744	340,633	2,009,831
	2188. ADMINISTRATION+SERVICE BLG		517,454		190566 MH	2,321,290	1,834,301	4,673,045
218D.	FIRE PUMP HOUSE,INC FNDTNS							
218D.1	BLDG. STRUC.							
218D.11	EARTH WORK							
218D.111	EARTH EXCAVATION			160 CY	40 MH	430	160	
218D.112	ROCK EXCAVATION							
218D.113	CONCRETE FILL							
218D.114	FILL + BACKFILL			100 CY	30 MH	299	100	
218D.115	DEWATERING							
	218D.11 EARTH WORK				70 MH	729	260	989
218D.13	SUBSTRUCTURE CONCRETE							
218D.131	FORMWORK			5900 SF	4720 MH	52,121	5,900	
218D.132	REINF. STEEL			20 TN	700 MH	9,040	8,000	
218D.133	CONCRETE			250 CY	438 MH	4,475	8,750	
218D.134	EMBEDDED STEEL			3 TN	450 MH	5,413	4,500	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218D.135	FLOOR FINISH			2400 SF	48 MH	490	24	
	218D.13 SUBSTRUCTURE CONCRETE				6356 MH	71,539	27,174	98,713
218D.14	SUPERSTRUCTURE							
218D.141	CONCRETE WORK							
218D.1411	FORMWORK							
218D.1412	REINF. STEEL							
218D.1413	CONCRETE							
	218D.141 CONCRETE WORK							
218D.142	STRUCT. + MISC. STEEL							
218D.1421	STRUCT. STEEL			20 TN	400 MH	5,207	15,000	
218D.1423	MISC. FRAMES, ETC.			1 TN	60 MH	782	1,200	
	218D.142 STRUCT. + MISC. STEEL				460 MH	5,989	16,200	22,189
218D.143	EXTERIOR WALLS							
218D.1433	METAL INSUL. SIDING			3800 SF	760 MH	9,894	15,200	
	218D.143 EXTERIOR WALLS				760 MH	9,894	15,200	25,094
218D.144	ROOF DECK							
218D.1441	METAL ROOF DECK			2900 SF	233 MH	3,032	2,900	
	218D.144 ROOF DECK				233 MH	3,032	2,900	5,932
218D.145	ROOF. + FLASHING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218D.1451	B.U. ROOF, INSUL. + FLASH			2900 SF	203 MH	2,736	3,625	
	218D.145 ROOF. + FLASHING				203 MH	2,736	3,625	6,361
218D.146	INT. WALLS + PARTIT.							
218D.1462	MASONRY WALLS			850 SF	213 MH	2,430	2,380	
218D.1463	PARTITIONS							
	218D.146 INT. WALLS + PARTIT.				213 MH	2,430	2,380	4,810
218D.147	DOORS + WINDOWS							
218D.1471	ROLLING STEEL DOORS			180 SF	107 MH	1,394	2,520	
218D.1472	PERSONNEL DOORS			120 SF	96 MH	1,114	1,440	
218D.1473	SASH + GLAZING							
	218D.147 DOORS + WINDOWS				203 MH	2,508	3,960	6,468
218D.149	PAINTING							
218D.1491	CONCRETE			1800 SF	36 MH	345	180	
218D.1492	STEELWORK			21 TN	105 MH	1,005	126	
218D.1493	METAL DECK			2900 SF	58 MH	555	290	
	218D.149 PAINTING				199 MH	1,905	596	2,501
	218D.14 SUPERSTRUCTURE				2271 MH	28,494	44,861	73,355
	218D.1 BLDG. STRUC.				8697 MH	100,762	72,295	173,057
218D.2	BUILDING SERVICES							
218D.21	PLUMBING + DRAINS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218D.211	ROOF DRAINS + PIPING							
218D.2111	DRAINS			2 EA	21 MH	269	400	
218D.2115	PIPING (ALL 2.5 IN + LGR)							
218D.21152	GALV STEEL/NNS	2280 LB	3,876	1 LT	547 MH	7,090	709	
	218D.2115 PIPING (ALL 2.5 IN + LGR)		3,876		547 MH	7,090	709	11,675
	218D.211 ROOF DRAINS + PIPING		3,876		568 MH	7,359	1,109	12,344
218D.212	FLOOR DRAINS + PIPING							
218D.2121	DRAINS			10 EA	100 MH	1,296	2,000	
218D.2125	PIPING							
218D.21251	2 IN + SMALLER - CI/NNS			2280 LB	68 MH	881	570	
218D.21252	2.5 IN + LARGER - CI/NNS	4900 LB	1,078	1 LT	98 MH	1,269	127	
	218D.2125 PIPING		1,078		166 MH	2,150	697	3,925
218D.2127	PIPING - MISC ITEMS							
218D.21271	HANGERS	1500 LB	2,250					
	218D.2127 PIPING - MISC ITEMS		2,250					2,250
	218D.212 FLOOR DRAINS + PIPING		3,328		266 MH	3,446	2,697	9,471
	218D.21 PLUMBING + DRAINS		7,204		834 MH	10,805	3,806	21,815
218D.22	HEATING, VENT, + AIR COND							
218D.221	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218D.2211	ROOF VENTILATORS + MOTOR	2 EA	4,000	1 LT	59 MH	764	76	
218D.22111	ROOF VENTILATOR							
218D.22112	ROOF VENTILATOR MOTOR							
	218D.2211 ROOF VENTILATORS + MOTOR		4,000		59 MH	764	76	4,840
	218D.221 ROTATING MACHINERY		4,000		59 MH	764	76	4,840
218D.222	HEAT TRANSFER EQUIPMENT							
218D.2221	UNIT HEATER + MOTOR	3 EA	1,500	1 LT	121 MH	1,564	156	
218D.22211	UNIT HEATER							
218D.22212	UNIT HEATER MOTOR							
	218D.2221 UNIT HEATER + MOTOR		1,500		121 MH	1,564	156	3,220
	218D.222 HEAT TRANSFER EQUIPMENT		1,500		121 MH	1,564	156	3,220
218D.225	PIPING							
218D.2251	2 IN + SMALLER							
218D.22511	CS/NNS			1560 LB	748 MH	9,697	2,028	
	218D.2251 2 IN + SMALLER				748 MH	9,697	2,028	11,725
	218D.225 PIPING				748 MH	9,697	2,028	11,725
218D.226	VALVES + DAMPERS	10 EA	1,000					
218D.2261	GATE							
218D.2263	GLOBE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218D.2269	SPECIAL VALVES + DAMPERS							
218D.22691	INTAKE LOUVERS	1 EA	1,200	1 LT	41 MH	529	53	
	218D.2269 SPECIAL VALVES + DAMPERS		1,200		41 MH	529	53	1,782
	218D.226 VALVES + DAMPERS		2,200		41 MH	529	53	2,782
218D.227	PIPING - MISC ITEMS							
218D.228	INSTRUMENTATION & CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	218D.22 HEATING, VENT, + AIR COND		9,700		985 MH	12,750	2,323	24,773
218D.24	LIGHTING & SERVICE POWER							
	218D.2 BUILDING SERVICES		16,904		1819 MH	23,555	6,129	46,588
	218D. FIRE PUMP HOUSE,INC FNDTNS		16,904		10516 MH	124,317	78,424	219,645
218E.	EMERGENCY FEED PUMP BLDG							
218E.1	BLDG. STRUCTURE							
218E.11	EXCAVATION WORK							
218E.111	EARTH EXCAVATION							
218E.112	ROCK EXCAVATION							
218E.113	CONCRETE FILL							
218E.114	FILL + BACKFILL							
218E.115	DEWATERING							
	218E.11 EXCAVATION WORK							
218E.13	SUBSTRUCTURE CONCRETE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218E.131	FORMWORK			17000 SF	13600 MH	150,177	17,000	
218E.132	REBAR			30 TN	1051 MH	13,570	12,000	
218E.133	CONCRETE			310 CY	543 MH	5,545	10,850	
218E.134	EMBEDDED STEEL							
218E.135	FLOOR FINISH			3500 SF	71 MH	726	35	
218E.136	WATERPROOFING			3700 SF	74 MH	690	370	
218E.137	CONSTRUCTION JOINTS			250 SF	250 MH	2,761	250	
218E.138	WIRE FABRIC			5800 SF	58 MH	743	696	
	218E.13 SUBSTRUCTURE CONCRETE				15647 MH	174,217	41,201	215,418
218E.14	SUPERSTRUCTURE							
218E.141	CONCRETE WORK							
218E.1411	FORMWORK							
218E.14111	FORMWORK-WOOD			86000 SF	77400 MH	854,682	86,000	
218E.14112	FORMWORK-METAL			4200 SF	336 MH	4,373	3,780	
	218E.1411 FORMWORK				77736 MH	859,055	89,780	948,835
218E.1412	REINF. STEEL			500 TN	20000 MH	258,266	200,000	
218E.1413	CONCRETE			4070 CY	8140 MH	83,125	142,450	
218E.1414	EMBEDDED STEEL			2 TN	300 MH	3,608	3,000	
218E.1415	FLOOR FINISH			7000 SF	140 MH	1,429	70	
218E.1416	WATERPROFFING			18300 SF	366 MH	3,411	1,830	
218E.1417	RUBBING CONCRETE SURFACES			27000 SF	811 MH	8,283	270	
218E.1418	CONSTRUCTION JOINTS			1000 SF	1000 MH	11,042	1,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218E.141 CONCRETE WORK				108493 MH	1,228,219	438,400	1,666,619
218E.142	STRUCT + MISC. STEEL							
218E.1421	STRUCTURAL STEEL			35 TN	700 MH	9,112	26,250	
218E.1423	MISC. FRAMES, ETC.			3 TN	180 MH	2,341	3,600	
218E.1425	FLOOR GRATING (GALV)			200 SF	40 MH	520	600	
218E.1426	STAIR TREADS			100 EA	100 MH	1,302	3,500	
218E.1427	HANDRAIL			300 LF	226 MH	2,940	3,000	
	218E.142 STRUCT + MISC. STEEL				1246 MH	16,215	36,950	53,165
218E.143	EXTERIOR WALLS							
218E.1431	CONCRETE							
218E.1433	METAL INSUL SIDING			1500 SF	300 MH	3,905	6,000	
	218E.143 EXTERIOR WALLS				300 MH	3,905	6,000	9,905
218E.145	ROOFING + FLASHING							
218E.1451	B.U. ROOF, INSUL + FLASH							
218E.1452	B.U.ROOF + FLASH (NO INSUL			4500 SF	225 MH	3,033	4,500	
	218E.145 ROOFING + FLASHING				225 MH	3,033	4,500	7,533
218E.147	DOORS + WINDOWS							
218E.1471	ROLLING STEEL DOORS							
218E.1472	PERSONNEL DOORS			225 SF	180 MH	2,088	2,700	
218E.1473	SASH + GLAZING							
	218E.147 DOORS + WINDOWS				180 MH	2,088	2,700	4,788

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218E.149	PAINTING							
218E.1491	CONCRETE			20000 SF	400 MH	3,823	2,000	
218E.1492	STEELWORK			38 TN	190 MH	1,818	228	
218E.1493	METAL DECK			4200 SF	84 MH	804	420	
218E.1494	HANDRAIL			300 LF	60 MH	574	30	
	218E.149 PAINTING				734 MH	7,024	2,678	9,702
	218E.14 SUPERSTRUCTURE				111178 MH	1,260,484	491,228	1,751,712
	218E.1 BLDG. STRUCTURE				126825 MH	1,434,701	532,429	1,967,130
218E.2	BUILDING SERVICES							
218E.21	PLUMBING + DRAINS							
218E.211	ROOF DRAINS + PIPING							
218E.2111	DRAINS			2 EA	21 MH	269	400	
218E.2115	PIPING (ALL 2.5 IN + LRG)							
218E.21151	GALV STEEL/NNS	2280 LB	3,876	1 LT	547 MH	7,090	709	
	218E.2115 PIPING (ALL 2.5 IN + LRG)		3,876		547 MH	7,090	709	11,675
	218E.211 ROOF DRAINS +*PIPING		3,876		568 MH	7,359	1,109	12,344
218E.212	FLOOR DRAINS + PIPING							
218E.2121	DRAINS			14 EA	140 MH	1,813	2,800	
218E.2125	PIPING (ALL 2.5 IN + LRG)							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218E.21251	CI/NNS	2920 LB	642	1 LT	59 MH	765	77	
218E.21252	CS/NNS	2850 LB	4,275	1 LT	684 MH	8,865	887	
	218E.2125 PIPING (ALL 2.5 IN + LRG)		4,917		743 MH	9,630	964	15,511
	218F.212 FLOOR DRAINS + PIPING		4,917		883 MH	11,443	3,764	20,124
	218E.21 PLUMBING + DRAINS		8,793		1451 MH	18,802	4,873	32,468
218E.22	HEATING, VENT, + AIR COND							
218E.221	ROTATING MACHINERY							
218E.2211	ROOF VENTILATORS + MOTOR	2 EA	4,000	1 LT	200 MH	2,586	259	
218E.22111	ROOF VENTILATOR							
218E.22112	ROOF VENTILATOR MOTOR							
	218E.2211 ROOF VENTILATORS + MOTOR		4,000		200 MH	2,586	259	6,845
	218E.221 ROTATING MACHINERY		4,000		200 MH	2,586	259	6,845
218E.222	HEAT TRANSFER EQUIPMENT							
218E.2221	STEAM UNIT HEATER + MOTOR	2 EA	1,000	1 LT	79 MH	1,024	102	
218E.22211	STEAM UNIT HEATER							
218E.22212	STEAM UNIT HEATER MOTOR							
	218E.2221 STEAM UNIT HEATER + MOTOR		1,000		79 MH	1,024	102	2,126
	218E.222 HEAT TRANSFER EQUIPMENT		1,000		79 MH	1,024	102	2,126
218E.225	PIPING							

UNITED ENGINEERS & CONSTRUCTORS INC.
2.5 IN HG AV - MIDDLETOWN,USA
1139 MWE PRESSURIZED WATER REACTOR

PLANT CODE 148 — COST BASIS 07/76 — 04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218E.2251	2IN + SMALLER							
218E.22511	CS/NNS			330 LB	159 MH	2,061	429	
	218E.2251 2IN + SMALLER				159 MH	2,061	429	2,490
	218E.225 PIPING				159 MH	2,061	429	2,490
218E.226	VALVES + DAMPERS							
218E.2261	GATE	4 EA	200					
218E.2269	SPECIAL VALVES + DAMPERS							
218E.22691	INTAKE LOUVERS	1 EA	5,600	1 LT	41 MH	529	53	
	218E.2269 SPECIAL VALVES + DAMPERS		5,600		41 MH	529	53	6,182
	218E.226 VALVES + DAMPERS		5,800		41 MH	529	53	6,382
218E.227	PIPING-MISC. ITEMS							
218E.2271	HANGERS + SUPPORTS	67 LB	101					
	218E.227 PIPING-MISC. ITEMS		101					101
218E.228	INSTRUMENTATION & CONTROL	1 LT	2,000	1 LT	25 MH	306	15	
	218E.22 HEATING, VENT, + AIR COND		12,901		504 MH	6,506	858	20,265
218E.24	LIGHTING & SERVICE POWER			5100 SF	1531 MH	18,826	8,670	
	218E.2 BUILDING SERVICES		21,694		3486 MH	44,134	14,401	80,229
	218E. EMERGENCY FEED PUMP BLDG		21,694		130311 MH	1,478,835	546,830	2,047,359
218F.	MANWAY TUNNELS (RCA TUNLS)							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218F.1	BUILDING STRUCTURE							
218F.11	EXCAVATION							
218F.111	EARTH-EXCAVATION							
218F.112	ROCK EXCAVATION							
218F.113	CONCRETE FILL							
218F.114	FILL + BACKFILL							
218F.115	DEWATERING							
	218F.11 EXCAVATION							
218F.13	SUBSTRUCTURE CONCRETE							
218F.131	FORMWORK			3300 SF	2640 MH	29,154	3,300	
218F.132	REINF. STEEL			25 TN	875 MH	11,301	10,000	
218F.133	CONCRETE			200 CY	351 MH	3,585	7,000	
218F.134	EMBEDDED STEEL							
218F.135	FLOOR FINISH			4000 SF	80 MH	818	40	
218F.136	WATERPROOFING			4000 SF	80 MH	746	400	
218F.137	RUBBING CONCRETE SURFACES							
218F.138	CONSTRUCTION JOINTS			70 SF	70 MH	773	70	
218F.139	WIRE FABRIC			5400 SF	109 MH	1,406	648	
	218F.13 SUBSTRUCTURE CONCRETE				4205 MH	47,783	21,458	69,241
218F.14	SUPERSTRUCTURE							
218F.141	CONCRETE WORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218F.1411	FORMWORK							
218F.14111	FORMWORK-WOOD			16700 SF	15030 MH	165,967	16,700	
218F.14112	FORMWORK-METAL			4000 SF	320 MH	4,167	3,600	
	218F.1411 FORMWORK				15350 MH	170,134	20,300	190,434
218F.1412	REINFORCING STEEL			125 TN	5000 MH	64,567	50,000	
218F.1413	CONCRETE			1000 CY	2000 MH	20,424	35,000	
218F.1414	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218F.1415	FLOOR FINISH							
218F.1416	WATERPROOFING			20000 SF	400 MH	3,728	2,000	
218F.1417	RUBBING CONCRETE SURFACES			19000 SF	571 MH	5,832	190	
218F.1418	CONSTRUCTION JOINTS			1500 SF	1500 MH	16,564	1,500	
	218F.141 CONCRETE WORK				24971 MH	283,053	110,490	393,543
218F.142	STRUCTURAL+MISC.STEEL			10 TN	200 MH	2,603	7,500	
218F.1421	STRUCTURAL STEEL							
	218F.142 STRUCTURAL+MISC.STEEL				200 MH	2,603	7,500	10,103
218F.149	PAINTING							
218F.1491	CONCRETE			20000 SF	400 MH	3,828	2,000	
218F.1492	STEELWORK			10 TN	50 MH	479	60	
218F.1493	METAL DECK			4000 SF	80 MH	766	400	
	218F.149 PAINTING				530 MH	5,073	2,460	7,533
	218F.14 SUPERSTRUCTURE				25701 MH	290,729	120,450	411,179

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218F.1 BUILDING STRUCTURE				29906 MH	338,512	141,908	480,420
218F.2	BUILDING SERVICES							
218F.21	PLUMBING + DRAINS							
218F.211	FLOOR DRAINS + PIPING							
218F.2111	DRAINS			6 EA	60 MH	778	1,200	
218F.2115	PIPING (ALL 2.5 IN + LRG)							
218F.21151	CI/NNS	7020 LB	1,544	1 LT	140 MH	1,813	181	
	218F.2115 PIPING (ALL 2.5 IN + LRG)		1,544		140 MH	1,813	181	3,538
	218F.211 FLOOR DRAINS + PIPING		1,544		200 MH	2,591	1,381	5,516
	218F.21 PLUMBING + DRAINS		1,544		200 MH	2,591	1,381	5,516
218F.24	LIGHTING & SERVICE POWER			4000 SF	1200 MH	14,755	7,200	
	218F.2 BUILDING SERVICES		1,544		1400 MH	17,346	8,581	27,471
	218F. MANWAY TUNNELS (RCA TUNLS)		1,544		31306 MH	355,858	150,489	507,891
218G.	ELEC. TUNNELS							
218G.1	BLD.STRUC.(INCL.ACCT218E)							
218G.2	BUILDING SERVICES							
218G.21	PLUMBING + DRAINS							
218G.211	FLOOR DRAINS + PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218G.2111	DRAINS			12 EA	121 MH	1,565	2,400	
218G.2115	PIPING (ALL 2.5 IN + LGR)							
218G.21151	CI/NNS	12710 LB	2,796	1 LT	254 MH	3,292	329	
	218G.2115 PIPING (ALL 2.5 IN + LGR)		2,796		254 MH	3,292	329	6,417
	218G.211 FLOOR DRAINS + PIPING		2,796		375 MH	4,857	2,729	10,382
	218G.21 PLUMBING + DRAINS		2,796		375 MH	4,857	2,729	10,382
218G.24	LIGHTING & SERVICE POWER							
	218G.2 BUILDING SERVICES		2,796		375 MH	4,857	2,729	10,382
	218G. ELEC. TUNNELS		2,796		375 MH	4,857	2,729	10,382
218H.	NON-ESSEN. SWGR BLDG.							
218H.1	BLDG. STRUCT.							
218H.11	EXCAVATION WORK							
218H.111	EARTH EXCAVATION							
218H.112	ROCK EXCAVATION							
218H.113	CONCRETE FILL							
218H.114	FILL + BACKFILL							
218H.115	DEWATERING							
	218H.11 EXCAVATION WORK							
218H.13	SUBSTRUCTURE CONCRETE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218H.131	FORMWORK			8800 SF	7040 MH	77,740	8,800	
218H.132	REINF. STEEL			16 TN	560 MH	7,232	6,400	
218H.133	CONCRETE			310 CY	543 MH	5,545	10,850	
218H.134	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218H.135	FLOOR FINISH			3800 SF	75 MH	765	38	
218H.136	WATERPROOFING							
218H.137	CONSTRUCTION JOINTS							
218H.138	WIRE FABRIC							
	218H.13 SUBSTRUCTURE CONCRETE				8368 MH	93,086	27,588	120,674
218H.14	SUPERSTRUCTURE							
218H.141	CONCRETE WORK							
218H.1411	FORMWORK							
218H.14111	FORMWORK-WOOD							
218H.14112	FORMWORK-METAL			300 SF	23 MH	302	270	
	218H.1411 FORMWORK				23 MH	302	270	572
218H.1412	REINF. STEEL			1 TN	45 MH	582	400	
218H.1413	CONCRETE			10 CY	20 MH	204	350	
218H.1414	EMBEDDED STEEL							
218H.1415	FLOOR FINISH			300 SF	6 MH	60	3	
218H.1416	WATERPROOFING							
218H.1417	RUBBING CONCRETE SURFACES							
218H.1418	CONSTRUCTION JOINTS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218H.141 CONCRETE WORK				94 MH	1,148	1,023	2,171
218H.142	STRUCT + MISC. STEEL							
218H.1421	STRUCT. STEEL			60 TN	1200 MH	15,621	45,000	
218H.1423	MISC. FRAMES, ETC.			3 TN	180 MH	2,341	3,600	
218H.1425	FLOOR GRATING (GALV.)							
218H.1426	STAIR TREADS							
218H.1427	HANDRAIL							
	218H.142 STRUCT + MISC. STEEL				1380 MH	17,962	48,600	66,562
218H.143	EXTERIOR WALLS							
218H.1431	CONCRETE WALLS							
218H.1432	MASONRY WALLS			5100 SF	1275 MH	14,548	14,280	
218H.1433	METAL INSUL SIDING			1800 SF	360 MH	4,687	7,200	
	218H.143 EXTERIOR WALLS				1635 MH	19,235	21,480	40,715
218H.144	ROOF DECK							
218H.1442	CONCRETE PLANK			3700 SF	296 MH	3,852	4,810	
218H.1443	CONCRETE FILL			45 CY	91 MH	930	1,440	
218H.1444	REINF. STEEL			3 TN	120 MH	1,552	1,200	
	218H.144 ROOF DECK				507 MH	6,334	7,450	13,784
218H.145	ROOFING & FLASHING							
218H.1452	B.U.ROOF+FLASH(NO INSUL.)			3700 SF	185 MH	2,494	3,700	
	218H.145 ROOFING & FLASHING				185 MH	2,494	3,700	6,194

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218H.146	INTERIOR WALLS & PARTITION							
218H.1461	CONCRETE WALLS							
218H.1463	METAL PARTITIONS			430 SF	26 MH	302	645	
	218H.146 INTERIOR WALLS & PARTITION				26 MH	302	645	947
218H.147	DOORS + WINDOWS							
218H.1472	PERSONNEL DOORS			100 SF	80 MH	928	1,200	
218H.1473	SASH & GLAZING							
	218H.147 DOORS + WINDOWS				80 MH	928	1,200	2,128
218H.149	PAINTING							
218H.1491	CONCRETE			2000 SF	40 MH	383	200	
218H.1492	STEEL WORK			63 TN	315 MH	3,015	378	
218H.1493	METAL DECK							
218H.1494	HANDRAIL							
	218H.149 PAINTING				355 MH	3,398	578	3,976
	218H.14 SUPERSTRUCTURE				4262 MH	51,801	84,676	136,477
	218H.1 BLDG. STRUCT.				12630 MH	144,887	112,264	257,151
218H.2	BUILDING SERVICES							
218H.22	HEATING, VENT, + AIR COND			1 LT	300 MH	3,881	1,400	
218H.221	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218H.2211	PROPELLER FAN + MOTOR	2 EA	3,000					
218H.22111	PROPELLER FAN							
218H.22112	PROPELLER FAN MOTOR							
	218H.2211 PROPELLER FAN + MOTOR		3,000					3,000
	218H.221 ROTATING MACHINERY		3,000					3,000
218H.222	HEAT TRANSFER EQUIPMENT							
218H.2221	ELECTRIC UNIT HEATER + MTR	2 EA	1,500					
218H.22211	ELECTRIC UNIT HEATER							
218H.22212	ELECTRIC UNIT HTR MOTOR							
	218H.2221 ELECTRIC UNIT HEATER + MTR		1,500					1,500
	218H.222 HEAT TRANSFER EQUIPMENT		1,500					1,500
218H.224	GEN FILTRATION EQUIPMENT							
218H.2241	ROLL FILTER + MOTOR	1 EA	1,200					
218H.22411	ROLL FILTER							
218H.22412	ROLL FILTER MOTOR							
	218H.2241 ROLL FILTER + MOTOR		1,200					1,200
	218H.224 GEN FILTRATION EQUIPMENT		1,200					1,200
218H.226	VALVES + DAMPERS							
218H.2269	SPECIAL VALVES + DAMPERS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218H.22691	INTAKE LOUVERS	1 EA	1,000					
218H.22692	ROOF VENTILATOR	2 EA	1,000					
	218H.2269 SPECIAL VALVES + DAMPERS		2,000					2,000
	218H.226 VALVES + DAMPERS		2,000					2,000
	218H.22 HEATING, VENT, + AIR COND		7,700		300 MH	3,881	1,400	12,981
218H.24	LIGHTING & SERVICE POWER			5000 SF	1500 MH	18,443	9,000	
218H.28	INSTRUMENTATION + CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	218H.2 BUILDING SERVICES		9,700		1816 MH	22,520	10,410	42,630
	218H. NON-ESSEN. SWGR BLDG.		9,700		14446 MH	167,407	122,674	299,781
218J.	MN STEAM + FW PIPE ENC.							
218J.1	BLDG. STRUCT.							
218J.11	EXCAVATION WORK							
218J.111	EARTH EXCAVATION							
218J.112	ROCK EXCAVATION							
218J.113	CONCRETE FILL							
218J.114	FILL + BACKFILL							
218J.115	DEWATERING							
	218J.11 EXCAVATION WORK							
218J.13	SUBSTRUCTURE CONCRETE							
218J.131	FORMWORK			6200 SF	4960 MH	54,769	6,200	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218J.132	REINF. STEEL			260 TN	9100 MH	117,511	104,000	
218J.133	CONCRETE			2600 CY	4551 MH	46,476	91,000	
218J.134	EMBEDDED STEEL			2 TN	300 MH	3,608	3,000	
218J.135	FLOOR FINISH			1500 SF	31 MH	316	15	
218J.136	WATERPROOFING			5000 SF	100 MH	932	500	
218J.137	CONSTRUCTION JOINTS			2000 SF	2000 MH	22,084	2,000	
218J.138	RUBBING CONCRETE SURFACES							
218J.139	WIRE FABRIC			8000 SF	80 MH	1,032	960	
	218J.13 SUBSTRUCTURE CONCRETE				21122 MH	246,728	207,675	454,403
218J.14	SUPERSTRUCTURE							
218J.141	CONCRETE WORK							
218J.1411	FORMWORK							
218J.14111	FORMWORK-WOOD			68000 SF	61200 MH	675,795	68,000	
218J.14112	FORMWORK-METAL			7000 SF	560 MH	7,290	6,300	
	218J.1411 FORMWORK				61760 MH	683,085	74,300	757,385
218J.1412	REINF. STEEL			370 TN	14800 MH	191,117	148,000	
218J.1413	CONCRETE			4330 CY	8660 MH	88,436	151,550	
218J.1414	EMBEDDED STEEL			11 TN	1650 MH	19,845	16,500	
218J.1415	FLOOR FINISH			4000 SF	80 MH	818	40	
218J.1416	WATERPROOFING			31000 SF	620 MH	5,778	3,100	
218J.1417	RUBBING CONCRETE SURFACES			22000 SF	660 MH	6,740	220	
218J.1418	CONSTRUCTION JOINTS			4000 SF	4000 MH	44,170	4,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218J.141 CONCRETE WORK				92230 MH	1,039,989	397,710	1,437,699
218J.142	STRUCT + MISC. STEEL							
218J.1421	STRUCT STEEL			470 TN	9400 MH	122,365	352,500	
218J.1423	MISC. FRAMES, ETC.			10 TN	600 MH	7,811	12,000	
218J.1425	FLOOR GRATING (GALV)			3000 SF	600 MH	7,811	9,000	
218J.1426	STAIR TREADS			200 EA	200 MH	2,603	7,000	
218J.1427	HAND RAIL			830 LF	622 MH	8,100	8,300	
	218J.142 STRUCT + MISC. STEEL				11422 MH	148,690	388,800	537,490
218J.145	ROOFING + FLASHING							
218J.1452	B.U.ROOF+FLASH(NO INSUL.)			7000 SF	350 MH	4,718	7,000	
	218J.145 ROOFING + FLASHING				350 MH	4,718	7,000	11,718
218J.146	INTERIORWALLS+PARTITIONS							
218J.1461	CONCRETE WALLS							
218J.1463	METAL PARTITIONS (SEAL PLA			700 SF	42 MH	487	1,050	
	213J.146 INTERIORWALLS+PARTITIONS				42 MH	487	1,050	1,537
218J.147	DOORS + WINDOWS							
218J.1472	PERSONNEL DOORS			170 SF	136 MH	1,578	2,040	
218J.1473	SASH + GLAZING							
	218J.147 DOORS + WINDOWS				136 MH	1,578	2,040	3,618
218J.149	PAINTING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218J.1491	CONCRETE			20000 SF	400 MH	3,828	2,000	
218J.1492	STEELWORK			480 TN	2400 MH	22,968	2,880	
218J.1493	METAL DECK			7000 SF	140 MH	1,340	700	
218J.1494	HANDRAIL			830 LF	166 MH	1,589	83	
	218J.149 PAINTING				3106 MH	29,725	5,663	35,388
	218J.14 SUPERSTRUCTURE				107286 MH	1,225,187	802,263	2,027,450
	218J.1 BLDG. STRUCT.				128408 MH	1,471,915	1,009,938	2,481,853
218J.2	BLDG. SERV.							
218J.22	HEATING, VENT, + AIR COND							
218J.221	ROTATING MACHINERY							
218J.2211	SUPPLY FAN + MOTOR	2 EA	6,800	1 LT	200 MH	2,586	259	
218J.22111	SUPPLY FAN							
218J.22112	SUPPLY FAN MOTOR							
	218J.2211 SUPPLY FAN + MOTOR		6,800		200 MH	2,586	259	9,645
	218J.221 ROTATING MACHINERY		6,800		200 MH	2,586	259	9,645
218J.225	PIPING + DUCTWORK							
218J.2253	DUCTWORK			250 LB	53 MH	620	250	
	218J.225 PIPING + DUCTWORK				53 MH	620	250	870
	218J.22 HEATING, VENT, + AIR COND		6,800		253 MH	3,206	509	10,515

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218J.24	LIGHTING & SERVICE POWER			7000 SF	2100 MH	25,821	12,600	
	218J.2 BLDG. SERV.		6,800		2353 MH	29,027	13,109	48,936
	218J. MN STEAM + FW PIPE ENC.		6,800		130761 MH	1,500,942	1,023,047	2,530,789
218K.	PIPE TUNNELS							
218K.1	BLDG. STRUCT							
218K.11	EXCAVATION WORK							
218K.111	EARTH EXCAVATION							
218K.112	ROCK EXCAVATION							
218K.113	CONCRETE FILL							
218K.114	FILL + BACKFILL							
218K.115	DEWATERING							
	218K.11 EXCAVATION WORK							
218K.13	SUBSTRUCTURE CONCRETE							
218K.131	FORMWORK			1920 SF	1535 MH	16,950	1,920	
218K.132	REINF. STEEL			60 TN	2100 MH	27,118	24,000	
218K.133	CONCRETE			725 CY	1269 MH	12,958	25,375	
218K.134	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218K.135	FLOOR FINISH			2000 SF	40 MH	408	20	
218K.136	WATERPROOFING			8000 SF	160 MH	1,491	800	
218K.137	CONSTRUCTION JOINTS			2650 SF	2650 MH	29,262	2,650	
218K.138	RUBBING CONCRETE SURFACES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218K.139	WIRE FABRIC			4000 SF	80 MH	1,032	480	
	218K.13 SUBSTRUCTURE CONCRETE				7984 MH	91,023	56,745	147,768
218K.14	SUPERSTRUCTURE							
218K.141	CONCRETE WORK							
218K.1411	FORMWORK							
218K.14111	FORMWORK-WOOD			7680 SF	6911 MH	76,313	7,680	
218K.14112	FORMWORK-METAL			2700 SF	216 MH	2,813	2,430	
	218K.1411 FORMWORK				7127 MH	79,126	10,110	89,236
218K.1412	REINFORCING STEEL							
218K.1413	CONCRETE							
218K.1414	EMBEDDED STEEL							
218K.1415	FLOOR FINISH							
218K.1416	WATERPROOFING							
218K.1417	RUBBING CONCRETE SURFACES							
218K.1418	CONSTRUCTION JOINTS							
	218K.141 CONCRETE WORK				7127 MH	79,126	10,1 0	89,236
218K.142	STRUCTURAL+MISC. STEEL							
218K.1421	STRUCTURAL STEEL			10 TN	200 MH	2,603	7,500	
	218K.142 STRUCTURAL+MISC. STEEL				200 MH	2,603	7,500	10,103
218K.149	PAINTING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218K.1491	CONCRETE			15000 SF	300 MH	2,871	1,500	
218K.1492	STEELWORK			10 TN	50 MH	479	60	
218K.1493	METAL DECK			2700 SF	54 MH	517	270	
	218K.149 PAINTING				404 MH	3,867	1,830	5,697
	218K.14 SUPERSTRUCTURE				7731 MH	85,596	19,440	105,036
	218K.1 BLDG. STRUCT				15715 MH	176,619	76,185	252,804
218K.2	BLDG. SERV.							
218K.21	DRAINS + PIPING			6 EA	751 MH	9,731	6,000	
218K.24	LIGHTING + SERVICE POWER			2700 SF	809 MH	9,948	4,590	
	218K.2 BLDG. SERV.				1560 MH	19,679	10,590	30,269
	218K. PIPE TUNNELS				17275 MH	196,298	86,775	283,073
218M.	HYDROGEN RECOMBINER STRUCT							
218M.1	BLDG. STRUCTURES							
218M.11	EXCAVATION WORK							
218M.111	EARTH EXCAVATION							
218M.112	ROCK EXCAVATION							
218M.113	CONCRETE FILL							
218M.114	FILL + BACKFILL							
218M.115	DEWATERING							
	218M.11 EXCAVATION WORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218M.13	SUBSTRUCTURE CONCRETE							
218M.131	FORMWORK			100 SF	80 MH	883	100	
218M.132	REINF. STEEL			2 TN	71 MH	917	800	
218M.133	CONCRETE			20 CY	35 MH	356	700	
218M.134	EMBEDDED STEEL							
218M.135	FLOOR FINISH							
218M.136	WATERPROOFING			400 SF	8 MH	75	40	
218M.137	CONSTRUCTION JOINTS							
218M.138	RUBBING CONCRETE SURFACES							
218M.139	WIRE FABRIC			600 SF	12 MH	154	72	
	218M.13 SUBSTRUCTURE CONCPETE				206 MH	2,385	1,712	4,097
218M.14	SUPERSTRUCTURE							
218M.141	CONCRETE WORK							
218M.1411	FORMWORK							
218M.14111	FORMWORK-WOOD			1400 SF	1260 MH	13,912	1,400	
218M.14112	FORMWORK-METAL							
	218M.1411 FORMWORK				1260 MH	13,912	1,400	15,312
218M.1412	REINF. STEEL			43 TN	1720 MH	22,212	17,200	
218M.1413	CONCRETE			480 CY	960 MH	9,804	16,800	
218M.1414	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218M.1415	FLOOR FINISH							
218M.1416	WATERPROOFING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218M.1417	RUBBING CONCRETE SURFACES							
218M.1418	CONSTRUCTION JOINTS			350 SF	350 MH	3,865	350	
	218M.141 CONCRETE WORK				4440 MH	51,597	37,250	88,847
218M.142	STRUCT + MISC STEEL							
218M.1421	STRUCT. STEEL			5 TN	100 MH	1,302	3,750	
218M.1423	MISC. FRAMES, ETC.			1 TN	60 MH	782	1,200	
	218M.142 STRUCT + MISC STEEL				160 MH	2,084	4,950	7,034
218M.145	ROOFING & FLASHING			300 SF	21 MH	283	300	
218M.1451	B.U.ROOF & FLASH(NO INSUL)							
	218M.145 ROOFING & FLASHING				21 MH	283	300	583
218M.149	PAINTING			1 LS	100 MH	957	100	
218M.1491	CONCRETE							
218M.1492	STEELWORK							
218M.1493	METAL DECK							
	218M.149 PAINTING				100 MH	957	100	1,057
	218M.14 SUPERSTRUCTURE				4721 MH	54,921	42,600	97,521
	218M.1 BLDG. STRUCTURES				4927 MH	57,306	44,312	101,618
218M.2	BUILDING SERVICES			1 LT	200 MH	2,586	2,500	
218M.24	LIGHTING + SERVICE POWER							
	218M.2 BUILDING SERVICES				200 MH	2,586	2,500	5,086

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218M. HYDROGEN RECOMBINER STRUCT				5127 MH	59,892	46,812	106,704
218P.	CONTAIN EQ HATCH MSLE SHLD							
218P.1	SHIELD STRUCTURE							
218P.13	SUBSTRUCTURE CONCRETE							
218P.14	SUPERSTRUCTURE							
218P.141	CONCRETE WORK							
218P.1411	FORMWORK							
218P.14111	FORMWORK-WOOD			7500 SF	6750 MH	74,537	7,500	
218P.14112	FORMWORK-METAL							
	218P.1411 FORMWORK				6750 MH	74,537	7,500	82,037
218P.1412	REINF. STEEL			35 TN	1400 MH	18,079	14,000	
218P.1413	CONCRETE			280 CY	560 MH	5,718	9,800	
218P.1414	EMBEDDED STEEL							
218P.1417	RUBBING CONCRETE SURFACES							
218P.1418	CONSTRUCTION JOINTS			300 SF	300 MH	3,313	300	
	218P.141 CONCRETE WORK				9010 MH	101,647	31,600	133,247
	218P.14 SUPERSTRUCTURE				9010 MH	101,647	31,600	133,247
	218P.1 SHIELD STRUCTURE				9010 MH	101,647	31,600	133,247
	218P. CONTAIN EQ HATCH MSLE SHLD				9010 MH	101,647	31,600	133,247

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218S.	HOLDING POND							
218S.1	POND STRUCTURE							
218S.11	EXCAVATION WORK							
218S.111	EARTH EXCAVATION			2205 CY	552 MH	5,913	2,205	
218S.112	ROCK EXCAVATION							
218S.113	CONCRETE FILL							
218S.114	FILL + BACKFILL			262 CY	79 MH	787	262	
218S.115	PUMPING							
	218S.11 EXCAVATION WORK				631 MH	6,700	2,467	9,167
218S.13	SUBSTRUCTURE CONCRETE							
218S.131	FORMWORK			5040 SF	4031 MH	44,511	5,040	
218S.132	REINF. STEEL			25 TN	875 MH	11,301	10,000	
218S.133	CONCRETE			420 CY	735 MH	7,505	14,700	
218S.134	EMBEDDED STEEL							
218S.135	FLOOR FINISH			4480 SF	89 MH	908	45	
218S.136	WATERPROOFING							
218S.137	CONSTRUCTION JOINTS			630 SF	630 MH	6,956	630	
218S.138	RUBBING CONCRETE SURFACES							
218S.139	WATERSTOPS							
	218S.13 SUBSTRUCTURE CONCRETE				6360 MH	71,181	30,415	101,596
	218S.1 POND STRUCTURE				6991 MH	77,881	32,882	110,763

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218S. HOLDING POND				6991 MH	77,881	32,882	110,763
218T.	ULTIMATE HEAT SINK STRUCT							
218T.1	BLDG. STRUCT							
218T.11	EXCAVATION WORK							
218T.111	EARTH EXCAVATION			5100 CY	1275 MH	13,655	5,100	
218T.112	ROCK EXCAVATION			11000 CY	8800 MH	94,252	44,000	
218T.113	CONCRETE FILL			1200 CY	1200 MH	12,254	38,400	
218T.114	FILL + BACKFILL			2500 CY	750 MH	7,464	2,500	
218T.115	DEWATERING							
	218T.11 EXCAVATION WORK				12025 MH	127,625	90,000	217,625
218T.13	SUBSTRUCTURE CONCRETE							
218T.131	FORMWORK			1550 SF	1240 MH	13,694	1,550	
218T.132	REINF. STEEL			150 TN	5251 MH	67,807	60,000	
218T.133	CONCRETE			1520 CY	2660 MH	27,164	53,200	
218T.134	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218T.135	FLOOR FINISH			10000 SF	200 MH	2,042	100	
218T.136	WATERPROOFING							
218T.137	CONSTRUCTION JOINTS			1000 SF	1000 MH	11,042	1,000	
218T.138	WIRE FABRIC			10000 SF	200 MH	2,583	1,200	
218T.139	WATERSTOP			1000 LF	60 MH	612	700	
	218T.13 SUBSTRUCTURE CONCRETE				10761 MH	126,748	119,250	245,998

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218T.14	SUPERSTRUCTURE							
218T.141	CONCRETE WORK							
218T.1411	FORMWORK							
218T.14111	FORMWORK-WOOD			125000 SF	112500 MH	1,242,270	125,000	
218T.14112	FORMWORK-METAL			10000 SF	800 MH	10,414	9,000	
	218T.1411 FORMWORK				113300 MH	1,252,684	134,000	1,386,684
218T.1412	REINF. STEEL			700 TN	26000 MH	361,572	280,000	
218T.1413	CONCRETE			7350 CY	14700 MH	150,116	257,250	
218T.1414	EMBEDDED STEEL			2 TN	300 MH	3,603	3,000	
218T.1415	FLOOR FINISH			18000 SF	360 MH	3,677	180	
218T.1416	WATERPROOFING							
218T.1417	RUBBING CONCRETE SURFACES			27000 SF	811 MH	8,283	270	
218T.1418	CONSTRUCTION JOINTS			8000 SF	8000 MH	88,340	8,000	
	218T.141 CONCRETE WORK				165471 MH	1,868,280	682,700	2,550,980
218T.142	STRUCT + MISC. STEEL							
218T.1421	STRUCT STEEL			230 TN	4600 MH	59,881	172,500	
218T.1423	MISC. FRAMES, ETC.			7 TN	420 MH	5,468	8,400	
218T.1425	FLOOR GRATING (GALV.)			270 SF	54 MH	704	810	
218T.1426	STAIR TREADS			135 EA	135 MH	1,757	4,725	
218T.1427	HANDRAIL			700 LF	526 MH	6,845	7,000	
	218T.142 STRUCT + MISC. STEEL				5735 MH	74,655	193,435	268,090

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218T.143	EXTERIOR WALLS							
218T.1431	CONCRETE WALLS							
218T.1432	MASONRY WALLS							
	218T.143 EXTERIOR WALLS							
218T.145	ROOFING + FLASHING							
218T.1452	BU ROOF + FLASH (NO INSUL)							
	218T.145 ROOFING + FLASHING							
218T.146	INTERIOR WALLS + PARTITION							
218T.1461	CONCRETE WALLS							
218T.1462	MASONRY WALLS							
218T.1463	PARTITIONS							
	218T.146 INTERIOR WALLS + PARTITION							
218T.147	DOORS + WINDOWS							
218T.1472	PERSONNEL DOORS			85 SF	68 MH	789	1,020	
218T.1473	SASH + GLAZING							
	218T.147 DOORS + WINDOWS				68 MH	789	1,020	1,809
218T.149	PAINTING							
218T.1491	CONCRETE (WATERSEALING)			3300 SF	66 MH	632	1,650	
218T.1492	STEELWORK			240 TN	1200 MH	11,484	1,440	
218T.1493	METAL DECK			10000 SF	200 MH	1,914	1,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218T.1494	HANDRAIL			700 LF	140 MH	1,340	70	
	218T.149 PAINTING				1606 MH	15,370	4,160	19,530
	218T.14 SUPERSTRUCTURE				172880 MH	1,959,094	881,315	2,840,409
	218T.1 BLDG. STRUCT				195666 MH	2,213,467	1,090,565	3,304,032
218T.2	BUILDING SERVICES							
218T.21	PLUMBING & DRAINS							
218T.211	FLOOR DRAINS & PIPING							
	218T.21 PLUMBING & DRAINS							
218T.22	HEATING, VENT + AIR COND							
218T.221	ROTATING MACHINERY							
218T.2211	MECH EQUIPT RM FAN + MOTOR	2 EA	3,000	1 LT	72 MH	931	93	
218T.22111	MECH EQUIPT RM FAN							
218T.22112	MECH EQUIPT RM FAN MOTOR							
	218T.2211 MECH EQUIPT RM FAN + MOTOR		3,000		72 MH	931	93	4,024
218T.2212	SWITCHGEAR RM FAN + MOTOR	2 EA	5,000	1 LT	79 MH	1,024	102	
218T.22121	SWITCHGEAR RM FAN							
218T.22122	SWITCHGEAR RM FAN MOTOR							
	218T.2212 SWITCHGEAR RM FAN + MOTOR		5,000		79 MH	1,024	102	6,126
	218T.221 ROTATING MACHINERY		8,000		151 MH	1,955	195	10,150

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218T.222	HEAT TRANSFER EQUIPTMENT							
218T.2221	SW GR RM ELEC HEATER + MTR	4 EA	3,000	1 LT	151 MH	1,868	187	
218T.22211	SW GR RM ELEC HEATER							
218T.22212	SW GR RM ELEC HTR MOTOR							
	218T.2221 SW GR RM ELEC HEATER + MTR		3,000		151 MH	1,868	187	5,055
	218T.222 HEAT TRANSFER EQUIPTMENT		3,000		151 MH	1,868	187	5,055
218T.224	GEN FILTRATION EQUIPMENT							
218T.2241	ROLL FILTER	1 EA	9,600	1 LT	200 MH	2,586	259	
	218T.224 GEN FILTRATION EQUIPMENT		9,600		200 MH	2,586	259	12,445
218T.226	VALVES + DAMPERS							
218T.2269	SPECIAL VALVES + DAMPERS							
218T.22691	M.E.R. INTAKE LOUVER	1 EA	1,000	1 LT	31 MH	402	40	
218T.22692	SWITCHGR RM EXH LOUVER	2 EA	1,200	1 LT	52 MH	671	67	
	218T.2269 SPECIAL VALVES + DAMPERS		2,200		83 MH	1,073	107	3,380
	218T.226 VALVES + DAMPERS		2,200		83 MH	1,073	107	3,380
218T.228	INSTRUMENTATION + CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	218T.22 HEATING, VENT + AIR COND		24,800		601 MH	7,678	758	33,236
218T.24	LIGHTING + SERVICE POWER							
	218T.2 BUILDING SERVICES		24,800		601 MH	7,678	758	33,236

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	218T. ULTIMATE HEAT SINK STRUCT		24,800		196267 MH	2,221,145	1,091,323	3,337,268
218V.	CONTR RM EMG AIR INTK STR							
218V.1	BLDG. STRUCTURE							
218V.11	EXCAVATION WORK							
218V.111	EARTH EXCAVATION			8100 CY	2025 MH	21,689	8,100	
218V.112	ROCK EXCAVATION			135 CY	109 MH	1,168	540	
218V.113	CONCRETE FILL							
218V.114	FILL & BACKFILL			9500 CY	2850 MH	28,364	9,500	
218V.115	PUMPING							
218V.116	CHAIN LINK FENCE (7' HIGH)			1600 LF	480 MH	4,474	10,400	
	218V.11 EXCAVATION WORK				5464 MH	55,695	28,540	84,235
218V.13	SUBSTRUCTURE CONCRETE							
218V.131	FORMWORK			3600 SF	2880 MH	31,802	3,600	
218V.132	REINF. STEEL			10 TN	351 MH	4,531	4,000	
218V.133	CONCRETE			130 CY	228 MH	2,328	4,550	
218V.134	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
218V.135	FLOOR FINISH							
218V.136	WATERPROOFING			1050 SF	21 MH	196	105	
218V.137	CONSTRUCTION JOINTS			500 SF	500 MH	5,522	500	
218V.138	RUBBING CONCRETE SURFACES							
218V.139	REMOVABLE CONCRETE PLUGS (							
	218V.13 SUBSTRUCTURE CONCRETE				4130 MH	46,183	14,255	60,438

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218V.14	SUPERSTRUCTURE							
218V.141	CONCRETE WORK							
218V.1411	FORMWORK							
218V.14111	FORMWORK-WOOD							
	218V.1411 FORMWORK							
218V.1412	REINF. STEEL							
218V.1413	CONCRETE							
218V.1414	EMBEDDED STEEL							
218V.1415	FLOOR FINISH							
218V.1416	WATERPROOFING							
218V.1417	RUBBING CONCRETE SURFACES							
218V.1418	CONSTRUCTION JOINTS							
	218V.141 CONCRETE WORK							
218V.143	EXTERIOR WALLS							
218V.1431	CONCRETE							
	218V.143 EXTERIOR WALLS							
218V.145	ROOFING + FLASHING							
218V.1452	B.U.ROOF & FLASH(NO INSUL)							
	218V.145 ROOFING + FLASHING							
218V.149	PAINTING							

ACCT NO.	ACCOUNT DESCRIPTION		FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
218V.1491	CONCRETE								
	218V.149	PAINTING							
	218V.14	SUPERSTRUCTURE							
	218V.1	BLDG. STRUCTURE				9594 MH	101,878	42,795	144,673
218V.2	BUILDING SERVICES								
218V.22	EMERG.O.A.DUCT(UNDERGRND)								
	218V.2	BUILDING SERVICES							
	218V.	CONTR RM EMG AIR INTK STR				9594 MH	101,878	42,795	144,673
	21 .	STRUCTURES + IMPROVEMENTS		5,902,426		4716266 MH	55,696,709	39,776,622	101,375,757

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
22 .	REACTOR PLANT EQUIPMENT							
220A.	NUCLEAR STEAM SUPPLY(NSSS)							
220A.1	QUOTED NSSS PRICE	1 LT	65,000,000					
220A.2	DISTRIBUTED NSSS COST							
220A.21	REACTOR EQUIPMENT							
220A.211	VESSEL STRUCTURE							
220A.212	VESSEL INTERNALS							
220A.2121	LOWER INTERNALS							
220A.2122	UPPER INTERNALS							
	220A.212 VESSEL INTERNALS							
220A.213	CONTROL ROD SYSTEM							
220A.2131	CONTROL RODS							
220A.2132	CONTROL ROD DRIVES							
	220A.213 CONTROL ROD SYSTEM							
	220A.21 REACTOR EQUIPMENT							
220A.22	MAIN HEAT XFER XPORT SYS							
220A.221	MAIN COOLANT PUMPS							
220A.222	REACTOR COOLANT PIPING							
220A.223	STEAM GENERATORS							
220A.224	PRESSURIZER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
220A.225	PRESSURIZER RELIEF TANK							
	220A.22 MAIN HEAT XFER XPORT SYS							
220A.23	SAFEGUARDS SYSTEM							
220A.231	RESIDUAL HEAT RMVL SYSTEM							
220A.2311	RHR PUMPS & DRIVES							
220A.2312	RHR HEAT EXCHANGER							
	220A.231 RESIDUAL HEAT RMVL SYSTEM							
220A.232	SAFETY INJECTION SYSTEM							
220A.2321	SI PUMPS & DRIVES							
220A.2322	ACCUMULATOR TANKS							
220A.2323	BORON INJECTION TANK							
220A.2324	BORON INJECTION SURGE TANK							
220A.2325	BORON INJ RECIRC PUMP&DRV							
	220A.232 SAFETY INJECTION SYSTEM							
	220A.23 SAFEGUARDS SYSTEM							
220A.25	FUEL HANDLING & STORAGE							
220A.251	FUEL HANDLING TOOLS							
	220A.25 FUEL HANDLING & STORAGE							
220A.26	OTHER EQUIPMENT							
220A.261	COOLANT TREATMENT & RECVRY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
220A.2611	ROTATING MACHINERY							
220A.26111	CENTRIFUGAL CHRG PMP & MTR							
220A.26112	POS DISPL CHRG PMP & MTR							
220A.26113	BORIC ACID XFER PMP & MTR							
220A.26114	CHILLER PMP & MTR							
220A.26115	BORON INJ M/U PMP & MTR							
	220A.2611 ROTATING MACHINERY							
220A.2612	HEAT TRANSFER EQUIPMENT							
220A.26121	MODERATING HX							
220A.26122	MN COOLANT PMP SEAL H2O HX							
220A.26123	CHILLER							
220A.26124	REGENERATIVE HX							
220A.26125	LETDOWN HX							
220A.26126	EXCESS LETDOWN HX							
220A.26127	LETDOWN CHILLER HX							
220A.26128	LETDOWN REHEAT HX							
	220A.2612 HEAT TRANSFER EQUIPMENT							
220A.2613	TANKS & PRESSURE VESSELS							
220A.26131	VOLUME CONTROL TANK							
220A.26132	CHILLER SURGE TANK							
220A.26133	BORIC ACID BATCH TANK							
220A.26134	CHEMICAL DRAIN TANK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	220A.2613 TANKS & PRESSURE VESSELS							
220A.2614	PURIF & FILTRATION EQUIP							
220A.26141	MIXED BED DEMINS							
220A.26142	CATION DEMINS							
220A.26143	PROCESS FILTERS							
220A.26144	SEAL WATER INJ FILTER							
220A.26145	THERMAL REGENERATION DEMIN							
	220A.2614 PURIF & FILTRATION EQUIP							
	220A.261 COOLANT TREATMENT & RECVRY							
220A.262	MAINTENANCE EQUIPMENT							
	220A.26 OTHER EQUIPMENT							
220A.27	INSTRUMENTATION & CONTROL							
	220A.2 DISTRIBUTED NSSS COST							
220A.3	UNDISTRIBUTED NSSS COST							65,000,000
	220A. NUCLEAR STEAM SUPPLY(NSSS)		65,000,000					
220B.	NSSS OPTIONS							
221.	REACTOR EQUIPMENT							
221.1	REACTOR VESSEL + ACCESSORY							
221.11	REACTOR SUPPORT							
221.111	CONCRETE WORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
221.112	STEEL SUPPORTS	1 LT	475,000	1 LT	2400 MH	33,168	3,317	
	221.11 REACTOR SUPPORT		475,000		2400 MH	33,168	3,317	511,485
221.12	VESSEL STRUCTURE							
221.121	BODY AND ATTACHMENT			1 LS	58300 MH	762,547	86,107	
221.122	CLOSURE AND ATTACHMENTS							
221.123	STUDS,FASTENERS,SEALS,GSKT							
221.126	INSULATION							
	221.12 VESSEL STRUCTURE				58300 MH	762,547	86,107	848,654
221.13	VESSEL INTERNALS							
221.131	LOWER INTERNALS			1 LT	8400 MH	109,870	11,600	
221.132	UPPER INTERNALS			1 LT	5600 MH	73,246	7,700	
	221.13 VESSEL INTERNALS				14000 MH	183,116	19,300	202,416
221.14	TRANSPORT TO SITE			1 LT			1,800,000	
	221.1 REACTOR VESSEL + ACCESSORY		475,000		74700 MH	978,831	1,908,724	3,362,555
221.2	REACTOR CONTROL DEVICES							
221.21	CONTROL ROD SYSTEM							
221.211	CONTROL RODS							
221.212	CONTROL ROD DRIVES (CRD)			65 EA	11052 MH	144,556	16,231	
221.213	CRD MISSILE SHIELD			1 LS	1300 MH	17,966	1,935	
221.214	CRDM SEISMIC SUPPORTS			1 LT	364 MH	5,030	20,000	
221.215	CRDMS + RODS- PU RECYCLE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
221.21	CONTROL ROD SYSTEM				12716 MH	167,552	38,166	205,718
221.2	REACTOR CONTROL DEVICES				12716 MH	167,552	38,166	205,718
221.	REACTOR EQUIPMENT		475,000		87416 MH	1,146,383	1,946,890	3,568,273
222.	MAIN HEAT XFER XPORT SYS.							
222.1	REACTOR CORE COOLANT SYS.							
222.11	FLUID CIRCULATION DR. SYS.							
222.111	ROTATING MACHINERY							
222.1111	MAIN COOLANT PUMPS&DRIVES			4 EA	23000 MH	303,987	26,875	
222.11111	MAIN COOLANT PUMPS							
222.11112	MAIN COOLANT PUMP DRIVES							
222.1111	MAIN COOLANT PUMPS&DRIVES				23000 MH	303,987	26,875	330,862
222.111	ROTATING MACHINERY				23000 MH	303,987	26,875	330,862
222.118	INSTRUMENTATION + CONTROL							
222.119	FOUNDATIONS / SKIDS							
222.1191	CONCRETE WORK							
222.1192	STEEL SUPPORTS	1 LT	775,000	1 LT	5417 MH	74,863	7,486	
222.119	FOUNDATIONS / SKIDS		775,000		5417 MH	74,863	7,486	857,349
222.11	FLUID CIRCULATION DR. SYS.		775,000		28417 MH	378,850	34,361	1,188,211

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
222.12	REACT.COOLANT PIPING SYS.							
222.125	PIPING							
222.1251	2IN.+ SMALLER							
222.12511	SS/NNS			650 LB	779 MH	10,099	3,250	
222.12512	SS/SC1			3080 LB	9240 MH	119,754	36,652	
222.12513	SS/SC2			900 LB	2700 MH	34,993	10,710	
	222.1251 2IN.+ SMALLER				12719 MH	164,846	50,612	215,458
222.1252	2.5 + LARGER							
222.12521	SS/NNS	10000 LB	40,000	1 LT	6000 MH	77,762	7,776	
222.12522	SS/SC1	41600 LB	374,400	1 LT	74879 MH	970,465	97,047	
222.12523	SS/SC1(FURNISHED WITH NSS)	98820 LB		1 LT	177876 MH	2,305,345	230,535	
222.12524	SS/SC2	4410 LB	39,690	1 LT	7938 MH	102,878	10,288	
	222.1252 2.5 + LARGER		454,090		266693 MH	3,456,450	345,646	4,256,186
	222.125 PIPING		454,090		279412 MH	3,621,296	396,258	4,471,644
222.126	REACTOR COOLANT VALVES	202 EA	142,107					
222.1261	GATE							
222.1262	CHECK							
222.1263	GLOBE							
222.1264	SAUNDERS WEIR							
222.1265	RELIEF							
222.1267	BALL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
222.1269	SPECIAL VALVES							
222.12691	NEEDLE							
222.12692	ANGLE							
	222.1269 SPECIAL VALVES							
	222.126 REACTOR COOLANT VALVES		142,107					142,107
222.127	PIPING - MISC.ITEMS							
222.1271	HANGERS + SUPPORTS	12000 LB	18,000					
222.1272	INSULATION							
222.1273	SPECIALTIES							
	222.127 PIPING - MISC.ITEMS		18,000					18,000
222.128	INSTRUMENTATION + CONTROL	1 LT	120,560	1 LT	1000 MH	12,224	1,222	
	222.12 REACT.COOLANT PIPING SYS.		734,757		280412 MH	3,633,520	397,480	4,765,757
222.13	STEAM GENERATOR EQUIPMENT							
222.132	HEAT TRANSFER EQUIPMENT							
222.1321	STEAM GENERATORS			4 EA	47000 MH	649,540	69,445	
	222.132 HEAT TRANSFER EQUIPMENT				47000 MH	649,540	69,445	718,985
222.138								
222.139	FOUNDATIONS / SKIDS							
222.1391	CONCRETE WORK							
222.1392	STEEL SUPPORTS	1 LT	1,850,000	1 LT	9200 MH	127,144	12,714	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	222.139 FOUNDATIONS / SKIDS		1,850,000		9200 MH	127,144	12,714	1,989,858
	222.13 STEAM GENERATOR EQUIPMENT		1,850,000		56200 MH	776,684	82,159	2,708,843
222.14	PRESSURIZING SYSTEM							
222.143	TANKS AND PRESSURE VESSELS							
222.1431	PRESSURIZER			1 EA	5000 MH	65,399	6,450	
222.1432	PRESSURIZER RELIEF TANK			1 EA	700 MH	9,156	860	
	222.143 TANKS AND PRESSURE VESSELS				5700 MH	74,555	7,310	81,865
222.148	INSTRUMENTATION + CONTROL							
222.149	FOUNDATIONS / SKIDS							
222.1491	CONCRETE WORK							
222.1492	STEEL SUPPORTS	1 LT	100,000	1 LT	500 MH	6,910	691	
	222.149 FOUNDATIONS / SKIDS		100,000		500 MH	6,910	691	107,601
	222.14 PRESSURIZING SYSTEM		100,000		6200 MH	81,465	8,001	189,466
222.15	PRI COOL PIPE WHIP RESTRNT	1 LT	490,000	1 LT	3333 MH	43,593	4,359	
222.151	PLATE							
222.152	SHEAR LUGS							
222.153	ANCHORS							
222.154	BEAMS							
222.155	U-BOLT & NUTS							
222.156	WELDS							

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
222.157	ELASTO-PLASTIC MATERIAL							
	222.15 PRI COOL PIPE WHIP RESTRNT		490,000		3333 MH	43,593	4,359	537,952
	222.1 REACTOR CORE COOLANT SYS.		3,949,757		374562 MH	4,914,112	526,360	9,390,229
	222. MAIN HEAT XFER XPORT SYS.		3,949,757		374562 MH	4,914,112	526,360	9,390,229
223.	SAFEGUARDS SYSTEM							
223.1	RESIDUAL HEAT REMOVAL SYS							
223.11	ROTATING MACHINERY							
223.111	RHR PUMPS AND DRIVES			2 EA	2000 MH	26,433	2,200	
223.1111	RHR PUMPS							
223.1112	RHR PUMP DRIVES							
	223.111 RHR PUMPS AND DRIVES				2000 MH	26,433	2,200	28,633
	223.11 ROTATING MACHINERY				2000 MH	26,433	2,200	28,633
223.12	HEAT TRANSFER EQUIPMENT							
223.121	RHR HEAT EXCHANGERS			2 EA	1000 MH	13,080	1,100	
	223.12 HEAT TRANSFER EQUIPMENT				1000 MH	13,080	1,100	14,180
223.15	PIPING							
223.151	2IN + SMALLER							
223.1511	SS/SC2			2240 LB	6721 MH	87,104	26,656	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	223.151 2IN + SMALLER				6721 MH	87,104	26,656	113,760
223.152	2.5IN + LARGER							
223.1521	SS/SC1	14040 LB	126,360	1 LT	25273 MH	327,549	32,755	
223.1522	SS/SC2	55380 LB	498,420	1 LT	99684 MH	1,291,945	129,195	
	223.152 2.5IN + LARGER		624,780		124957 MH	1,619,494	161,950	2,406,224
	223.15 PIPING		624,780		131678 MH	1,706,598	188,606	2,519,984
223.16	RHR VALVES	20 EA	7,526					
223.161	GATE							
223.162	CHECK							
223.163	GLOBE							
223.165	RELIEF							
223.166	BUTTERFLY							
	223.16 RHR VALVES		7,526					7,526
223.17	PIPING - MISC. ITEMS							
223.171	HANGERS + SUPPORTS	13000 LB	19,500					
223.172	INSULATION							
223.173	SPECIALTIES							
	223.17 PIPING - MISC. ITEMS		19,500					19,500
223.18	INSTRUMENTATION + CONTROL	1 LT	26,460	1 LT	203 MH	2,482	124	
	223.1 RESIDUAL HEAT REMOVAL SYS		678,266		134881 MH	1,748,593	192,030	2,618,889

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
223.3	SAFETY INJECTION SYSTEM							
223.31	ROTATING MACHINERY							
223.311	S.I. PUMPS AND DRIVES			2 EA	2200 MH	29,077	2,400	
223.3111	S I PUMPS							
223.3112	S I PUMP DRIVES							
	223.311 S.I. PUMPS AND DRIVES				2200 MH	29,077	2,400	31,477
223.312	BORON INJECT PUMP + DRIVE	2 EA	15,000	1 LT	100 MH	1,322	132	
223.3121	BORON INJ RECIRC PUMP							
223.3122	BORON INJ RECIRC PUMP DRVE							
	223.312 BORON INJECT PUMP + DRIVE		15,000		100 MH	1,322	132	16,454
	223.31 ROTATING MACHINERY		15,000		2300 MH	30,399	2,532	47,931
223.33	TANKS AND PRESSURE VESSELS							
223.331	ACCUMULATOR TANK			4 EA	3200 MH	41,855	3,800	
223.332	BORON INJECTION TANK			1 EA	200 MH	2,616	200	
223.333	BORON INJECTION SURGE TANK			1 EA	100 MH	1,308	100	
223.334	REFUELING WATER STORAGE TK			1 EA	8819 MH	115,349	226,800	
	223.33 TANKS AND PRESSURE VESSELS				12319 MH	161,128	230,900	392,028
223.35	PIPING							
223.351	2IN. + SMALLER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
223.3511	SS/NNS			1680 LB	2016 MH	26,127	8,400	
223.3512	SS/SC1			3340 LB	10021 MH	129,873	39,746	
223.3513	SS/SC2			3960 LB	11879 MH	153,960	47,124	
223.3514	SS/SC3			480 LB	1440 MH	18,662	5,712	
	223.351 2IN. + SMALLER				25356 MH	328,622	100,982	429,604
223.352	2.5IN + LARGER							
223.3521	SS/SC1	38010 LB	342,090	1 LT	68418 MH	886,722	88,672	
223.3522	SS/SC2	25180 LB	226,620	1 LT	45324 MH	587,415	58,742	
	223.352 2.5IN + LARGER		568,710		113742 MH	1,474,1[illegible]7	147,414	2,190,261
	223.35 PIPING		568,710		139098 MH	1,802,[illegible]59	248,396	2,619,865
223.36	VALVES	121 EA	177,906					
223.361	GATE							
223.362	CHECK							
223.363	GLOBE							
223.364	DIAPHRAGM/SAUNDERS WEIR							
223.365	RELIEF							
223.369	SPECIAL VALVES							
223.3691	NEEDLE							
	223.369 SPECIAL VALVES							
	223.36 VALVES		177,906					177,906
223.37	PIPING - MISC.ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
223.371	HANGERS + SUPPORTS	14500 LB	21,750					
223.372	INSULATION							
223.373	SPECIALTIES							
	223.37 PIPING - MISC.ITEMS		21,750					21,750
223.38	INSTRUMENTATION + CONTROL	1 LT	53,500	1 LT	411 MH	5,025	251	
	223.3 SAFETY INJECTION SYSTEM		836,866		154128 MH	1,999,311	482,079	3,318,256
223.4	CONTAINMENT SPRAY SYSTEM							
223.41	ROTATING MACHINERY							
223.411	CONTAINMT SPRAY PUMP + MTR	2 EA	150,000	1 LT	2500 MH	33,042	3,304	
223.4111	CONTAINMENT SPRAY PUMP							
223.4112	CONTAINMENT SPRAY PUMP MTR							
	223.411 CONTAINMT SPRAY PUMP + MTR		150,000		2500 MH	33,042	3,304	186,346
	223.41 ROTATING MACHINERY		150,000		2500 MH	33,042	3,304	186,346
223.42	HEAT TRANFER EQUIPMENT							
223.421	CONTAIN.SPRAY HEAT XCHNGER	2 EA	150,500	1 LT	1000 MH	13,080	1,308	
	223.42 HEAT TRANFER EQUIPMENT		150,500		1000 MH	13,080	1,308	164,888
223.43	TANKS AND PRESSURE VESSELS							
223.431	SPRAY ADDITIVE TANK	1 EA	86,000	1 LT	200 MH	2,616	262	
	223.43 TANKS AND PRESSURE VESSELS		86,000		200 MH	2,616	262	88,878

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
223.45	PIPING							
223.451	2IN. + SMALLER							
223.4511	SS/NNS			730 LB	876 MH	11,355	3,650	
223.4512	SS/SC2			580 LB	1740 MH	22,551	6,902	
	223.451 2IN. + SMALLER				2616 MH	33,906	10,552	44,458
223.452	2.5IN + LARGER							
223.4521	SS/NNS	5280 LB	21,120	1 LT	3167 MH	41,044	4,104	
223.4522	SS/SC2	86460 LB	778,140	1 LT	155627 MH	2,016,988	201,699	
	223.452 2.5IN + LARGER		799,260		158794 MH	2,058,032	205,803	3,063,095
	223.45 PIPING		799,260		161410 MH	2,091,938	216,355	3,107,553
223.46	VALVES + FITTINGS							
223.461	VALVES	47 EA	544,918					
223.4611	GATE							
223.4612	CHECK							
223.4613	GLOBE							
223.4614	DIAPHRAGM/SAUNDERS WEIR							
223.4615	RELIEF							
	223.461 VALVES		544,918					544,918
223.462	FITTINGS							
223.4621	CONTAINMENT SPRAY NOZZLES	396 EA	18,256	1 LT	229 MH	2,969	297	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	223.462 FITTINGS		18,256		229 MH	2,969	297	21,522
	223.46 VALVES + FITTINGS		563,174		229 MH	2,969	297	566,440
223.47	PIPING - MISC. ITEMS							
223.471	HANGERS + SUPPORTS	17700 LB	26,550					
223.472	INSULATION							
223.473	SPECIALTIES							
	223.47 PIPING - MISC. ITEMS		26,550					26,550
223.48	INSTRUMENTATION + CONTROL	1 LT	35,930	1 LT	290 MH	3,545	177	
	223.4 CONTAINMENT SPRAY SYSTEM		1,311,414		165629 MH	2,147,190	221,703	4,180,307
223.5	COMBUSTIBLE GAS CONTROL SY							
223.55	PIPING	5000 LB	20,000	1 LT	3000 MH	38,881	3,888	
223.56	VALVES	20 EA	6,772					
223.57	PIPING - MISC ITEMS							
223.571	HANGERS + SUPPORTS	1000 LB	1,500					
223.572	INSULATION							
223.573	SPECIALTIES							
	223.57 PIPING - MISC ITEMS		1,500					1,500
223.58	INSTRUMENTATION + CONTROL	1 LT	9,960	1 LT	80 MH	979	49	
223.59	FOUNDATIONS / SKIDS							
223.591	HYDROGEN RECOMBINER	2 EA	750,000	1 LT	4000 MH	51,748	5,175	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
223.5911	ROTATING MACHINERY							
223.59111	BLOWER							
223.5911	ROTATING MACHINERY							
223.5912	HEAT TRANSFER EQUIPMENT							
223.59121	ELECTRIC HEATERS							
223.59122	DISCHARGE COOLER							
223.5912	HEAT TRANSFER EQUIPMENT							
223.5913	TANKS AND PRESSURE VESSELS							
223.59131	CATALYTIC RECOMBINER VESSL							
223.5913	TANKS AND PRESSURE VESSELS							
223.591	HYDROGEN RECOMBINER		750,000		4000 MH	51,748	5,175	806,923
223.59	FOUNDATIONS / SKIDS		750,000		4000 MH	51,748	5,175	806,923
223.5	COMBUSTIPLE GAS CONTROL SY		788,232		7080 MH	91,608	9,112	888,952
223.	SAFEGUARDS SYSTEM		4,114,778		461718 MH	5,986,702	904,924	11,006,404
224.	RADWASTE PROCESSING							
224.1	LIQUID WASTE SYSTEM							
224.11	EQUIPMENT DRAIN TRAIN							
224.111	ROTATING MACHINERY							

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.1111	EQUIP DRN TNK PUMPS + MTRS	2 EA	6,411	1 LT	120 MH	1,586	159	
224.11111	EQUIP DRAIN TANK PUMPS							
224.11112	EQUIP DRAIN TK PMP DRIVES							
	224.1111 EQUIP DRN TNK PUMPS + MTRS		6,411		120 MH	1,586	159	8,156
224.1112	EQUIP DRN TEST TK PUMP+MTR	2 EA	6,411	1 LT	120 MH	1,586	159	
224.11121	EQUIP DRN TEST TK PUMP							
224.11122	EQUIP DRN TST TK PMP DRIVE							
	224.1112 EQUIP DRN TEST TK PUMP+MTR		6,411		120 MH	1,586	159	8,156
224.1113	RCDT PUMP	2 EA	7,480	1 LT	120 MH	1,586	159	
224.11131	RX COOLANT DRN TANK PUMP							
224.11132	RX COOLANT DRN TK PMP DRV							
	224.1113 RCDT PUMP		7,480		120 MH	1,586	159	9,225
	224.111 ROTATING MACHINERY		20,302		360 MH	4,758	477	25,537
224.112	HEAT TRANSFER EQUIP							
224.1121	WASTE EVAPORATOR PACKAGE	1 EA	459,551	1 LT	5855 MH	75,746	7,575	
224.1122	RCDT HEAT EXCHANGER	1 EA	10,000	1 LT	287 MH	3,757	376	
	224.112 HEAT TRANSFER EQUIP		469,551		6142 MH	79,503	7,951	557,005
224.113	TANKS AND PRESSURE VESSELS							
224.1131	EQUIP DRAIN TANKS	2 EA	28,000	1 LT	200 MH	2,616	262	
224.1132	EQUIP DRAIN TEST TANKS	2 EA	28,000	1 LT	200 MH	2,616	262	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.1133	REACT COOLANT DRAIN TANK	1 EA	3,500	1 LT	52 MH	678	68	
	224.113 TANKS AND PRESSURE VESSELS		59,500		452 MH	5,910	592	66,002
224.114	PURIFICATION EQUIP							
224.1141	EQUIP DRAIN FILTER	1 EA	5,000	1 LT	121 MH	1,564	156	
224.1142	WASTE EVAP COND DEMIN	1 EA	21,371	1 LT	269 MH	3,521	352	
	224.114 PURIFICATION EQUIP		26,371		390 MH	5,085	508	31,964
224.115	PIPING							
224.1151	2.0IN + SMALLER			18500 LB	22200 MH	287,720	92,500	
224.1152	2.5IN + LARGER	20500 LB	82,000	1 LT	12300 MH	159,413	15,941	
	224.115 PIPING		82,000		34500 MH	447,133	108,441	637,574
224.116	VALVES							
224.1162	CHECK VALVES	1 LT	2,500					
224.1165	RELIEF VALVES	1 LT	4,000					
224.1168	PLUG VALVES	1 LT	29,600					
	224.116 VALVES		36,100					36,100
224.117	PIPING-MISC. ITEMS							
224.1171	HANGERS+SUPPORTS	7000 LB	10,500					
224.1172	POST DEMIN. STRAINER	1 EA	100	1 LT	10 MH	131	13	
224.1173	INSULATION							
	224.117 PIPING-MISC. ITEMS		10,600		10 MH	131	13	10,744-

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.118								
	224.11 EQUIPMENT DRAIN TRAIN		704,424		41854 MH	542,520	117,982	1,364,926
224.12	MISC WASTE TRAIN							
224.121	ROTATING MACHINERY							
224.1211	MISC WASTE TANK PUMPS+MTRS	2 EA	6,411	1 LT	120 MH	1,586	159	
224.12111	MISC WASTE TANK PUMP							
224.12112	MISC WASTE TANK PUMP DRIVE							
	224.1211 MISC WASTE TANK PUMPS+MTRS		6,411		120 MH	1,586	159	8,156
224.1212	MISC WASTE TEST TK PP+MTRS	2 EA	6,411	1 LT	120 MH	1,586	159	
224.12121	MISC WASTE TEST TK PUMP							
224.12122	MISC WASTE TEST TK PMP DRV							
	224.1212 MISC WASTE TEST TK PP+MTRS		6,411		120 MH	1,586	159	8,156
	224.121 ROTATING MACHINERY		12,822		240 MH	3,172	318	16,312
224.122	HEAT EXCHANGE EQUIPMENT							
224.123	TANKS AND PRESSURE VESSELS							
224.1231	MISC WASTE TANKS	2 EA	84,000	1 LT	600 MH	7,848	785	
224.1232	MISC WASTE TEST TANKS	2 EA	84,000	1 LT	600 MH	7,848	785	
	224.123 TANKS AND PRESSURE VESSELS		168,000		1200 MH	15,696	1,570	185,266
224.124	PURIF AND FILTRATION EQUIP							

ACCT NO.	ACCOUNT DESCRIPTION	******* FACTORY ******* QUANTITY	COSTS	********** SITE ********** QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
224.1241	MISC WASTE FILTERS	2 EA	10,000	1 LT	96 MH	1,241	124	
224.1242	MISC WASTE DEMINERALIZER	2 EA	42,742	1 LT	540 MH	6,984	698	
224.1243	MISC WASTE R/O UNITS	2 EA	450,000	1 LT	958 MH	12,395	1,240	
	224.124 PURIF AND FILTRATION EQUIP		502,742		1594 MH	20,620	2,062	525,424
224.125	PIPING							
224.1251	2.0IN + SMALLER							
224.1252	2.5IN + LARGER							
	224.125 PIPING							
224.126	VALVES							
224.1262	CHECK VALVES	1 LT	1,000					
224.1268	PLUG	1 LT	20,000					
	224.126 VALVES		21,000					21,000
224.127	PIPING-MISC. ITEMS							
224.1271	HANGERS+SUPPORTS							
224.1272	STRAINERS	2 EA	200	1 LT	21 MH	269	27	
	224.127 PIPING-MISC. ITEMS		200		21 MH	269	27	496
224.128								
	224.12 MISC WASTE TRAIN		704,764		3055 MH	39,757	3,977	748,498
224.13	DETERGENT WASTE TRAIN							
224.131	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.1311	DETER WASTE TANK PUMPS+MTR	2 EA	6,411	1 LT	120 MH	1,586	159	
224.13111	DETER WASTE TANK PUMPS							
224.13112	DETER WASTE TANK PMP DRIVE							
	224.1311 DETER WASTE TANK PUMPS+MTR		6,411		120 MH	1,586	159	8,156
224.1312	DET WASTE TEST TK PUMP+MTR	2 EA	6,411	1 LT	120 MH	1,586	159	
224.13121	DET WASTE TEST TK PUMP							
224.13122	DET WASTE TEST TK PMP DRV							
	224.1312 DET WASTE TEST TK PUMP+MTR		6,411		120 MH	1,586	159	8,156
	224.131 ROTATING MACHINERY		12,822		240 MH	3,172	318	16,312
224.132	HEAT TRANSFER EQUIPMENT							
224.133	TANKS AND PRESSURE VESSELS							
224.1331	DETERGENT WASTE TANKS	2 EA	28,000	1 LT	200 MH	2,616	262	
224.1332	DETERGENT WASTE TEST TANKS	2 EA	28,000	1 LT	200 MH	2,616	262	
	224.133 TANKS AND PRESSURE VESSELS		56,000		400 MH	5,232	524	61,756
224.134	PURIF AND FILTRATION EQUIP							
224.1341	DETERGENT FILTER	1 EA	5,000	1 LT	96 MH	1,241	124	
224.1342	DETERGENT DEMINERALIZER	1 EA	21,371	1 LT	268 MH	3,465	347	
224.1343	DETERGENT R/O UNIT PACKAGE	1 EA	225,000	1 LT	478 MH	6,187	619	
224.1344	DETERGENT WASTE STRAINER	1 EA	1,000	1 LT	52 MH	671	67	
	224.134 PURIF AND FILTRATION EQUIP		252,371		894 MH	11,564	1,157	265,092

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.135	PIPING							
224.136	VALVES							
224.1362	CHECK VALVES	1 LT	500					
224.1368	PLUG	1 LT	13,000					
	224.136 VALVES		13,500					13,500
224.137	PIPING-MISC ITEMS							
224.1371	HANGERS + SUPPORTS	4600 LB	6,900					
224.1372	RESIN STRAINER	1 EA	100	1 LT	10 MH	131	13	
	224.137 PIPING-MISC ITEMS		7,000		10 MH	131	13	7,144
	224.13 DETERGENT WASTE TRAIN		341,693		1544 MH	20,099	2,012	363,804
224.14	CHEMICAL WASTE TRAIN							
224.141	ROTATING MACHINERY							
224.1411	CHEMICAL WASTE TK PUMP+MTR	1 EA	2,137	1 LT	51 MH	673	67	
224.14111	CHEMICAL WASTE TK PUMP							
224.14112	CHEM WASTE TK PUMP DRV							
	224.1411 CHEMICAL WASTE TK PUMP+MTR		2,137		51 MH	673	67	2,877
	224.141 ROTATING MACHINERY		2,137		51 MH	673	67	2,877
224.142	HEAT TRANSFER EQUIPMENT							
224.143	TANKS AND PRESSURE VESSELS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.1431	CHEMICAL WASTE TANK	1 EA	3,000	1 LT	47 MH	617	62	
	224.143 TANKS AND PRESSURE VESSELS		3,000		47 MH	617	62	3,679
224.144	PURIF AND FILTER EQUIPMENT							
224.145	PIPING							
224.146	VALVES	1 LT	660					
224.1462	CHECK							
224.1468	PLUG							
	224.146 VALVES		660					660
224.147	PIPING-MISC ITEMS							
224.1471	HANGERS+SUPPORTS							
	224.147 PIPING-MISC ITEMS							
224.148								
	224.14 CHEMICAL WASTE TRAIN		5,797		98 MH	1,290	129	7,216
224.15	STM GEN BLOWDOWN							
224.151	STM GEN BLOWDOWN TREATMENT							
224.1511	BLOWDOWN DISCH PUMP&DRIVE							
224.15111	BLOWDOWN DISCHARGE PUMP	2 EA	7,000	1 LT	90 MH	1,189	119	
224.15112	BLOWDOWN DISCH PUMP DRIVE							
	224.1511 BLOWDOWN DISCH PUMP&DRIVE		7,000		90 MH	1,189	119	8,308
224.1512	HEAT TRANSFER EQUIPMENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.15121	BLOWDOWN HEAT EXCHANGER	1 EA	5,000	1 LT	126 MH	1,648	165	
	224.1512 HEAT TRANSFER EQUIPMENT		5,000		126 MH	1,643	165	6,813
224.1513	TANKS & PRESSURE VESSELS							
224.15131	BLOWDOWN SURGE TANK	1 EA	5,000	1 LT	200 MH	2,616	262.	
	224.1513 TANKS & PRESSURE VESSELS		5,000		200 MH	2,616	262	7,878
224.1514	PURIFICATION & FILT EQUIP							
224.15141	BLOWDOWN CATION DEMIN	2 EA	60,000	1 LT	833 MH	10,895	1,090	
224.15142	BLOWDOWN MIXED-BED DEMIN	2 EA	70,000	1 LT	833 MH	10,895	1,090	
224.15143	BLOWDOWN INLET FILTER	1 EA	7,500	1 LT	133 MH	1,738	174	
224.15144	BLOWDOWN OUTLET FILTER	1 EA	7,500	1 LT	133 MH	1,738	174	
	224.1514 PURIFICATION & FILT EQUIP		145,000		1932 MH	25,266	2,528	172,794
224.1515	PIPING							
224.15151	2IN & SMALLER			18000 LB	21600 MH	279,944	90,000	
224.15152	2.5IN & LARGER							
	224.1515 PIPING				21600 MH	279,944	90,000	369,944
224.1516	VALVES	1 LT	25,590					
224.15162	CHECK							
224.15163	GLOBE							
224.15164	DIAPHRAGM							
	224.1516 VALVES		25,590					25,590

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.1517	PIPING - MISC. ITEMS							
224.15171	HANGERS & SUPPORTS							
224.15172	INSULATION							
	224.1517 PIPING - MISC. ITEMS							
224.1518	INSTRUMENTATION&CONTROL	1 LT	15,950	1 LT	124 MH	1,516	76	
224.1519	FOUNDATIONS & SKIDS							
	224.151 STM GEN BLOWDOWN TREATMENT		203,540		24072 MH	312,179	93,150	608,869
	224.15 STM GEN BLOWDOWN		203,540		24072 MH	312,179	93,150	608,869
224.16	REGEN CHEM WASTE TRAIN							
224.161	ROTATING MACHINERY							
224.1611	REGEN WASTE TANK PUMP+MTR	2 EA	8,000	1 LT	120 MH	1,586	159	
224.16111	REGEN WASTE TANK PUMP							
224.16112	REGEN WASTE TANK PMP DRIVE							
	224.1611 REGEN WASTE TANK PUMP+MTR		8,000		120 MH	1,586	159	9,745
224.1612	REGEN WASTE TEST TK PP+MTR	2 EA	8,000	1 LT	120 MH	1,586	159	
224.16121	REGEN WASTE TST TK PUMP							
224.16122	REGEN WST TST TK PUMP DRV							
	224.1612 REGEN WASTE TEST TK PP+MTR		8,000		120 MH	1,586	159	9,745
	224.161 ROTATING MACHINERY		16,000		240 MH	3,172	318	19,490

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.163	TANKS AND PRESSURE VESSELS							
224.1631	REGEN WASTE TANK			2 EA	5000 MH	65,399	46,000	
224.1632	REGEN WASTE TEST TANK			2 EA	5000 MH	65,399	46,000	
	224.163 TANKS AND PRESSURE VESSELS				10000 MH	130,798	92,000	222,798
224.164	PURIF + FILTRATION EQUIP							
224.1641	REGEN WASTE FILTER	2 EA	10,000	1 LT	96 MH	1,255	126	
224.1642	REGEN WASTE EVAP COND DEMI	1 EA	30,000	1 LT	833 MH	10,895	1,090	
224.1643	REGENERATION WASTE EVAP PK	2 EA	1,000,000	1 LT	12500 MH	163,497	16,350	
	224.164 PURIF + FILTRATION EQUIP		1,040,000		13429 MH	175,647	17,566	1,233,213
224.165	PIPING							
224.166	VALVES							
224.1662	CHECK	1 LT	800					
224.1668	PLUG	1 LT	19,100					
	224.166 VALVES		19,900					19,900
224.167	PIPING-MISC ITENS							
224.1671	HANGERS+SUPPORTS							
224.1672	POST DEMIN STRAINER	1 EA	100	1 LT	10 MH	131	13	
224.1673	INSULATION							
	224.167 PIPING-MISC ITENS		100		10 MH	131	13	244
224.168								
	224.16 REGEN CHEM WASTE TRAIN		1,076,000		23679 MH	309,748	109,897	1,495,645

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.17	MISC RADWASTE EQUIP							
224.171	CHEM FEED PACKAGE	1 EA	15,000	1 LT	300 MH	3,923	392	
224.172	VACUUM DEGASIFIER PKG	1 EA	30,000	1 LT	600 MH	7,848	785	
	224.17 MISC RADWASTE EQUIP		45,000		900 MH	11,771	1,177	57,948
224.18	INSTRUMENTATION + CONTROL	1 LT	64,150	1 LT	493 MH	6,028	603	
	224.1 LIQUID WASTE SYSTEM		3,145,368		95695 MH	1,243,392	328,927	4,717,687
224.2	RAD GAS WASTE PROCESSING							
224.21	RAD GAS WASTE PROCESS SYS							
224.211	ROTATING MACHINERY							
224.2111	RAD GAS COMPRESSORS & DRVS	2 EA	104,000	1 LT	1000 MH	13,217	1,322	
224.21111	RAD GAS COMPRESSORS							
224.21112	RAD GAS COMPRESSOR DRIVE							
	224.2111 RAD GAS COMPRESSORS & DRVS		104,000		1000 MH	13,217	1,322	118,539
	224.211 ROTATING MACHINERY		104,000		1000 MH	13,217	1,322	118,539
224.213	TANKS AND PRESSURE VESSELS							
224.2131	GAS SURGE TANK	1 EA	8,548	1 LT	96 MH	1,255	126	
224.2132	GAS DECAY TANKS	4 EA	96,000	1 LT	500 MH	6,540	654	
	224.213 TANKS AND PRESSURE VESSELS		104,548		596 MH	7,795	780	113,123
224.214	PURIF + FILTRATION EQUIP							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.2141	RECOMBINER PACKAGES	2 EA	500,000	1 LT	1900 MH	24,852	2,485	
224.2142	GAS WASTE DRAIN FILTER	1 EA	2,500	1 LT	81 MH	1,051	105	
	224.214 PURIF + FILTRATION EQUIP		502,500		1981 MH	25,903	2,590	530,993
224.215	PIPING							
224.2151	2 IN + SMALLER							
224.21511	SS/NNS			22800 LB	27360 MH	354,598	114,000	
	224.2151 2 IN + SMALLER				27360 MH	354,598	114,000	468,598
224.2152	2.5 IN + LARGER							
224.21521	SS/NNS	13490 LB	53,960	1 LT	8095 MH	104,912	10,491	
224.21522								
	224.2152 2.5 IN + LARGER		53,960		8095 MH	104,912	10,491	169,363
	224.215 PIPING		53,960		35455 MH	459,510	124,491	637,961
224.216	VALVES							
224.2162	CHECK	1 LT	500					
224.2164	DIAPHRAGM	1 LT	10,000					
224.2165	RELIEF	1 LT	50					
224.2168	PLUG	1 LT	1,500					
	224.216 VALVES		12,050					12,050
224.217	PIPING-MISC ITEMS							
224.2171	HANGERS + SUPPORTS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.2172	GAS TRAPS	6 EA	1,200					
	224.217 PIPING-MISC ITEMS		1,200					1,200
224.218	INSTRUMENTATION + CONTROL	1 LT	26,330	1 LT	202 MH	2,470	124	
	224.21 RAD GAS WASTE PROCESS SYS		804,588		39234 MH	508,895	129,307	1,442,790
	224.2 RAD GAS WASTE PROCESSING		804,588		39234 MH	508,895	129,307	1,442,790
224.3	SOLID WASTE SYSTEM							
224.31	SOLID WASTE PROCESSING SYS							
224.311	ROTATING MACHINERY							
224.3111	ACID METERING PUMP&DRIVE	1 EA	2,000	1 LT	51 MH	673	67	
224.31111	ACID METERING PUMP							
224.31112	ACID METERING PUMP DRIVE							
	224.3111 ACID METERING PUMP&DRIVE		2,000		51 MH	673	67	2,740
224.3112	CAUSTIC METERING PUMP&DRV	1 EA	2,000	1 LT	51 MH	673	67	
224.31121	CAUSTIC METERING PUMP							
224.31122	CAUSTIC METERING PUMP DRVE							
	224.3112 CAUSTIC METERING PUMP&DRV		2,000		51 MH	673	67	2,740
224.3113	HYDRAULIC BAILER & DRIVE	1 EA	21,500	1 LT	352 MH	4,555	456	
224.31131	HYDRAULIC BAILER							
224.31132	HYDRAULIC BAILER DRIVE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	224.3113 HYDRAULIC BAILER & DRIVE		21,500		352 MH	4,555	456	26,511
224.3114	SPENT RESIN SLUICE PMP&DRV	1 EA	2,150	1 LT	59 MH	779	78	
224.31141	SPENT RESIN SLUICE PUMP							
224.31142	SPENT RESIN SLUICE PMP DRV							
	224.3114 SPENT RESIN SLUICE PMP&DRV		2,150		59 MH	779	78	3,007
224.3115	SPENT RESIN XFER PUMP&DRVE	1 EA	5,000	1 LT	59 MH	779	78	
224.31151	SPENT RESIN XFER PUMP							
224.31152	SPENT RESIN XFER PUMP DRVE							
	224.3115 SPENT RESIN XFER PUMP&DRVE		5,000		59 MH	779	78	5,857
224.3116	CONCENTRATES TANK PMP&DRV	2 EA	10,000	1 LT	120 MH	1,586	159	
224.31161	CONCENTRATES TANK PUMP							
224.31162	CONCENTRATES TK PUMP DRIVE							
	224.3116 CONCENTRATES TANK PMP&DRV		10,000		120 MH	1,586	159	11,745
	224.311 ROTATING MACHINERY		42,650		692 MH	9,045	905	52,600
224.313	TANKS AND PRESSURE VESSELS							
224.3131	EVAPORATOR CONCENTRATES TK	2 EA	60,000	1 LT	400 MH	5,232	523	
224.3132	SPENT RESIN STORAGE TANK	1 EA	38,700	1 LT	100 MH	1,308	131	
	224.313 TANKS AND PRESSURE VESSELS		98,700		500 MH	6,540	654	105,894
224.314	PURIF.+FILTRATION EQUIPT.							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
224.3141	FILTERS	1 EA	3,225	1 LT	41 MH	529	53	
	224.314 PURIF.+FILTRATION EQUIPT.		3,225		41 MH	529	53	3,807
224.315	PIPING							
224.3151	2IN. + SMALLER							
224.31511	SS/NNS			50550 LB	60660 MH	786,178	252,750	
	224.3151 2IN. + SMALLER				60660 MH	786,178	252,750	1,038,928
224.3152	2.5IN + LARGER							
224.31521	SS/NNS	29940 LB	119,760	1 LT	17964 MH	232,818	23,282	
	224.3152 2.5IN + LARGER		119,760		17964 MH	232,818	23,282	375,860
	224.315 PIPING		119,760		78624 MH	1,018,996	276,032	1,414,788
224.316	SOLID WASTE PROCESS VALVES	1 LT	29,455					
224.3161	GATE							
224.3162	CHECK							
224.3164	SAUNDERS WEIR							
224.3167	BALL							
	224.316 SOLID WASTE PROCESS VALVES		29,455					29,455
224.317	PIPING-MISC ITEMS							
224.3171	HANGERS + SUPPORTS	18000 LB	27,000					
224.3172	INSULATION							
224.3173	SPECIALTIES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	224.317 PIPING-MISC ITEMS		27,000					27,000
224.318	INSTRUMENTATION + CONTROL	1 LT	31,280	1 LT	240 MH	2,935	147	
224.319	FOUNDATIONS/SKIDS							
224.3191	SOLIDIFICATION PACKAGE	1 LS	440,750	1 LT	5800 MH	75,863	7,586	
	224.319 FOUNDATIONS/SKIDS		440,750		5800 MH	75,863	7,586	524,199
	224.31 SOLID WASTE PROCESSING SYS		792,820		85897 MH	1,113,908	285,377	2,192,105
224.32	VOLUME REDUCTION							
224.321	VOLUME REDUCTION SYSTEM	1 LT	900,000	1 LT	25000 MH	326,993	32,699	
	224.32 VOLUME REDUCTION		900,000		25000 MH	326,993	32,699	1,259,692
	224.3 SOLID WASTE SYSTEM		1,692,820		110897 MH	1,440,901	318,076	3,451,797
	224. RADWASTE PROCESSING		5,642,776		245826 MH	3,193,188	776,310	9,612,274
225.	FUEL HANDLING + STORAGE							
225.1	FUEL HANDLG TOOLS + EQUIP							
225.11	CRANES + HOISTS							
225.111	NEW + SPENT FUEL CRANE	1 EA	64,500	1 LT	1000 MH	12,680	1,268	
225.112	MONORAILS + HOISTS	1 LT	8,600	1 LT	260 MH	3,297	330	
225.113	NEW FUEL ELEVATOR	1 LT	21,500	1 LT	1000 MH	12,680	1,268	
225.114	SPENT FUEL CASK CRANE	1 EA	387,000	1 LT	2700 MH	34,236	3,424	
	225.11 CRANES + HOISTS		481,600		4960 MH	62,893	6,290	550,783

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
225.12	FUEL HANDLING TOOLS	1 LT	900,000	1 LT	372 MH	4,812	481	
225.13	TRANSFER SYSTEMS							
225.131	TILTING MECHANISM	2 EA	20,000	1 LT	1000 MH	12,936	1,294	
225.132	FUEL XFER TUBE	1 LT	100,000	1 LT	6731 MH	87,079	8,708	
	225.13 TRANSFER SYSTEMS		120,000		7731 MH	100,015	10,002	230,017
225.15	S.F.ENCAPSULATION FACILITY							
	225.1 FUEL HANDLG TOOLS + EQUIP		1,501,600		13063 MH	167,720	16,773	1,686,093
225.3	SERVICE PLATFORMS							
225.31	REACTOR SERVICE PLATFORM							
225.32	FUEL STOR POOL SERV PLATFM	1 LT	64,500	1 LT	1000 MH	13,017	1,302	
	225.3 SERVICE PLATFORMS		64,500		1000 MH	13,017	1,302	78,819
225.4	FUEL STOR,CLNG,+INSPEC EQ.							
225.41	NEW FUEL STORAGE RACKS	1 LT	182,750	1 LT	5150 MH	67,041	6,704	
225.42	SPENT FUEL STORAGE RACKS	1 LT	182,750	1 LT	5150 MH	67,041	6,704	
225.43	SPENT FUEL POOL CLG+PURIF							
225.431	ROTATING MACHINERY							
225.4311	SPENT FUEL POOL PMPS+MOTOR	2 EA	77,400	1 LT	600 MH	7,931	793	
225.43111	SPENT FUEL POOL PUMP							
225.43112	SPENT FUEL POOL PMP DRIVE							
	225.4311 SPENT FUEL POOL PMPS+MOTOR		77,400		600 MH	7,931	793	86,124

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
225.4312	SPNT FL PL SKIMMER PMP+MOT	1 EA	3,010	1 LT	69 MH	912	91	
225.43121	SPNT FL PL SKIMMER PUMPS							
225.43122	SPNT FL PL SKMR PUMP DRIVE							
	225.4312 SPNT FL PL SKIMMER PMP+MOT		3,010		69 MH	912	91	4,013
	225.431 ROTATING MACHINERY		80,410		669 MH	8,843	884	90,137
225.432	HEAT XFER EQUIPMENT							
225.4321	SPENT FUEL POOL HEAT XCHGR	1 EA	96,750	1 LT	500 MH	6,540	654	
	225.432 HEAT XFER EQUIPMENT		96,750		500 MH	6,540	654	103,944
225.434	PURIF + FILTRATION EQUIP							
225.4341	STRAINER	1 EA	3,225	1 LT	52 MH	671	67	
225.4342	SPENT FUEL POOL SKIMMERS	5 EA	5,052	1 LT	500 MH	6,469	647	
225.4343	FUEL POOL PREFILTER	1 EA	3,225	1 LT	52 MH	671	67	
225.4344	FUEL POOL POST FILTER	1 EA	3,225	1 LT	52 MH	671	67	
225.4345	FUEL POOL DEMINERALIZER	1 EA	17,200	1 LT	252 MH	3,260	326	
	225.434 PURIF + FILTRATION EQUIP		31,927		908 MH	11,742	1,174	44,843
225.435	PIPING							
225.4351	2 IN + SMALLER							
225.43511	SS/NNS			7670 LB	9203 MH	119,275	38,350	
	225.4351 2 IN + SMALLER				9203 MH	119,275	38,350	157,625
225.4352	2.5 IN + LARGER							

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
225.43521	SS/NNS	6050 LB	24,200	1 LT	3630 MH	47,047	4,705	
225.43522	SS/SC3	9410 LB	84,690	1 LT	16938 MH	219,522	21,952	
	225.4352 2.5 IN + LARGER		108,890		20568 MH	266,569	26,657	402,116
	225.435 PIPING		108,890		29771 MH	385,844	65,007	559,741
225.436	SPENT FP CLG+PURIF SYS VLV	60 EA	169,638					
225.4361	GATE VALVES							
225.4362	CHECK VALVES							
225.4363	GLOBE VALVES							
225.4364	SAUNDERS WEIR VALVES							
225.4365	RELIEF VALVES							
225.4366	BUTTERFLY							
225.4367	BALL							
225.4369	SPECIAL VALVES							
	225.436 SPENT FP CLG+PURIF SYS VLV		169,638					169,638
225.437	PIPING-MISC ITEMS							
225.4371	HANGERS AND SUPPORTS	4600 LB	6,900					
	225.437 PIPING-MISC ITEMS		6,900					6,900
	225.43 SPENT FUEL POOL CLG+PURIF		494,515		31848 MH	412,969	67,719	975,203
225.48	INSTRUMENTATION + CONTROL	1 LT	14,900	1 LT	124 MH	1,516	76	
	225.4 FUEL STOR,CLNG,+INSPEC EQ.		874,915		42272 MH	548,567	81,203	1,504,685
	225. FUEL HANDLING + STORAGE		2,441,015		56335 MH	729,304	99,278	3,269,597

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.	OTHER REACTOR PLANT EQUIP							
226.1	INERT GAS SYS							
226.11	H2/N2 GAS SUPPLY SYS							
226.115	PIPING	10000 LB	40,000	1 LT	6000 MH	77,762	7,776	
226.116	VALVES	17 EA	5,052					
226.117	PIPING-MISC ITEMS	1000 LB	1,100					
226.118	INSTRUMENTATION+CONTROL	1 LT	10,880	1 LT	90 MH	1,100	55	
	226.11 H2/N2 GAS SUPPLY SYS		57,032		6090 MH	78,862	7,831	143,725
	226.1 INERT GAS SYS		57,032		6090 MH	78,862	7,831	143,725
226.3	REACTOR MAKEUP WATER SYS							
226.31	ROTATING MACHINERY							
226.311	REACT M/U WATER PUMP&DRIVE	2 EA	5,912	1 LT	241 MH	3,185	319	
226.3111	REACT M/U WATER PUMP							
226.3112	REACT M/U WATER PUMP DRIVE							
	226.311 REACT M/U WATER PUMP&DRIVE		5,912		241 MH	3,185	319	9,416
	226.31 ROTATING MACHINERY		5,912		241 MH	3,185	319	9,416
226.33	TANKS AND PRESSURE VESSELS							
226.331	REACTOR MAKEUP WTR TANK			1 EA	5400 MH	70,631	157,500	
	226.33 TANKS AND PRESSURE VESSELS				5400 MH	70,631	157,500	228,131

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.35	PIPING							
226.351	2IN + SMALLER							
226.3511	SS/NNS			10 LB	12 MH	158	50	
226.3512	SS/SC2			700 LB	2100 MH	27,217	8,330	
	226.351 2IN + SMALLER				2112 MH	27,375	8,380	35,755
226.352	2.5IN + LARGER							
226.3521	SS/NNS	9840 LB	39,360	1 LT	5903 MH	76,507	7,651	
226.3522	SS/SC2	4100 LB	36,900	1 LT	7379 MH	95,638	9,564	
226.3523	SS/SC3	10 LB	90	1 LT	18 MH	230	12	
	226.352 2.5IN + LARGER		76,350		13300 MH	172,375	17,227	265,952
	226.35 PIPING		76,350		15412 MH	199,750	25,607	301,707
226.36	VALVES	67 EA	39,778					
226.361	GATE							
226.362	CHECK							
226.363	GLOBE							
226.364	SAUNDERS WEIR							
226.367	BALL							
226.369	SPECIAL VALVES							
226.3691	NEEDLE							
	226.369 SPECIAL VALVES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	226.36 VALVES		39,778					39,778
226.37	PIPING-MISC ITEMS							
226.371	HANGERS AND SUPPORTS	2900 LB	4,350					
	226.37 PIPING-MISC ITEMS		4,350					4,350
226.38	INSTRUMENTATION + CONTROL	1 LT	4,770	1 LT	79 MH	967	48	
	226.3 REACTOR MAKEUP WATER SYS		131,160		21132 MH	274,533	183,474	589,167
226.4	COOLANT TREATMENT&RECYCLE							
226.41	CHEM & VOLUME CONTROL							
226.411	ROTATING MACHINERY							
226.4111	CENTRIFUGAL CHRG PUMP&MTR			2 EA	1400 MH	18,503	1,500	
226.41111	CENTRIFUGAL CHARGING PUMPS							
226.41112	CENTRIFUGAL CHG PMP DRIVES							
	226.4111 CENTRIFUGAL CHRG PUMP&MTR				1400 MH	18,503	1,500	20,003
226.4112	POSITIVE DISPL CHRG P+M			1 EA	400 MH	5,286	500	
226.41121	POSITIVE DISPL CHG PUMP							
226.41122	POSITIVE DISPL CHG PMP DRV							
	226.4112 POSITIVE DISPL CHRG P+M				400 MH	5,286	500	5,786
226.4113	BORIC ACID XFER PUMP + MTR			2 EA	141 MH	1,863	150	
226.41131	BORIC ACID XFER PUMPS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.41132	BORIC ACID XFER PMP DRIVES							
	226.4113 BORIC ACID XFER PUMP + MTR				141 MH	1,863	150	2,013
226.4114	CHILLER PUMP + MTR			2 EA	159 MH	2,101	170	
226.41141	CHILLER PUMPS							
226.41142	CHILLER PUMP DRIVES							
	226.4114 CHILLER PUMP + MTR				159 MH	2,101	170	2,271
226.4115	BORON INJ M/J PUMP + MTR			1 EA	251 MH	3,317	300	
226.41151	BORON INJ M/U PUMP							
226.41152	BORON INJ M/U PUMP DRIVE							
	226.4115 BORON INJ M/U PUMP + MTR				251 MH	3,317	300	3,617
	226.411 ROTATING MACHINERY				2351 MH	31,070	2,620	33,690
226.412	HEAT TRANS EQUIP							
226.4121	MODERATING HX			1 EA	40 MH	523	50	
226.4122	MAIN COOLANT PUMP SEAL H2O			1 EA	40 MH	523	50	
226.4123	CHILLER			1 EA	75 MH	971	90	
226.4124	REGENERATIVE HX			1 EA	52 MH	678	60	
226.4125	LETDOWN(NON-REGEN) HX			1 EA	75 MH	978	90	
226.4126	EXCESS LETDOWN HX			1 EA	40 MH	523	50	
226.4127	LETDOWN CHILLER HX			1 EA	52 MH	678	60	
226.4128	LETDOWN REHEAT HX			1 EA	40 MH	523	50	
	226.412 HEAT TRANS EQUIP				414 MH	5,397	500	5,897

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.413	TANKS & PRESS VESSELS							
226.4131	VOLUME CONTROL TANK			1 EA	100 MH	1,308	120	
226.4132	BORIC ACID TANKS	2 EA	300,000	1 LT	552 MH	7,218	722	
226.4133	CHILLER SURGE TANK			1 EA	55 MH	719	60	
226.4134	BORIC ACID BATCH TANK			1 EA	75 MH	978	90	
226.4135	CHEMICAL MIXING TANK			1 LT	52 MH	678	65	
226.4136	RESIN FILL TANK	1 EA	300	1 LT	40 MH	523	52	
226.4137	RCP SEAL STANDPIPE							
	226.413 TANKS & PRESS VESSELS		300,300		874 MH	11,424	1,109	312,833
226.414	PURIF & FILTRATION EQUIP							
226.4141	MIXED BED DEMINS			2 EA	300 MH	3,923	360	
226.4142	CATION DEMINS			1 EA	100 MH	1,308	120	
226.4143	PROCESS FILTERS			1 LT	152 MH	1,966	180	
226.4144	SEAL WATER INJECTION FILTE			1 LT	100 MH	1,293	107	
226.4145	THERMAL REGENERATION DEMIN			5 EA	775 MH	10,136	900	
	226.414 PURIF & FILTRATION EQUIP				1427 MH	18,626	1,667	20,293
226.415	PIPING							
226.4151	2IN + SMALLER							
226.41511	SS/NNS			160 LB	193 MH	2,499	800	
226.41512	SS/SC1			980 LB	2940 MH	38,103	11,662	
226.41513	SS/SC2			12730 LB	38191 MH	494,968	151,487	
226.41514	SS/SC3			1900 LB	5700 MH	73,875	22,610	

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2.5 IN HG AV - MIDDLETOWN,USA

1139 MWE PRESSURIZED WATER REACTOR

04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	226.4151 2IN + SMALLER				47024 MH	609,445	186,559	796,004
226.4152	2.5IN + LARGER							
226.41521	SS/NNS	4240 LB	16,960	1 LT	2544 MH	32,971	3,297	
226.41522	SS/SC1	240 LB	2,160	1 LT	433 MH	5,613	561	
226.41523	SS/SC2	26560 LB	239,040	1 LT	47807 MH	619,600	61,960	
226.41524	SS/SC3	3310 LB	29,790	1 LT	5958 MH	77,217	7,722	
	226.4152 2.5IN + LARGER		287,950		56742 MH	735,401	73,540	1,096,891
	226.415 PIPING		287,950		103766 MH	1,344,846	260,099	1,892,895
226.416	CVCS VALVES	405 EA	330,885					
226.4161	GATE							
226.4162	CHECK							
226.4163	GLOBE							
226.4164	DIAPHRAGM							
226.4165	RELIEF							
226.4166	BUTTERFLY							
226.4169	SPECIAL VALVES							
226.41691	NEEDLE							
226.41692	THREE WAY							
	226.4169 SPECIAL VALVES							
	226.416 CVCS VALVES		330,885					330,885
226.417	PIPING-MISC ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.4171	HANGERS + SUPPORTS	10000 LB	15,000					
226.4172	INSULATION							
226.4173	SPECIALTIES							
226.41731	BORIC ACID BLENDER	1 EA	1,397	1 LT	81 MH	1,060	106	
226.41732	LET DOWN ORIFICES	3 EA	1,500	1 LT	121 MH	1,564	156	
226.41733	RC PUMP SEAL BYPASS ORIFIC	4 EA	2,000	1 LT	159 MH	2,059	206	
	226.4173 SPECIALTIES		4,897		361 MH	4,683	468	10,048
	226.417 PIPING-MISC ITEMS		19,897		361 MH	4,683	468	25,048
226.418	INSTRUMENTATION+CONTROL	1 LT	110,770	1 LT	849 MH	10,373	519	
226.419	FOUNDATIONS/SKIDS							
226.4191	BATCHING TANK AGITATOR	1 EA	2,000	1 LT	100 MH	1,293	129	
226.4192	BORON CONCEN MESUR UNIT	1 EA	1,000	1 LT	52 MH	671	67	
	226.419 FOUNDATIONS/SKIDS		3,000		152 MH	1,964	196	5,160
	226.41 CHEM & VOLUME CONTROL		1,052,802		110194 MH	1,428,388	267,178	2,748,368
226.42	BORON RECYCLE SYSTEM							
226.421	ROTATING MACHINERY							
226.4211	RECYCLE EVAP FD PUMPS+MTRS	2 EA	4,300	1 LT	200 MH	2,643	264	
226.42111	RECYCLE EVAP FEED PUMP							
226.42112	RECYCLE EVAP FEED PMP DRVE							
	226.4211 RECYCLE EVAP FD PUMPS+MTRS		4,300		200 MH	2,643	264	7,207

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.4212	RECYCLE TST TK PUMPS&DRIVE	2 EA	3,000	1 LT	200 MH	2,643	264	
226.42121	RECYCLE TST TANK PUMPS							
226.42122	RECYCLE TST TK PUMP DRIVES							
	226.4212 RECYCLE TST TK PUMPS&DRIVE		3,000		200 MH	2,643	264	5,907
	226.421 ROTATING MACHINERY		7,300		400 MH	5,286	528	13,114
226.423	TANKS AND PRESSURE VESSELS							
226.4231	RECYCLE HOLDUP TANKS			2 EA	7300 MH	95,482	178,000	
226.4232	RECYCLE EVAP REAGENT TKS	2 EA	3,600	1 LT	100 MH	1,308	131	
226.4233	RECYCLE TEST TANKS			2 EA	4200 MH	54,935	108,000	
	226.423 TANKS AND PRESSURE VESSELS		3,600		11600 MH	151,725	286,131	441,456
226.424	PURIF. + FILTRATION EQUI							
226.4241	RECYCLE HOLDUP TANK DEMIN	2 EA	38,467	1 LT	452 MH	5,910	591	
226.4242	RECYCLE EVAP COND DEMIN	1 EA	32,056	1 LT	226 MH	2,957	296	
226.4243	RECYCLE EVAP FEED FILTER	2 EA	5,000	1 LT	153 MH	1,979	198	
226.4244	RECYCLE EVAP COND FILTER	1 EA	2,500	1 LT	76 MH	984	98	
226.4245	RECYCLE EVAP CONCEN FILTER	1 EA	2,500	1 LT	96 MH	1,241	124	
226.4246	RECYCLE EVAPORATOR PKG	1 EA	773,620	1 LT	9676 MH	126,558	12,656	
	226.424 PURIF. + FILTRATION EQUI		854,143		10679 MH	139,629	13,963	1,007,735
226.425	PIPING							
226.4251	2IN + SMALLER			51000 LB	153000 MH	1,982,941	606,900	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.42511	SS/N							
226.42512	SS/NNS							
	226.4251 2IN + SMALLER				153000 MH	1,982,941	606,900	2,589,841
226.4252	2.5IN & LARGER	5000 LB	45,000	1 LT	9000 MH	116,644	11,664	
226.42521	SS/NNS							
	226.4252 2.5IN & LARGER		45,000		9000 MH	116,644	11,664	173,308
	226.425 PIPING		45,000		162000 MH	2,099,585	618,564	2,763,149
226.426	BORON RECYCLE SYS VALVES	278 EA	341,412					
226.4261	GATE							
226.4262	CHECK							
226.4263	GLOBE							
226.4264	DIAPHRAGM							
226.4265	RELIEF							
226.4269	SPECIAL VALVES							
226.42692	THREE - WAY							
	226.4269 SPECIAL VALVES							
	226.426 BORON RECYCLE SYS VALVES		341,412					341,412
226.427	PIPING-MISC ITEMS							
226.4271	HANGERS & SUPPORTS	11200 LB	16,800					
226.4272	INSULATION							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.42/3	SPECIALTIES							
	226.427 PIPING-MISC ITEMS		16,800					16,800
226.428	INSTRUMENTATION+CONTROL	1 LT	90,210	1 LT	693 MH	8,474	424	
	226.42 BORON RECYCLE SYSTEM		1,358,465		185372 MH	2,404,699	919,610	4,682,774
	226.4 COOLANT TREATMENT&RECYCLE		2,411,267		295566 MH	3,833,087	1,186,788	7,431,142
226.6	FLUID LEAK DETECTION SYS							
226.68	INSTRUMENTATION+CONTROL	1 LT	94,800	1 LT	151 MH	1,846	92	
	226.6 FLUID LEAK DETECTION SYS		94,800		151 MH	1,846	92	96,738
226.7	AUX COOL SYS							
226.71	NUC SERV WTR SYS							
226.711	ROTATING MACHINERY							
226.7111	SAFEGUARDS CLG TWR PMP&DRV	2 EA	545,025	1 LT	1400 MH	18,503	1,850	
226.71111	SAFEGUARDS CLG TWR PUMP							
226.71112	SAFEGUARDS CLG TWR PMP DRV							
	226.7111 SAFEGUARDS CLG TWR PMP&DRV		545,025		1400 MH	18,503	1,850	565,378
	226.711 ROTATING MACHINERY		545,025		1400 MH	18,503	1,850	565,378
226.712	HEAT TRANS EQUIP							
226.7121	UHS CLG TOWER			2 EA			750,000	
	226.712 HEAT TRANS EQUIP						750,000	750,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.715	PIPING							
226.7151	2IN & SMALLER							
226.71511	CS/N							
226.71512	CS/NNS							
	226.7151 2IN & SMALLER							
226.7152	2.5IN & LARGER							
226.71521	CS/SC 3	252860 LB	568,935	1 LT	151716 MH	1,966,300	196,630	
	226.7152 2.5IN & LARGER		568,935		151716 MH	1,966,300	196,630	2,731,865
	226.715 PIPING		568,935		151716 MH	1,966,300	196,630	2,731,865
226.716	VALVES	26 EA	125,000					
226.7162	CHECK							
226.7163	GLOBE							
226.7165	RELIEF							
226.7166	BUTTERFLY							
	226.716 VALVES		125,000					125,000
226.717	PIPING-MISC ITEMS							
226.7171	HANGERS & SUPPORTS	14000 LB	21,000					
226.7172	INSULATION							
226.7173	SPECIALTIES							
226.7174	PIPE TRENCHING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	226.717 PIPING-MISC ITEMS		21,000					21,000
226.718	INSTRUMENTATION+CONTROL	1 LT	104,820	1 LT	805 MH	9,840	492	
	226.71 NUC SERV WTR SYS		1,364,780		153921 MH	1,994,643	948,972	4,308,395
226.72	PRI CMPNT COOLING WTR							
226.721	ROTATING MACHINERY							
226.7211	PRIM CMPNT PUMP + MTR	4 EA	349,375	1 LT	4000 MH	52,867	5,287	
226.72111	PRIM CMPNT PUMP							
226.72112	PRIM CMPNT PUMP DRIVE							
	226.7211 PRIM CMPNT PUMP + MTR		349,375		4000 MH	52,867	5,287	407,529
	226.721 ROTATING MACHINERY		349,375		4000 MH	52,867	5,287	407,529
226.722	HEAT TRANS EQUIP							
226.7221	PRI CMPNT HX	2 EA	600,000	1 LT	2500 MH	32,700	3,270	
	226.722 HEAT TRANS EQUIP		600,000		2500 MH	32,700	3,270	635,970
226.723	TANKS & PRESS VESSELS							
226.7231	WATER HEAD TANK	2 EA	26,875	1 LT	219 MH	2,864	286	
	226.723 TANKS & PRESS VESSELS		26,875		219 MH	2,864	286	30,025
226.725	PIPING							
226.7251	2IN + SMALLER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.72511	CS/SC3			250 LB	300 MH	3,889	825	
	226.7251 2IN + SMALLER				300 MH	3,889	825	4,7[illegible]
226.7252	2.5IN + LARGER							
226.72521	CS/NNS	1370 LB	2,055	1 LT	328 MH	4,250	425	
226.72522	CS/SC2	7580 LB	17,055	1 LT	4547 MH	58,933	5,893	
226.72523	CS/SC3	340140 LB	765,315	1 LT	204084 MH	2,645,010	264,501	
	226.7252 2.5IN + LARGER		784,425		208959 MH	2,708,193	270,819	3,763,437
	226.725 PIPING		784,425		209259 MH	2,712,082	271,644	3,768,151
226.726	VALVES	387 EA	681,120					
226.7261	GATE							
226.7262	CHECK							
226.7263	GLOBE							
226.7265	RELIEF							
226.7266	BUTTERFLY							
	226.726 VALVES		681,120					681,120
226.727	PIPING-MISC ITEMS							
226.7271	HANGERS + SUPPORTS	71000 LB	106,500					
226.7272	INSULATION							
226.7273	SPECIALTIES							
	226.727 PIPING-MISC ITEMS		106,500					106,500
226.728	INSTRUMENTATION+CONTROL	1 LT	104,550	1 LT	803 MH	9,815	491	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	226.72 PRI CMPNT COOLING WTR		[illegible],845		216781 MH	2,810,328	280,978	5,744,151
	226.7 AUX COOL SYS		4,017,625		370702 MH	4,804,971	1,229,950	10,052,546
226.8	MAINTENANCE EQUIPMENT							
226.81	REMOTELY CONTROLLED TOOLS							
226.82	RADIOACTIVE MAINT FACIL							
226.83	PORTABLE SHIELDING							
226.84	TOOLS & EQUIP FOR REACT VE							
226.841	VESSEL HARDWARE							
226.8411	CLOSURE STUD TENSIONERS							
226.8412	ELONGATION MEASURING DEVIC							
226.8413	STUD HANDLING TOOL							
226.8414	HEAD GUIDE STUDS							
	226.841 VESSEL HARDWARE							
226.842	SEALWELD CUTTING+WELDING							
226.843	LIFTING FIXTURES							
	226.84 TOOLS & EQUIP FOR REACT VE							
226.85	CORE-TOOLS + FIXTURES							
226.851	LIFTING FIXTURES & DEVICES							
	226.85 CORE-TOOLS + FIXTURES							
226.86	DECONTAMINATION EQUIPMENT			1 LT			200,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.861	ROTATING MACHINERY							
226.8611	DRAIN COLLECTION PUMP+MTR							
226.86111	DRAIN COLLECTION PUMP							
226.86112	DRAIN COLLECTION PMP DRIVE							
	226.8611 DRAIN COLLECTION PUMP+MTR							
226.8612	BARREL PUMPS + MOTORS							
226.86121	BARREL PUMPS							
226.86122	BARREL PUMP DRIVES							
	226.8612 BARREL PUMPS + MOTORS							
	226.861 ROTATING MACHINERY							
226.862	HEAT TRANSFER EQUIPMENT							
226.8621	WATER HEATER							
	226.862 HEAT TRANSFER EQUIPMENT							
226.863	TANKS AND PRESSURE VESSELS							
226.8631	DRAIN COLLECTION TANK							
226.8632	AGITATED VESSEL CLEANER							
	226.863 TANKS AND PRESSURE VESSELS							
226.864	PURIF + FILTRATION EQUIPMT							
226.8641	DRAIN FILTER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.8642	STRAINERS							
	226.864 PURIF + FILTRATION EQUIPMT							
226.865	PIPING							
226.866	VALVES							
226.8661	GATE							
226.8662	CHECK							
226.8665	RELIEF							
226.8667	BALL							
226.8668	PLUG							
	226.866 VALVES							
226.867	PIPING - MISC ITEMS							
226.8673	SPECIALTIES							
226.86731	SPRAY RINGS							
226.86732	STEAM CLEANER							
	226.8673 SPECIALTIES							
	226.867 PIPING - MISC ITEMS							
226.868	INSTRUMENTATION+CONTROL							
226.8681	ULTRASONIC GENERATOR							
226.8682	ULTRASONIC TRANSDUCERS							
	226.868 INSTRUMENTATION+CONTROL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.869	FOUNDATIONS/SKIDS							
226.8691	ULTRASONIC PACKAGES							
226.8692	MISCELLANEOUS ITEMS							
226.86921	PRECLEANING BOOTH							
226.86922	WORK BENCH							
226.86923	WATER CURTAIN							
	226.8692 MISCELLANEOUS ITEMS							
	226.869 FOUNDATIONS/SKIDS							
	226.86 DECONTAMINATION EQUIPMENT						200,000	200,000
226.87	LAUNDRY EQUIPMENT			1 LT			60,000	
226.871	WASHER EXTRACTORS							
226.872	WASHERS							
226.873	DRYERS							
226.874	LIFTING DEVICES							
226.875	MISCELLANEOUS							
226.8751	LABELS							
226.8752	SHELVES							
226.8753	CABINETS							
226.8754	HAMPERS							
226.8755	CARTS							
226.8756	WASTE CARS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	226.875 MISCELLANEOUS							
226.876	DOUBLE SINK							
226.877	PIPING - MISC ITEMS							
	226.87 LAUNDRY EQUIPMENT						60,000	60,000
226.88	HOT CHANGE AREA			1 LT			5,000	
226.881	SHOWERS,PERSONNEL							
226.882	FRISKERS,PERSONNEL							
226.883	SINKS							
	226.88 HOT CHANGE AREA						5,000	5,000
	226.8 MAINTENANCE EQUIPMENT						265,000	265,000
226.9	SAMPLING EQUIP							
226.92	HEAT TRANS EQUIP							
226.921	SAMPLE HEAT EXCHANGERS							
	226.92 HEAT TRANS EQUIP							
226.93	TANKS + PRESS VESSELS							
226.931	SAMPLE VESSEL							
226.932	SAMPLE SINK + HOOD							
	226.93 TANKS + PRESS VESSELS							
226.95	PIPING							

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
226.951	2IN + SMALLER							
226.9511	SS/NNS			3000 LB	3600 MH	46,658	15,000	
	226.951 2IN + SMALLER				3600 MH	46,658	15,000	61,658
	226.95 PIPING				3600 MH	46,658	15,000	61,658
226.96	SAMPLE SYSTEM VALVES	67 EA	16,556					
226.961	GATE							
226.962	CHECK							
226.963	GLOBE							
226.964	SAUNDERS WEIR							
226.965	RELIEF							
	226.96 SAMPLE SYSTEM VALVES		16,556					16,556
226.97	PIPING-MISC ITEMS							
226.971	HANGERS & SUPPORTS	500 LB	750					
226.972	INSULATION							
226.973	SPECIALTIES							
	226.97 PIPING-MISC ITEMS		750					750
226.98	INSTRUMENTATION+CONTROL	1 LT	200,000	1 LT	1500 MH	18,335	917	
	226.9 SAMPLING EQUIP		217,306		5100 MH	64,993	15,917	298,216
	226. OTHER REACTOR PLANT EQUIP		6,929,190		698741 MH	9,058,292	2,889,052	18,876,534
227.	RX INSTRUMENTATION+CONTROL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
227.1	BENCHBOARD, PANELS + RACKS							
227.11	NSS CONTROL BOARD	1 LT	615,000	1 LT	4251 MH	51,963	2,598	
227.14	REMOTE SHUTDOWN PANELS	1 LT	100,000	1 LT	833 MH	10,182	509	
227.15	HVAC PANELS	1 LT	50,000	1 LT	416 MH	5,087	254	
227.16	RADWASTE PANELS + RACKS	1 LT	209,000	1 LT	1742 MH	21,294	1,065	
227.17	LOCAL PANELS + CABINETS	1 LT	200,000	1 LT	1667 MH	20,379	1,019	
227.18	INSTRUMENT RACKS	1 LT	264,000	1 LT	2933 MH	35,850	1,793	
	227.1 BENCHBOARD, PANELS + RACKS		1,438,000		11842 MH	144,753	7,238	1,589,991
227.2	PROCESS COMPUTER	1 LT	1,722,000	1 LT	40960 MH	507,904	50,790	
227.3	MONITORING SYSTEMS							
227.31	RADIOLOGICAL MON+DATA MNG	1 LT	550,000	1 LT	4584 MH	56,031	2,802	
227.32	NEUTRON MONITORING SYSTEM	1 LT	662,000	1 LT	2758 MH	33,712	1,686	
227.33	POST ACCIDENT MONITOR	1 LT	80,000	1 LT				
227.34	REACTOR DIAGNOSTIC SYSTEM	1 LT	263,000	1 LT	2191 MH	26,782	1,339	
227.35	CONTAINMENT ATMOSPHERE MON	1 LT	120,000	1 LT	1000 MH	12,224	611	
227.36	CONTAINMENT LEAK MONITOR	1 LT	60,000	1 LT	500 MH	6,112	611	
227.37	FAILED FUEL DETECTION	1 LT	54,000	1 LT	451 MH	5,514	551	
	227.3 MONITORING SYSTEMS		1,789,000		11484 MH	140,375	7,600	1,936,975
227.4	PLANT CONTROL SYSTEMS							
227.41	REACTOR POWER CONTROL	1 LT	500,000	1 LT	2084 MH	25,472	2,547	
227.42	REACTOR PROTECTION SYSTEM	1 LT	600,000	1 LT	2500 MH	30,559	3,056	
227.43	ENGR SAFETY FEATURE ACTUAT	1 LT	350,000	1 LT	1667 MH	20,379	2,038	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	227.4 PLANT CONTROL SYSTEMS		1,450,000		6251 MH	76,410	7,641	1,534,051
227.5	RX PLANT I+C TUBING+FITTING	1 LT	117,260	1 LT	3080 MH	37,650	3,765	
	227. RX INSTRUMENTATION+CONTROL		6,516,280		73617 MH	907,092	77,034	7,500,406
228.	REACTOR PLANT MISC ITEMS							
228.1	MISC SUSPENSE ITEMS							
228.11	FINAL ALIGNMENT+CHECKING			1 LT	66752 MH	863,563	54,825	
228.12	FIELD PAINTING			1 LT	25000 MH	239,250	104,812	
228.13	QUALIFICATION OF WELDERS			1 LT	7330 MH	98,222	45,150	
	228.1 MISC SUSPENSE ITEMS				99082 MH	1,201,035	204,787	1,405,822
228.2	STANDARD NSSS VALVE PKG	1 LT	1,500,000					
228.3	REACTOR PLANT INSULATION							
228.31	PIPE INSULATION			1 LT	27470 MH	357,659	742,860	
228.32	EQUIPMENT INSULATION			1 LT	5080 MH	66,142	229,955	
228.33	NSSS INSULATION			1 LT	16033 MH	208,750	745,540	
	228.3 REACTOR PLANT INSULATION				48583 MH	632,551	1,718,355	2,350,906
	228. REACTOR PLANT MISC ITEMS		1,500,000		147665 MH	1,833,586	1,923,142	5,256,728
	22 . REACTOR PLANT EQUIPMENT		96,568,796		2145880 MH	27,768,659	9,142,990	133,480,445

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
23 .	TURBINE PLANT EQUIPMENT							
231.	TURBINE GENERATOR							
231.1	TURBINE GENERATOR +ACCSSRY							
231.11	TURBINE FACTORY COST	1 LT	53,217,000					
231.12	OTHER TURBINE COSTS			1 LT	201800 MH	2,565,988	245,100	
231.13	EXCITER & VOLTAGE REGULTR.							
231.14	MOISTURE SEPARATOR/REHEATR							
	231.1 TURBINE GENERATOR +ACCSSRY		53,217,000		201800 MH	2,565,988	245,100	56,028,088
231.2	FOUNDATIONS							
231.21	T-G PEDESTAL							
231.211	EXCAVATION WORK							
231.213	SUBSTRUCTURE CONCRETE							
231.2131	FORMWORK			7500 SF	6000 MH	66,254	7,500	
231.2132	REINFORCING STEEL			250 TN	8751 MH	113,003	100,000	
231.2133	CONCRETE			3400 CY	5951 MH	60,773	119,000	
231.2134	EMBEDDED STEEL			27 TN	4050 MH	48,709	40,500	
231.2135	WATERSTOPS			200 LF	20 MH	204	140	
231.2138	RUBBING CONCRETE SURFACE							
231.2139	EXPANSION JOINT							
	231.213 SUBSTRUCTURE CONCRETE				24772 MH	288,943	267,140	556,083
231.214	SUPERSTRUCTURE							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
231.2141	CONCRETE WORK							
231.21411	FORMWORK			50200 SF	50200 MH	554,329	100,400	
231.21412	REINFORCING STEEL			530 TN	21200 MH	273,762	212,000	
231.21413	CONCRETE			4500 CY	9000 MH	91,908	157,500	
231.21414	EMBEDDED STEEL			60 TN	9000 MH	108,240	90,000	
231.21417	RUBBING CONCRETE SURFACES			50000 SF	1500 MH	15,318	500	
231.21418	EXPANSION JOINT			1100 SF	110 MH	1,276	1,100	
	231.2141 CONCRETE WORK				91010 MH	1,044,833	561,500	1,606,333
231.2142	STRUCTURAL + MISC STEEL							
231.21421	STRUCTURAL STEEL			5 TN	100 MH	1,302	3,750	
231.21425	GRATING			700 SF	140 MH	1,822	2,100	
	231.2142 STRUCTURAL + MISC STEEL				240 MH	3,124	5,850	8,974
	231.214 SUPERSTRUCTURE				91250 MH	1,047,957	567,350	1,615,307
	231.21 T-G PEDESTAL				116022 MH	1,336,900	834,490	2,171,390
231.22	REHEATR&MOISTR SEPRTR SUPT							
231.221	STRUCTURAL STEEL							
	231.22 REHEATR&MOISTR SEPRTR SUPT							
	231.2 FOUNDATIONS				116022 MH	1,336,900	834,490	2,171,390
231.4	LUBRICATING OIL SYSTEM							
231.43	TANKS + PRESSURE VESSELS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
231.431	LUBE OIL STORAGE TANK			1 EA	281 MH	3,676	22,897	
	231.43 TANKS + PRESSURE VESSELS				281 MH	3,676	22,897	26,573
231.45	PIPING							
231.451	2IN. + SMALLER							
231.4511	CS/NNS			2400 LB	1153 MH	14,942	3,120	
	231.451 2IN. + SMALLER				1153 MH	14,942	3,120	18,062
231.452	2.5IN + LARGER							
231.4521	CS/NNS	1920 LB	2,880	1 LT	461 MH	5,976	598	
	231.452 2.5IN + LARGER		2,880		461 MH	5,976	598	9,454
	231.45 PIPING		2,880		1614 MH	20,918	3,718	27,516
231.46	VALVES	20 EA	23,650					
231.461	GATE							
	231.46 VALVES		23,650					23,650
231.47	PIPING-MISC. ITEMS							
231.471	HANGERS + SUPPORTS	864 LB	1,296					
231.472	INSULATION							
231.473	SPECIALTIES							
	231.47 PIPING-MISC. ITEMS		1,296					1,296
231.48	INSTRUMENTATION + CONTROL	1 LT	9,830	1 LT	75 MH	917	46	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
231.49	SKIDS / FOUNDATIONS							
231.491	LUBE OIL CONDTNG EQPT SKID	1 LT	108,575	1 LT	1152 MH	14,903	1,490	
231.492	FIRE PROTECTION EQPT.			1 LT	3000 MH	38,881	58,050	
	231.49 SKIDS / FOUNDATIONS		108,575		4152 MH	53,784	59,540	221,899
	231.4 LUBRICATING OIL SYSTEM		146,231		6122 MH	79,295	86,201	311,727
231.5	GAS SYSTEMS							
231.51	HYDROGEN STORAGE SYSTEM							
231.513	TANKS + PRESSURE VESSELS							
231.5131	HYDROGEN STORAGE BOTTLES	1 LT	88,150	1 LT	5031 MH	65,801	6,580	
	231.513 TANKS + PRESSURE VESSELS		88,150		5031 MH	65,801	6,580	160,531
231.515	PIPING							
231.5151	2 IN + SMALLER							
231.5152	2.5 IN + LARGER							
231.51521	CS/NNS	4800 LB	7,200	1 LT	1153 MH	14,942	1,494	
	231.5152 2.5 IN + LARGER		7,200		1153 MH	14,942	1,494	23,636
	231.515 PIPING		7,200		1153 MH	14,942	1,494	23,636
231.516	VALVES							
231.5163	GLOBE	10 EA	500					
	231.516 VALVES		500					500

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
231.517	PIPING-MISC ITEMS							
231.5171	HANGERS + SUPPORTS	960 LB	1,440					
231.5172	INSULATION							
231.5173	SPECIALTIES							
	231.517 PIPING-MISC ITEMS		1,440					1,440
	231.51 HYDROGEN STORAGE SYSTEM		97,290		6184 MH	80,743	8,074	186,107
231.52	CARBON DIOXIDE STORAGE SYS							
231.523	TANKS + PRESSURE VESSELS							
231.5231	CARBON DIOXIDE TANKS	1 LT	53,750	1 LT	3060 MH	40,024	4,002	
	231.523 TANKS + PRESSURE VESSELS		53,750		3060 MH	40,024	4,002	97,776
231.525	PIPING							
231.5251	2 IN + SMALLER							
231.5252	2.5 IN + LARGER							
231.52521	CS/NNS	4800 LB	7,200	1 LT	1153 MH	14,942	1,494	
	231.5252 2.5 IN + LARGER		7,200		1153 MH	14,942	1,494	23,636
	231.525 PIPING		7,200		1153 MH	14,942	1,494	23,636
231.526	VALVES							
231.5263	GLOBES	10 EA	500					
	231.526 VALVES		500					500

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
231.527	PIPING-MISC ITEMS							
231.5271	HANGER + SUPPORT	960 LB	1,440					
231.5272	INSULATION							
231.5273	SPECIALTIES							
	231.527 PIPING-MISC ITEMS		1,440					1,440
	231.57 CARBON DIOXIDE STORAGE SYS		62,890		4213 MH	54,966	5,496	123,352
	231.5 GAS SYSTEMS		160,180		10397 MH	135,709	13,570	309,459
231.6	MSTR SEPRTR/REHTR DRAINSYS							
231.63	TANKS + PRESS. VESSELS							
231.631	M/S DRAIN TANK	4 EA	20,425	1 LT	281 MH	3,676	368	
231.632	REHEATER DRAIN TANK	4 EA	70,950	1 LT	931 MH	12,174	1,217	
	231.63 TANKS + PRESS. VESSELS		91,375		1212 MH	15,850	1,585	108,810
231.65	PIPING							
231.651	2IN. + SMALLER							
231.6511	CS/NNS			900 LB	433 MH	5,613	1,170	
	231.651 2IN. + SMALLER				433 MH	5,613	1,170	6,783
231.652	2.5IN. + LARGER							
231.6521	CS/NNS	338290 LB	507,435	1 LT	81190 MH	1,052,254	105,225	
	231.652 2.5IN. + LARGER		507,435		81190 MH	1,052,254	105,225	1,664,914

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	231.65 PIPING		507,435		81623 MH	1,057,867	106,395	1,671,697
231.66	VALVES	48 EA	624,144					
231.661	GATE							
231.662	CHECK							
231.663	GLOBE							
231.668	PLUG							
	231.66 VALVES		624,144					624,144
231.67	PIPING-MISC. ITEMS							
231.671	PIPE HANGERS + SUPPORTS	67838 LB	101,757					
231.672	INSULATION							
231.673	SPECIALTIES							
	231.67 PIPING-MISC. ITEMS		101,757					101,757
231.68	INSTRUMENTATION + CONTROL	1 LT	26,520	1 LT	203 MH	2,482	124	
	231.6 MSTR SEPRTR/REHTR DRAINSYS		1,351,231		83038 MH	1,076,199	108,104	2,535,534
	231. TURBINE GENERATOR		54,874,642		417379 MH	5,194,091	1,287,465	61,356,198
233.	CONDENSING SYSTEMS							
233.1	CONDENSER EQUIPMENT							
233.12	HEAT TRANSFER EQUIPMENT							
233.121	CONDENSERS	3 EA	5,938,515	1 LT	99209 MH	1,325,166	132,517	
233.122	TUBE CLEANING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	233.12 HEAT TRANSFER EQUIPMENT		5,938,515		99209 MH	1,325,166	132,517	7,396,198
	233.1 CONDENSER EQUIPMENT		5,938,515		99209 MH	1,325,166	132,517	7,396,198
233.2	CONDENSATE SYSTEM							
233.21	ROTATING MACHINERY							
233.211	CONDENSATE PUMP + MOTOR	3 EA	299,925	1 LT	3000 MH	39,651	3,965	
233.2111	COND PUMP							
233.2112	COND PUMP MOTOR							
	233.211 CONDENSATE PUMP + MOTOR		299,925		3000 MH	39,651	3,965	343,541
233.212	BOOSTER PUMP + MOTOR	3 EA	499,875	1 LT	3400 MH	44,937	4,494	
233.2121	BOOSTER PUMP							
233.2122	BOOSTER PUMP MOTOR							
	233.212 BOOSTER PUMP + MOTOR		499,875		3400 MH	44,937	4,494	549,306
233.213	TRANSFER PUMP + MOTOR	2 EA	29,000	1 LT	241 MH	3,185	319	
233.2131	TRANS PUMP							
233.2132	TRANS PUMP MOTOR							
	233.213 TRANSFER PUMP + MOTOR		29,000		241 MH	3,185	319	32,504
	233.21 ROTATING MACHINERY		828,800		6641 MH	87,773	8,778	925,351
233.23	TANKS & PRESSURE VESSELS							
233.231	CONDENSATE STORAGE TANK	1 EA	234,000	1 LT	9181 MH	120,086	12,009	

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	233.23 TANKS & PRESSURE VESSELS		234,000		9181 MH	120,086	12,009	366,095
233.25	PIPING							
233.251	2 IN. + SMALLER							
233.2511	CS/NNS			390 LB	187 MH	2,425	507	
	233.251 2 IN. + SMALLER				187 MH	2,425	507	2,932
233.252	2.5 IN. + LARGER							
233.2521	CS/NNS	483140 LB	724,710	1 LT	115954 MH	1,502,808	150,281	
	233.252 2.5 IN. + LARGER		724,710		115954 MH	1,502,808	150,281	2,377,799
	233.25 PIPING		724,710		116141 MH	1,505,233	150,788	2,380,731
233.26	VALVES	171 EA	506,331					
233.261	GATE VALVES							
233.262	CHECK VALVES							
233.263	GLOBE VALVES							
233.266	BUTTERFLY							
233.267	BALL VALVES							
	233.26 VALVES		506,331					506,331
233.27	PIPING-MISC. ITEMS							
233.271	HANGERS + SUPPORTS	96706 LB	145,059					
233.272	INSULATION							
233.273	SPECIALTIES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	233.27 PIPING-MISC. ITEMS		145,059					145,059
233.28	INSTRUMENTATION + CONTROL	1 LT	49,300	1 LT	380 MH	4,647	232	
233.29	FOUNDATIONS							
233.291	CONDENSATE TANK FDTN							
233.2911	FORMWORK			15000 SF	12000 MH	132,508	15,000	
233.2912	REINFORCING STEEL			200 TN	7000 MH	90,394	80,000	
233.2913	CONCRETE			1600 CY	2800 MH	28,594	56,000	
233.2914	EMBEDDED IRON			1 TN	150 MH	1,804	1,500	
233.2915	STRUCTURAL STEEL			85 TN	1700 MH	22,130	63,750	
233.2916	MISC. STEEL			15 TN	900 MH	11,716	18,000	
	233.291 CONDENSATE TANK FDTN				24550 MH	287,146	234,250	521,396
233.292	CONDENSATE PUMP FDTN							
233.2921	FORMWORK							
233.2922	REINF. STEEL							
233.2923	CONCRETE							
233.2924	EMBEDDED IRON							
233.2925	STRUCTURAL STEEL							
233.2926	MISC. STEEL							
	233.292 CONDENSATE PUMP FDTN							
233.293	BOOSTER PUMP FDTN							
233.2931	FORMWORK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
233.2932	REINF. STEEL							
233.2933	CONCRETE							
233.2934	EMBEDDED IRON							
233.2935	STRUCTURAL STEEL							
233.2936	MISC. STEEL							
233.293	BOOSTER PUMP FDTN							
233.29	FOUNDATIONS				24550 MH	287,146	234,250	521,396
233.2	CONDENSATE SYSTEM		2,488,200		156893 MH	2,004,885	406,057	4,899,142
233.3	GAS REMOVAL SYSTEM							
233.31	CONDENSER GAS REMOVAL SYS.							
233.311	ROTATING MACHINERY							
233.3111	MECH VACUUM PUMP & MOTOR	3 EA	225,750	1 LT	1500 MH	19,825	1,983	
233.31111	MECH VAC PUMP							
233.31112	MECH VAC PUMP MOTOR							
233.3111	MECH VACUUM PUMP & MOTOR		225,750		1500 MH	19,825	1,983	247,558
233.311	ROTATING MACHINERY		225,750		1500 MH	19,825	1,983	247,558
233.315	PIPING							
233.3151	2 IN. + SMALLER							
233.31511	CS/NNS			240 LB	115 MH	1,490	312	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	233.3151 2 IN. + SMALLER				115 MH	1,490	312	1,802
233.3152	2.5 IN. + LARGER							
233.31521	CS/NNS	29520 LB	44,280	1 LT	7085 MH	91,824	9,182	
	233.3152 2.5 IN. + LARGER		44,280		7085 MH	91,824	9,182	145,286
	233.315 PIPING		44,280		7200 MH	93,314	9,494	147,088
233.316	VALVES	75 EA	37,628					
233.3161	GATE							
233.3162	CHECK							
233.3163	GLOBE							
233.3165	VACUUM RELIEF							
233.3166	BUTTERFLY							
233.3168	PLUG							
	233.316 VALVES		37,628					37,628
233.317	PIPING-MISC. ITEMS							
233.3171	HANGERS + SUPPORTS	5952 LB	8,928					
233.3172	INSULATION							
233.3173	SPECIALTIES							
	233.317 PIPING-MISC. ITEMS		8,928					8,928
233.318	INSTRUMENTATION + CONTROL	1 LT	7,600	1 LT	58 MH	709	35	
233.319	FOUNDATIONS/SKIDS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
233.3191	VACUUM PUMP FDTN.							
233.31911	FORMWORK							
233.31912	REINFORCING STEEL							
233.31913	CONCRETE							
233.31914	EMBEDDED STEEL							
	233.3191 VACUUM PUMP FDTN.							
	233.319 FOUNDATIONS/SKIDS							
	233.31 CONDENSER GAS REMOVAL SYS.		324,186		8758 MH	113,848	11,512	449,546
	233.3 GAS REMOVAL SYSTEM		324,186		8758 MH	113,848	11,512	449,546
233.4	TURBINE BYPASS SYSTEM							
233.41	TURBINE BYPASS SYS. EQPT.							
233.415	PIPING							
233.4151	2IN + SMALLER							
233.4152	2.5IN + LARGER							
	233.415 PIPING							
233.416	VALVES							
233.4163	GLOBE (DUMP)	12 EA	150,000					
	233.416 VALVES		150,000					150,000
233.417	PIPING - MISC. ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
233.4171	HANGERS + SUPPORTS							
233.4172	INSULATION							
233.4173	SPECIALTIES							
	233.417 PIPING - MISC. ITEMS							
233.418	INSTRUMENTATION + CONTROL							
	233.41 TURBINE BYPASS SYS. EQPT.		150,000					150,000
	233.4 TURBINE BYPASS SYSTEM		150,000					150,000
233.5	CONDENSATE POLISHING	1 LT	1,450,000	1 LT	41672 MH	539,107	53,911	
233.51	ROTATING MACHINERY							
233.511	ACID REGEN PUMP + MOTOR							
233.5111	ACID REGEN PUMP							
233.5112	ACID REGEN PUMP MOTOR							
	233.511 ACID REGEN PUMP + MOTOR							
233.512	CAUSTIC REGEN PUMP + MOTOR							
233.5121	CAUSTIC REGEN PUMP							
233.5122	CAUSTIC REGEN PUMP MOTOR							
	233.512 CAUSTIC REGEN PUMP + MOTOR							
233.513	AMMONIA REGEN PUMP + MOTOR							
233.5131	AMMONIA REGEN PUMP							
233.5132	AMMONIA REGEN PUMP MOTOR							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	233.513 AMMONIA REGEN PUMP + MOTOR							
233.514	SLUICE WATER REGEN P+M							
233.5141	SLUICE WATER REGEN PUMP							
233.5142	SLUICE WATER REGEN P MOTOR							
	233.514 SLUICE WATER REGEN P+M							
233.515	RECYCLE PUMP + MOTOR							
233.5151	RECYCLE PUMP							
233.5152	RECYCLE PUMP MOTOR							
	233.515 RECYCLE PUMP + MOTOR							
233.516	AIR BLOWER + MOTOR							
233.5161	AIR BLOWER							
233.5162	AIR BLOWER MOTOR							
	233.516 AIR BLOWER + MOTOR							
	233.51 ROTATING MACHINERY							
233.53	TANKS + PRESSURE VESSELS							
233.531	RESIN SEPRTR+CATION RGN TK							
233.532	ANION REGEN TANK							
233.533	RESIN STORAGE TANK							
233.534	HOT WATER HEATING TANK							
233.535	BULK ACID STORAGE TANK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
233.536	BULK CAUSTIC STORAGE TANK							
233.537	BULK AMMONIA STORAGE TANK							
	233.53 TANKS + PRESSURE VESSELS							
233.54	PURIFICATION EQUIPMENT							
233.541	MIXED BED DEMINERALIZERS							
	233.54 PURIFICATION EQUIPMENT							
233.58	INSTRUMENTATION + CONTROL	1 LT	53,520	1 LT	430 MH	5,257	263	
	233.5 CONDENSATE POLISHING		1,503,520		42102 MH	544,364	54,174	2,102,058
	233. CONDENSING SYSTEMS		10,404,421		306962 MH	3,988,263	604,260	14,996,944
234.	FEED HEATING SYSTEM							
234.1	FEEDWATER HEATERS	16 EA	2,023,150	1 LT	48000 MH	627,825	62,783	
234.12	HEAT TRANSFER EQUIPMENT							
234.121	NO.1 LP HEATERS							
234.122	NO.2 LP HEATERS							
234.123	NO.3 LP HEATERS							
234.124	NO.4 LP HEATERS							
234.125	NO.5 HP HEATERS							
234.126	NO.6 HP HEATERS							
	234.12 HEAT TRANSFER EQUIPMENT							
	234.1 FEEDWATER HEATERS		2,023,150		48000 MH	627,825	62,783	2,713,758

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
234.2	FEEDWATER SYSTEM							
234.21	ROTATING MACHINERY							
234.211	MAIN BOILER FEED PUMP-MBFP	2 EA	244,025	1 LT	2600 MH	34,364	3,436	
234.212	MBFP TURBINE DRIVES	2 EA	1,182,500	1 LT	10000 MH	129,369	12,937	
234.213	EMERGENCY FEEDWATER PUMPS	2 EA	232,200	1 LT	2000 MH	26,433	2,643	
234.214	EFP MOTOR							
234.215	EFP TURBINE							
234.216	STARTUP FEED PUMP + MOTOR	1 EA	80,625	1 LT	2300 MH	30,399	3,040	
234.2161	STARTUP FEED PUMP							
234.2162	STARTUP FEED PUMP MOTOR							
	234.216 STARTUP FEED PUMP + MOTOR		80,625		2300 MH	30,399	3,040	114,064
	234.21 ROTATING MACHINERY		1,739,350		16900 MH	220,565	22,056	1,981,971
234.25	PIPING							
234.251	2 IN + SMALLER							
234.2511	CS/NNS			440 LB	211 MH	2,737	572	
234.2512	CS/SC 3			240 LB	288 MH	3,730	792	
	234.251 2 IN + SMALLER				499 MH	6,467	1,364	7,831
234.252	2.5IN + LARGER							
234.2521	CS/NNS	963515 LB	1,445,273	1 LT	231243 MH	2,997,003	299,700	
234.2522	CS/SC 2	52870 LB	118,958	LT	31723 MH	411,141	41,114	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
234.2523	CS/SC 3	16200 LB	36,450	1 LT	9721 MH	125,984	12,598	
	234.252 2.5IN + LARGER		1,600,681		272687 MH	3,534,128	353,412	5,488,221
	234.25 PIPING		1,600,681		273186 MH	3,540,595	354,776	5,496,052
234.26	VALVES	1 LT	1,547,600					
234.261	GATE							
234.262	CHECK							
234.263	GLOBE							
	234.26 VALVES		1,547,600					1,547,600
234.27	PIPING-MISC. ITEMS							
234.271	HANGERS & SUPPORTS	206517 LB	309,776					
234.272	INSULATION							
234.273	SPECIALTIES							
	234.27 PIPING-MISC. ITEMS		309,776					309,776
234.28	INSTRUMENTATION + CONTROL	1 LT	59,050	1 LT	455 MH	5,564	278	
234.29	SKIDS/FOUNDATIONS							
234.291	MPFP							
234.2911	FORMWORK							
234.2912	REINFORCING STEEL							
234.2913	CONCRETE							
234.2914	EMBEDDED STEEL							
	234.291 MPFP							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	234.29 SKIDS/FOUNDATIONS							
	234.2 FEEDWATER SYSTEM		5,256,457		290541 MH	3,766,724	377,110	9,400,291
234.3	EXTRACTION STEAM SYSTEM							
234.35	PIPING							
234.351	2 IN + SMALLER							
234.3511	CS/NNS			170 LB	81 MH	1,053	221	
	234.351 2 IN + SMALLER				81 MH	1,053	221	1,274
234.352	2.5IN + LARGER							
234.3521	CS/NNS	196230 LB	294,345	1 LT	47096 MH	610,381	61,038	
	234.352 2.5IN + LARGER		294,345		47096 MH	610,381	61,038	965,764
	234.35 PIPING		294,345		47177 MH	611,434	61,259	967,038
234.36	VALVES	48 EA	397,752					
234.361	GATE							
234.362	CHECK							
234.363	GLOBE							
	234.36 VALVES		397,752					397,752
234.37	PIPING-MISCELLANEOUS							
234.371	HANGER + SUPPORTS	39274 LB	58,911					
234.372	INSULATION							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
234.373	SPECIALTIES							
	234.37 PIPING-MISCELLANEOUS		58,911					58,911
234.38	INSTRUMENTATION + CONTROL	1 LT	33,910	1 LT	260 MH	3,177	159	
	234.3 EXTRACTION STEAM SYSTEM		784,918		47437 MH	614,611	61,418	1,460,947
234.4	FWH VENT + DRAIN SYSTEM							
234.41	ROTATING MACHINERY							
234.411	HEATER DRAIN PUMP + MOTOR	2 EA	198,875	1 LT	1800 MH	23,790	2,379	
234.4111	HEATER DRAIN PUMP							
234.4112	HEATER DRAIN PUMP MOTOR							
	234.411 HEATER DRAIN PUMP + MOTOR		198,875		1800 MH	23,790	2,379	225,044
	234.41 ROTATING MACHINERY		198,875		1800 MH	23,790	2,379	225,044
234.43	TANKS + PRESSURE VESSELS							
234.431	HEADER DRAIN TANK			1 EA	1200 MH	15,696	79,012	
	234.43 TANKS + PRESSURE VESSELS				1200 MH	15,696	79,012	94,708
234.45	PIPING							
234.451	2 IN + SMALLER							
234.4511	CS/NNS			110 LB	53 MH	686	143	
	234.451 2 IN + SMALLER				53 MH	686	143	829
234.452	2.5IN + LARGER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
234.4521	CS/NNS	159080 LB	238,620	1 LT	38178 MH	494,804	49,480	
	234.452 2.5IN + LARGER		238,620		38178 MH	494,804	49,480	782,904
	234.45 PIPING		238,620		38231 MH	495,490	49,623	783,733
234.46	VALVES	109 EA	210,915					
234.461	GATE							
234.462	CHECK							
234.463	GLOBE							
234.468	PLUG							
	234.46 VALVES		210,915					210,915
234.47	PIPING-MISC. ITEMS							
234.471	HANGERS & SUPPORTS	31838 LB	47,757					
234.472	INSULATION							
234.473	SPECIALTIES							
	234.47 PIPING-MISC. ITEMS		47,757					47,757
234.48	INSTRUMENTATION + CONTROL	1 LT	46,810	1 LT	360 MH	4,399	220	
	234.4 FWH VENT + DRAIN SYSTEM		742,977		41591 MH	539,375	131,234	1,413,586
	234. FEED HEATING SYSTEM		8,807,502		427569 MH	5,548,535	632,545	14,988,582
235.	OTHER TURBINE PLANT EQUIP.							
235.1	MAIN VAPOR PIPING SYSTEM							
235.11	MAIN STEAM SYSTEM							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.115	PIPING							
235.1151	2 IN + SMALLER							
235.11511	CS/NNS			440 LB	211 MH	2,737	572	
	235.1151 2 IN + SMALLER				211 MH	2,737	572	3,309
235.1152	2.5 IN + LARGER							
235.11521	CS/NNS							
235.115211	CS/NNS	505450 LB	758,175	1 LT	121307 MH	1,572,188	157,219	
235.115212	CS/NNS	505450 LB	758,175	1 LT	121307 MH	1,572,188	157,219	
	235.11521 CS/NNS		1,516,350		242614 MH	3,144,376	314,438	4,975,164
235.11522	CS/SC 2	397570 LB	894,533	1 LT	238542 MH	3,091,601	309,160	
	235.1152 2.5 IN + LARGER		2,410,883		481156 MH	6,235,977	623,598	9,270,458
	235.115 PIPING		2,410,883		481367 MH	6,238,714	624,170	9,273,767
235.116	VALVES	127 EA	1,402,880					
235.1161	GATE							
235.1162	CHECK							
235.1163	GLOBE							
235.1165	RELIEF							
235.1166	BUTTERFLY							
	235.116 VALVES		1,402,880					1,402,880
235.117	PIPING-MISC ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.1171	HANGERS + SUPPORTS	281782 LB	422,673					
235.1172	INSULATION							
235.1173	SPECIALTIES							
235.11731	CONTAINMENT PENETRATIONS							
235.11732	STEAM TRAPS + STRAINERS							
	235.1173 SPECIALTIES							
	235.117 PIPING-MISC ITEMS		422,673					422,673
235.118	INSTRUMENTATION+CONTROL	1 LT	46,100	1 LT	460 MH	5,622	281	
	235.11 MAIN STEAM SYSTEM		4,282,536		481827 MH	6,244,336	624,451	11,151,323
235.14	MAIN VAPOR PIPE WHIP RES.	1 LT	1,000,000	1 LT	6250 MH	81,360	8,136	
235.141	PLATE							
235.142	SHEAR LUGS							
235.143	ANCHORS							
235.144	BEAMS							
235.145	U-BOLT + NUTS							
235.146	WELDS							
235.147	ELASTO-PLASTIC MATERIAL							
	235.14 MAIN VAPOR PIPE WHIP RES.		1,000,000		6250 MH	81,360	8,136	1,089,496
	235.1 MAIN VAPOR PIPING SYSTEM		5,282,536		488077 MH	6,325,696	632,587	12,240,819
235.2	TURBINE AUXILIARIES							
235.21	MN STM/REHEAT VENTS + DRNS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.215	PIPING							
235.2151	2 IN. + SMALLER							
235.21511	CS/NNS			3240 LB	1555 MH	20,154	4,212	
	235.2151 2 IN. + SMALLER				1555 MH	20,154	4,212	24,366
235.2152	2.5IN + LARGER							
	235.215 PIPING				1555 MH	20,154	4,212	24,366
235.216	VALVES							
235.2163	GLOBE	1 LT	3,225					
	235.216 VALVES		3,225					3,225
235.217	PIPING-MISC. ITEMS							
235.2171	HANGERS + SUPPORTS	648 LB	972					
235.2172	INSULATION							
235.2173	SPECIALTIES							
	235.217 PIPING-MISC. ITEMS		972					972
	235.21 MN STM/REHEAT VENTS + DRNS		4,197		1555 MH	20,154	4,212	28,563
	235.2 TURBINE AUXILIARIES		4,197		1555 MH	20,154	4,212	28,563
235.3	TB CLOSED CLG WATER SYS							
235.31	ROTATING MACHINERY							
235.311	TB CLOSED CLG WTR PUMP	3 EA	32,250	1 LT	1200 MH	15,860	1,586	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.3111	TB CCW PUMP							
235.3112	TB CCW PUMP MOTOR							
	235.311 TB CLOSED CLG WTR PUMP		32,250		1200 MH	15,860	1,586	49,696
	235.31 ROTATING MACHINERY		32,250		1200 MH	15,860	1,586	49,696
235.32	HEAT TRANSFER EQUIPMENT							
235.321	HEAT EXCHANGERS	2 EA	296,160	1 LT	800 MH	10,464	1,046	
	235.32 HEAT TRANSFER EQUIPMENT		296,160		800 MH	10,464	1,046	307,670
235.33	TANKS + PRESSURE VESSELS							
235.331	HEAD TANK	1 EA	537	1 LT	52 MH	678	68	
	235.33 TANKS + PRESSURE VESSELS		537		52 MH	678	68	1,283
235.35	PIPING							
235.351	2 IN. + SMALLER							
235.3511	CS/NNS			1100 LB	527 MH	6,830	1,430	
	235.351 2 IN. + SMALLER				527 MH	6,830	1,430	8,260
235.352	2.5 IN + LARGER							
235.3521	CS/NNS	39940 LB	209,910	1 LT	33585 MH	435,276	43,528	
	235.352 2.5 IN + LARGER		209,910		33585 MH	435,276	43,528	688,714
	235.35 PIPING		209,910		34112 MH	442,106	44,958	696,974
235.36	VALVES	1 LT	376,250					

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.361	GATE							
235.362	CHECK							
235.363	GLOBE							
235.365	RELIEF							
235.366	BUTTERFLY							
235.368	PLUG							
	235.36 VALVES		376,250					376,250
235.37	PIPING-MISC. ITEMS							
235.371	HANGERS + SUPPORTS	28208 LB	42,312					
235.372	INSULATION							
235.373	SPECIALTIES							
	235.37 PIPING-MISC. ITEMS		42,312					42,312
235.38	INSTRUMENTATION + CONTROL	1 LT	17,950	1 LT	151 MH	1,846	92	
	235.3 TB CLOSED CLG WATER SYS		975,369		36315 MH	470,954	47,750	1,494,073
235.4	DEMIN.WATER MAKE-UP SYSTEM	1 LT	800,000	1 LT	4400 MH	57,551	5,755	
235.43	TANKS + PRESSURE VESSELS							
235.431	DEMINERALIZED WATER STG TK	58C00 LB	168,200	1 LT	6381 MH	83,462	8,346	
	235.43 TANKS + PRESSURE VESSELS		168,200		6381 MH	83,462	8,346	260,008
235.45	PIPING							
235.451	2 IN + SMALLER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.4511	CS/NNS							
	235.451 2 IN + SMALLER							
235.452	2.5 IN + LARGER							
235.4521	CS/NNS							
	235.452 2.5 IN + LARGER							
	235.45 PIPING							
235.46	VALVES							
235.47	PIPING-MISC ITEMS							
235.48	INSTRUMENTATION + CONTROL	1 LT	85,170	1 LT	680 MH	8,313	416	
235.49	SKIDS / FOUNDATIONS							
235.491	DEMINERALIZER PACKAGE							
235.4911	ROTATING MACHINERY							
235.49111	ACID REGENERANT P+M							
235.491111	ACID REGENERANT PUMP							
235.491112	ACID REGENERANT PUMP MOTOR							
	235.49111 ACID REGENERANT P+M							
235.49112	CAUSTIC REGENERANT P+M							
235.491121	CAUSTIC REGEN PUMP							
235.491122	CAUSTIC REGEN PUMP MOTOR							
	235.49112 CAUSTIC REGENERANT P+M							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.49113	DEGASIFIER EVACUATING P+M							
235.491131	DEGASIFIER EVAC PUMP							
235.491132	DEGASIFIER EVAC PUMP MOTOR							
	235.49113 DEGASIFIER EVACUATING P+							
235.49114	DEGASIFIER BOOSTER P+M							
235.491141	DEGASIFIER BOOSTER PUMP							
235.491142	DEGASIFIER BOOSTER P MOTOR							
	235.49114 DEGASIFIER BOOSTER P+M							
	235.4911 ROTATING MACHINERY							
235.4913	TANKS + PRESSURE VESSELS							
235.49131	VACUUM DEGASIFIER							
235.49132	ACID REGENERANT DAY TANK							
235.49133	CAUSTIC REGENERANT DAY TK							
	235.4913 TANKS + PRESSURE VESSELS							
235.4914	PURIFICATION+FILTRATION EQ							
235.49141	FILTERS							
235.49142	CATION ION EXCHANGE BEDS							
235.49143	ANION ION EXCHANGE BEDS							
235.49144	MIXED-BED ION EXCHANGE BED							
	235.4914 PURIFICATION+FILTRATION EQ							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	235.491 DEMINERALIZER PACKAGE							
235.492	DEMIN WTR ST TK FOUNDATION							
235.4921	EXCAVATION WORK			280 CY	70 MH	750	28	
235.4922	SUBSTRUCTURE CONCRETE							
235.49221	FORMWORK			1400 SF	111 MH	1,225	1,400	
235.49222	REINFORCING STEEL			4 TN	140 MH	1,807	1,600	
235.49223	CONCRETE			32 CY	55 MH	562	1,120	
235.49224	EMBEDDED STEEL			1 TN	150 MH	1,804	1,500	
	235.4922 SUBSTRUCTURE CONCRETE				456 MH	5,398	5,620	11,018
235.4923	SAND FILL			190 CY	190 MH	1,891	1,140	
	235.492 DEMIN WTR ST TK FOUNDATION				716 MH	8,039	7,040	15,079
	235.49 SKIDS / FOUNDATIONS				716 MH	8,039	7,040	15,079
	235.4 DEMIN.WATER MAKE-UP SYSTEM		1,053,370		12177 MH	157,365	21,557	1,232,292
235.5	CHEMICAL TREATMENT SYSTEM	1 LT	32,250	1 LT	152 MH	1,966	197	
235.51	ROTATING MACHINERY							
235.511	AMMONIA FEED PUMP + MOTOR							
235.5111	AMMONIA FEED PUMP							
235.5112	AMMONIA FEED PUMP MOTOR							
	235.511 AMMONIA FEED PUMP + MOTOR							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.512	HYDRAZINE FEED PUMP+MOTOR							
235.5121	HYDRAZINE FEED PUMP							
235.5122	HYDRAZINE FEED PUMP MOTOR							
	235.512 HYDRAZINE FEED PUMP+MOTOR							
	235.51 ROTATING MACHINERY							
235.53	TANKS + PRESSURE VESSELS							
235.531	AMMONIA STORAGE TANK							
235.532	HYDRAZINE STORAGE TANK							
	235.53 TANKS + PRESSURE VESSELS							
235.55	PIPING							
235.551	2 IN + SMALLER							
235.5511	SS/NNS			360 LB	433 MH	5,613	1,800	
	235.551 2 IN + SMALLER				433 MH	5,613	1,800	7,413
235.552	2.5 IN + LARGER							
	235.55 PIPING				433 MH	5,613	1,800	7,413
235.56	VALVES							
235.563	GLOBE	10 EA	1,000					
	235.56 VALVES		1,000					1,000
235.57	PIPE-MISC. ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
235.571	HANGERS + SUPPORTS	72 LB	108					
235.572	INSULATION							
235.573	SPECIALTIES							
	235.57 PIPE-MISC. ITEMS		108					108
235.58	INSTRUMENTATION + CONTROL	1 LT	1,960	1 LT	16 MH	196	10	
	235.5 CHEMICAL TREATMENT SYSTEM		35,318		601 MH	7,775	2,007	45,100
235.6	NEUTRALIZATION SYSTEM							
235.61	ROTATING MACHINERY							
235.611	OVERBOARD/RECIR PUMP+MOTOR	2 EA	9,000	1 LT	200 MH	2,643	264	
235.6111	OVERBOARD/RECIR PUMP							
235.6112	OVERBOARD/RECIR PUMP MOTOR							
	235.611 OVERBOARD/RECIR PUMP+MOTOR		9,000		200 MH	2,643	264	11,907
235.612	BLOWER + MOTOR	2 EA	6,000	1 LT	200 MH	2,643	264	
235.6121	BLOWER							
235.6122	BLOWER MOTOR							
	235.612 BLOWER + MOTOR		6,000		200 MH	2,643	264	8,907
	235.61 ROTATING MACHINERY		15,000		400 MH	5,286	528	20,814
235.63	TANKS AND PRESSURE VESSELS							
235.631	NEUTRALIZATION TANK	2 EA	40,000	1 LT	200 MH	2,616	262	
	235.63 TANKS AND PRESSURE VESSELS		40,000		200 MH	2,616	262	42,878

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
235.65	PIPING							
235.651	2IN & SMALLER							
235.6511	CS/NNS							
	235.651 2IN & SMALLER							
235.652	2.5 IN & LARGER							
235.6521	CS/NNS	1320 LB	1,980	1 LT	317 MH	4,104	410	
	235.652 2.5 IN & LARGER		1,980		317 MH	4,104	410	6,494
	235.65 PIPING		1,980		317 MH	4,104	410	6,494
235.66	VALVES	1 LT	300					
235.67	PIPING - MISC ITEMS							
235.671	HANGERS + SUPPORTS	264 LB	396					
235.672	INSULATION							
235.673	SPECIALTIES							
	235.67 PIPING - MISC ITEMS		396					396
235.68								
	235.6 NEUTRALIZATION SYSTEM		57,676		917 MH	12,006	1,200	70,882
	235. OTHER TURBINE PLANT EQUIP.		7,408,466		539642 MH	6,993,9[illegible]0	709,313	15,111,729
236.	INSTRUMENTATION + CONTROL							
236.1	PROCESS IC EQUIPMENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
236.11	BENCHBOARD, PANELS + RACKS							
236.111	TURBINE PLT MAIN CONTRL BD	1 LT	300,000	1 LT	1667 MH	20,379	1,019	
236.112	TURBINE PANELS							
236.1121	TURBINE SUPERVISORY PANELS							
236.1122	EHC CONTROL CABINET							
236.1123	TURBINE ACCESSORY PANELS			1 LT	2916 MH	35,646	7,000	
	236.112 TURBINE PANELS				2916 MH	35,646	7,000	42,646
236.113	TURBINE PLANT HVAC PANELS	1 LT	40,000	1 LT	333 MH	4,069	203	
236.114	LOGIC PANELS+ CABINETS	1 LT	200,000	1 LT	1667 MH	20,379	1,019	
236.115	INSTRUMENT RACK-TURB PLANT	1 LT	456,000	1 LT	4560 MH	55,739	2,787	
	236.11 BENCHBOARD, PANELS + RACKS		996,000		11143 MH	136,212	12,028	1,144,240
236.13								
	236.1 PROCESS IC EQUIPMENT		996,000		11143 MH	136,212	12,028	1,144,240
236.2	PROCESS COMPUTER							
236.3	TURB PLT I+C TUBING	28300 LF	138,670	1 LT	2830 MH	34,593	3,459	
	236. INSTRUMENTATION + CONTROL		1,134,670		13973 MH	170,805	15,487	1,320,962
237.	TURBINE PLANT MISC ITEMS							
237.1	MISC SUSPENSE ITEMS							
237.11	PIPE			1 LT	7651 MH	99,158	87,612	
237.12	FIELD PAINTING			1 LT	31700 MH	399,069	180,062	
237.13	QUALIFICATION OF WELDERS			1 LT	7330 MH	98,222	30,100	

UNITED ENGINEERS & CONSTRUCTORS INC.
2.5 IN HG AV - MIDDLETOWN, USA
1139 MWE PRESSURIZED WATER REACTOR

PLANT CODE 148 COST BASIS 07/76 04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	237.1 MISC SUSPENSE ITEMS				56681 MH	596,449	297,774	894,223
237.3	**TURBINE PLANT INSULATION**							
237.31	PIPE INSULATION			1 LT	48730 MH	634,465	1,328,890	
237.32	EQUIPMENT INSULATION			1 LT	16070 MH	209,231	439,762	
	237.3 TURBINE PLANT INSULATION				64800 MH	843,696	1,768,652	2,612,348
	237. TURBINE PLANT MISC ITEMS				121481 MH	1,440,145	2,066,426	3,506,571
	23 . TURBINE PLANT EQUIPMENT		82,629,701		1827006 MH	23,335,789	5,315,496	111,280,986

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
24 .	ELECTRIC PLANT EQUIPMENT							
241.	SWITCHGEAR							
241.1	GEN EQPT SWITCHGEAR							
241.11	GEN LOAD BREAK SWITCH	1 LT	735,000	1 LT	4497 MH	55,632	5,563	
241.12	GEN NEUTRAL GROUNDING EQPT			1 LT	3372 MH	41,713	4,172	
241.13	GEN CURRENT+POTENTIAL XFMR			9 EA	561 MH	6,941	645	
241.131	GEN.CURRENT TRANSFORMERS							
241.132	GEN.POTENTIAL TRANSFORMERS							
	241.13 GEN CURRENT+POTENTIAL XFMR				561 MH	6,941	645	7,586
241.14	GEN SURGE PROTECTION EQPT							
241.15	GEN EXCITATION SWITCHGEAR							
	241.1 GEN EQPT SWITCHGEAR		735,000		8430 MH	104,286	10,380	849,666
241.2	STATION SERVICE SWITCHGEAR							
241.21	MEDIUM VOLTAGE METAL CLAD							
241.211	13.8 KV							
241.2111	NON-CLASS 1E 13.8 KV	2 EA	1,089,000	1 LT	14773 MH	182,750	18,275	
241.2112	CLASS 1E 13.8 KV							
	241.211 13.8 KV		1,089,000		14773 MH	182,750	18,275	1,290,025
241.212	6.9 KV							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
241.2121	NON-CLASS 1E 6.9 KV							
241.2122	CLASS 1E 6.9 KV							
	241.212 6.9 KV							
241.213	4.16 KV							
241.2131	NON-CLASS 1E 4.16 KV	2 EA	577,000	1 LT	7081 MH	87,597	8,760	
241.2132	CLASS 1E 4.16 KV	2 EA	1,062,000	1 LT	12139 MH	150,167	15,017	
	241.213 4.16 KV		1,639,000		19220 MH	237,764	23,777	1,900,541
241.214	D-G LD. SEQ. LOGIC PNLS	2 EA	142,000	1 LT	1348 MH	16,675	1,668	
	241.21 MEDIUM VOLTAGE METAL CLAD		2,870,000		35341 MH	437,189	43,720	3,350,909
241.22	STATION MOTOR CONTROL CNTR							
241.221	NON-CLASS 1E 480 V MCC	24 EA	486,000	1 LT	11240 MH	139,044	13,904	
241.222	CLASS 1E 480 V MCC	20 EA	370,000	1 LT	9442 MH	116,802	11,680	
	241.22 STATION MOTOR CONTROL CNTR		856,000		20682 MH	255,846	25,584	1,137,430
	241.2 STATION SERVICE SWITCHGEAR		3,726,000		56023 MH	693,035	69,304	4,488,339
	241. SWITCHGEAR		4,461,000		64453 MH	797,321	79,684	5,338,005
242.	STATION SERVICE EQUIPMENT							
242.1	STATION SERV&STARTUP XFMR							
242.11	UNIT AUXILIARY TRANSFORMER	2 EA	504,000	1 LT	5620 MH	69,523	6,952	
242.12	RESERVE AUXILIARY XFMR	2 EA	968,000	1 LT	6744 MH	83,426	8,343	
242.13	FOUNDATIONS FOR XFMRS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
242.131	EXCAVATION WORK							
242.1311	EARTH EXCAVATION							
242.1312	ROCK EXCAVATION							
242.1313	CONCRETE FILL							
242.1314	FILL + BACKFILL							
242.1315	DEWATERING							
	242.131 EXCAVATION WORK							
242.132	SUBSTRUCTURE CONCRETE							
242.1321	FORMWORK			6300 SF	5670 MH	62,611	6,300	
242.1322	REINFORCING STEEL			55 TN	1925 MH	24,857	22,000	
242.1323	CONCRETE			1060 CY	2120 MH	21,650	37,100	
242.1324	EMBEDDED STEEL			10 TN	1500 MH	18,039	15,000	
242.1325	FLOOR FINISH							
242.1326	WATERPROOFING							
242.1327	CONSTRUCTION JOINTS			2000 SF	2000 MH	22,084	2,000	
242.1328	RUBBING CONCRETE SURFACES			6000 SF	180 MH	1,838	60	
	242.132 SUBSTRUCTURE CONCRETE				13395 MH	151,079	82,460	233,539
242.133	CRUSHED STONE FILL			300 CY	300 MH	2,986	1,500	
	242.13 FOUNDATIONS FOR XFMRS				13695 MH	154,065	83,960	238,025
	242.1 STATION SERV&STARTUP XFMR		1,472,000		26059 MH	307,014	99,255	1,878,269
242.2	UNIT SUBSTATIONS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
242.21	LOAD CENTER SWITCHGEAR							
242.211	NON-CLASS 1E SWITCHGEAR							
242.2111	CLG TOWER+FIRE PUMP HOUSE	9 EA	251,000	1 LT	5563 MH	68,816	6,882	
242.2112	BALANCE OF PLANT-NO CT+FPH	18 EA	588,001	1 LT	11126 MH	137,636	13,764	
	242.211 NON-CLASS 1E SWITCHGEAR		839,001		16689 MH	206,452	20,646	1,066,099
242.212	CLASS 1E SWITCHGEAR	8 EA	445,000	1 LT	5200 MH	64,328	6,433	
	242.21 LOAD CENTER SWITCHGEAR		1,284,001		21889 MH	270,780	27,079	1,581,860
242.22	LOAD CENTER TRANSFORMERS							
242.221	NON-CLASS 1E TRANSFORMERS							
242.2211	CLG TOWER+FIRE PUMP HOUSE	9 EA	106,000	1 LT	4047 MH	50,064	5,006	
242.2212	BALANCE OF PLANT-NO CT+FPH	18 EA	212,000	1 LT	8093 MH	100,114	10,011	
	242.221 NON-CLASS 1E TRANSFORMERS		318,000		12140 MH	150,173	15,017	483,195
242.222	CLASS 1E TRANSFORMERS	8 EA	124,000	1 LT	3800 MH	47,009	4,701	
	242.22 LOAD CENTER TRANSFORMERS		442,000		15940 MH	197,187	19,718	658,905
242.23	MISCELLANEOUS XFMRS	1 LT	15,000	1 LT	899 MH	11,123	1,112	
	242.2 UNIT SUBSTATIONS		1,741,001		38728 MH	479,090	47,909	2,268,000
242.3	AUXILIARY POWER SOURCES							
242.31	BATTERY SYSTEMS							
242.311	STATION BATTERIES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
242.3111	NON-CLASS 1E BATTERY	2 EA	58,000	1 LT	1124 MH	13,904	1,390	
242.3112	CLASS 1E BATTERY	4 EA	80,000	1 LT	2248 MH	27,809	2,781	
	242.311 STATION BATTERIES		138,000		3372 MH	41,713	4,171	183,884
242.312	BATTERY CHARGERS							
242.3121	NON-CLASS 1E CHARGER	3 EA	22,500	1 LT	505 MH	6,243	625	
242.3122	CLASS 1E CHARGER	5 EA	35,000	1 LT	843 MH	10,428	1,043	
	242.312 BATTERY CHARGERS		57,500		1348 MH	16,676	1,668	75,844
	242.31 BATTERY SYSTEMS		195,500		4720 MH	58,389	5,839	259,728
242.32	EMERGENCY DIESEL GEN SYS							
242.321	DIESEL GENERATOR UNITS	2 EA	3,626,000	1 LT	26976 MH	333,710	33,371	
242.322	DIESEL GEN SUBSYSTEMS							
242.3221	ROTATING MACHINERY							
242.32211	FUEL OIL TRANSFER PUMP+MTR	2 EA	4,000	1 LT	226 MH	2,986	299	
242.322111	FUEL OIL TRANS PUMP							
242.322112	FUEL OIL TRANS PUMP MOTOR							
	242.32211 FUEL OIL TRANSFER PUMP+MTR		4,000		226 MH	2,986	299	7,285
	242.3221 ROTATING MACHINERY		4,000		226 MH	2,986	299	7,285
242.3223	TANKS AND PRESSURE VESSELS							
242.32231	7-DAY FUEL OIL TANKS			2 EA	4518 MH	59,093	30,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	242.3223 TANKS AND PRESSURE VESSELS				4518 MH	59,093	30,000	89,093
242.3224	PURIFICATION+FILTRATION EQ							
242.32241	FUEL OIL STRAINERS	2 EA	200	1 LT	111 MH	1,439	144	
	242.3224 PURIFICATION+FILTRATION EQ		200		111 MH	1,439	144	1,783
242.3225	PIPING							
242.32251	2 IN + SMALLER							
242.322511	CS/SC 3			955 LB	1146 MH	14,854	3,152	
	242.32251 2 IN + SMALLER				1146 MH	14,854	3,152	18,006
242.32252	2.5 IN + LARGER							
242.322521	CS/SC 3	3120 LB	7,020	1 LT	1873 MH	24,275	2,428	
	242.32252 2.5 IN + LARGER		7,020		1873 MH	24,275	2,428	33,723
	242.3225 PIPING		7,020		3019 MH	39,129	5,580	51,729
242.3226	VALVES	1 LT	10,000					
242.3227	PIPING - MISC ITEMS							
242.32271	HANGERS AND SUPPORTS	815 LB	1,223					
242.32272	INSULATION							
242.32273	SPECIALTIES							
	242.3227 PIPING - MISC ITEMS		1,223					1,223
242.3228	DIESEL GEN AUX SYS I+C							

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242.32281	DIESEL GEN LUBE OIL I+C	1 LT	10,940	1 LT	87 MH	1,063	53	
242.32282	DG FUEL OIL I+C	1 LT	9,800	1 LT	77 MH	941	47	
242.32283	DG STARTING AIR I+C	1 LT	8,100	1 LT	65 MH	796	40	
242.32284	DG JACKET WATER I+C	1 LT	12,280	1 LT	96 MH	1,173	59	
242.32285	DG INTAKE+EXHAUST I+C	1 LT	3,800	1 LT	30 MH	368	18	
	242.3228 DIESEL GEN AUX SYS I+C		44,920		355 MH	4,341	217	49,478
	242.322 DIESEL GEN SUBSYSTEMS		67,363		8229 MH	106,888	36,240	210,591
	242.32 EMERGENCY DIESEL GEN SYS		3,693,363		35205 MH	440,698	69,611	4,203,672
242.34	INVERTERS							
242.341	NON-CLASS 1E INVERTERS	2 EA	50,000	1 LT	674 MH	8,338	834	
242.342	CLASS 1E INVERTERS	4 EA	80,000	1 LT	1124 MH	13,904	1,390	
	242.34 INVERTERS		130,000		1798 MH	22,242	2,224	154,466
	242.3 AUXILIARY POWER SOURCES		4,018,863		41723 MH	521,329	77,674	4,617,866
	242. STATION SERVICE EQUIPMENT		7,231,864		106510 MH	1,307,433	224,838	8,764,135
243.	SWITCHBOARDS							
243.1	CONTROL PANELS							
243.11	GEN+AUX POWER SYS CTRL PNL	1 LT	200,000	1 LT	3743 MH	46,303	4,630	
243.12	CONSOLES							
243.13	VERTICAL PANELS							
243.14	GEN PROTECTIVE RELAY PANEL	1 LT	150,000	1 LT	2810 MH	34,762	3,476	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	243.1 CONTROL PANELS		350,000		6553 MH	81,065	8,106	439,171
243.2	AUX.POWER & SIGNAL BOARDS							
243.21	POWER DISTRIBUTION PANEL							
243.211	NON-CLASS 1E AC PANELS	2 EA	7,000	1 LT	224 MH	2,771	277	
243.212	CLASS 1E AC PANELS	4 EA	15,000	1 LT	358 MH	4,430	443	
	243.21 POWER DISTRIBUTION PANEL		22,000		582 MH	7,201	720	29,921
243.22	BATTERY CNTRL& DC DIST PNL							
243.221	NON-CLASS 1E DC PANELS	1 EA	21,000	1 LT	371 MH	4,589	459	
243.222	CLASS 1E DC PANELS	4 EA	67,000	1 LT	1461 MH	18,075	1,808	
243.223	MISC.PUSHBUTTONS,PNLS+FUSE			1 LT	1405 MH	17,275	50,000	
243.224	BATTERY FUSES							
	243.22 BATTERY CNTRL& DC DIST PNL		88,000		3237 MH	39,939	52,267	180,206
	243.2 AUX.POWER & SIGNAL BOARDS		110,000		3819 MH	47,140	52,987	210,127
	243. SWITCHBOARDS		460,000		10372 MH	128,205	61,093	649,298
244.	PROTECTIVE EQUIPMENT							
244.1	GENRL STATION GROUND SYS							
244.11	EQUIPMENT GROUNDING SYSTEM			1 LT	23411 MH	287,850	126,000	
244.12	YARD + STRUCTURE GROUNDING			1 LT	22199 MH	272,945	65,000	
	244.1 GENRL STATION GROUND SYS				45610 MH	560,795	191,000	751,795

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
244.2	FIRE DETECTION+SUPPRESSION			1 LT	7867 MH	101,959	51,600	
244.3	LIGHTNING PROTECTION			1 LT	2055 MH	25,280	40,000	
244.4	CATHODIC PROTECTION			1 LT	10485 MH	128,932	150,000	
244.5	HEAT TRACING + FREEZE PROT			1 LT	17984 MH	221,122	100,000	
	244. PROTECTIVE EQUIPMENT				84003 MH	1,038,088	532,600	1,570,688
245.	ELECT.STRUC +WIRING CONTNR							
245.1	UNDERGROUND DUCT RUNS							
245.11	NON-CLASS 1E DUCT BANKS							
245.111	PVC DUCTS			45000 LF	9900 MH	121,725	72,000	
245.112	STEEL CONDUIT			2250 LF	495 MH	6,086	5,063	
245.113	STRUCTURAL WORK							
245.1131	EXCAVATION WORK							
245.1132	SUBSTRUCTURE CONCRETE							
245.11321	FORMWORK			25000 SF	20000 MH	220,848	25,000	
245.11322	REINFORCING STEEL			80 TN	2800 MH	36,158	32,000	
245.11323	CONCRETE			1750 CY	3063 MH	31,278	61,250	
	245.1132 SUBSTRUCTURE CONCRETE				25863 MH	288,284	118,250	406,534
	245.113 STRUCTURAL WORK				25863 MH	288,284	118,250	406,534
	245.11 NON-CLASS 1E DUCT BANKS				36258 MH	416,095	195,313	611,408
245.12	CLASS 1E DUCT BANKS							

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245.121	PVC DUCTS			20000 LF	4400 MH	54,099	32,000	
245.122	STEEL CONDUIT			1000 LF	219 MH	2,692	2,250	
245.123	STRUCTURAL WORK							
245.1231	EXCAVATION WORK							
245.1232	SUBSTRUCTURE CONCRETE							
245.12321	FORMWORK			11100 SF	8880 MH	98,056	11,100	
245.12322	REINFORCING STEEL			36 TN	1260 MH	16,271	14,400	
245.12323	CONCRETE			780 CY	1365 MH	13,940	27,300	
	245.1232 SUBSTRUCTURE CONCRETE				11505 MH	128,267	52,800	181,067
	245.123 STRUCTURAL WORK				11505 MH	128,267	52,800	181,067
	245.12 CLASS 1E DUCT BANKS				16124 MH	185,058	87,050	272,108
	245.1 UNDERGROUND DUCT RUNS				52382 MH	601,153	282,363	883,516
245.2	CABLE TRAY			75000 LF	225000 MH	2,766,465	1,111,500	
245.3	CONDUIT			350000 LF	280000 MH	3,442,712	787,500	
	245. ELECT.STRUC +WIRING CONTNR				557382 MH	6,810,330	2,181,363	8,991,693
246.	POWER & CONTROL WIRING							
246.1	GENERATOR CIRCUITS WIRING							
246.11	MAIN GENERATOR BUS DUCT	1130 LF	435,050	1 LT	15368 MH	188,955	18,896	
246.12	DG UNIT BUS DUCT							
	246.1 GENERATOR CIRCUITS WIRING		435,050		15368 MH	188,955	18,896	642,901

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
246.2	STATION SERVICE PWR WIRING							
246.21	HIGH VOLTAGE BUS+CABLE							
246.211	BUS DUCT							
246.2111	15 KV BUS DUCT							
246.2112	8 KV BUS DUCT							
246.2113	5 KV BUS DUCT							
	246.211 BUS DUCT							
246.212	CABLE							
246.2121	15 KV CABLE			17700 LF	8143 MH	100,120	458,607	
246.2122	8 KV CABLE							
246.2123	5 KV CABLE			22600 LF	9041 MH	111,162	300,580	
	246.212 CABLE				17184 MH	211,282	759,187	970,469
	246.21 HIGH VOLTAGE BUS+CABLE				17184 MH	211,282	759,187	970,469
246.22	LOW VOLTAGE BUS+CABLE							
246.221	BUS DUCT							
246.222	CABLE							
246.2221	LOW VOLTAGE POWER CABLE			477250 LF	62043 MH	762,843	334,075	
	246.222 CABLE				62043 MH	762,843	334,075	1,096,918
	246.22 LOW VOLTAGE BUS+CABLE				62043 MH	762,843	334,075	1,096,918

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	246.2 STATION SERVICE PWR WIRING				79227 MH	974,125	1,093,262	2,067,387
246.3	CONTROL CABLE			2100 MF	268800 MH	3,305,003	2,799,300	
246.4	INSTRUMENT WIRE			1900 MF	239400 MH	2,943,518	1,520,000	
246.5	CONTAINMENT PENETRATIONS	61 EA	506,300	1 LT	24400 MH	300,007	30,001	
	246. POWER & CONTROL WIRING		941,350		627195 MH	7,711,608	5,461,459	14,114,417
	24 . ELECTRIC PLANT EQUIPMENT		13,094,214		1449915 MH	17,792,985	8,541,037	39,428,236

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
25 .	MISCELLANEOUS PLANT EQUIPT							
251.	TRANSPORTATION & LIFT EQPT							
251.1	CRANES & HOISTS							
251.11	TURBINE BUILDING CRANE							
251.111	TG OVERHEAD TRAVELING CRAN	1 EA	476,225	1 LT	6252 MH	80,881	8,088	
251.112	HEATER BAY CRANE	1 EA	236,500	1 LT	1500 MH	19,406	1,941	
	251.11 TURBINE BUILDING CRANE		712,725		7752 MH	100,287	10,029	823,041
251.12	REACTOR CONTNMT BLDG CRANE	1 EA	1,182,500	1 LT	17000 MH	219,927	21,993	
251.13	REACTOR SERVICE BLDG.CRANE							
251.14	INTAKE STRUCTURE CRANE							
251.15	CIRC WATER PUMPHOUSE CRANE							
251.16	MISC.CRANES,HOISTS+MONORLS			1 LT	3000 MH	38,811	83,850	
251.161	10 TON CRANES							
251.162	5 TON CRANES							
	251.16 MISC.CRANES,HOISTS+MONORLS				3000 MH	38,811	83,850	122,661
251.17	DIESEL BUILDING CRANES	2 EA	43,000	1 LT	600 MH	7,761	776	
	251.1 CRANES & HOISTS		1,938,225		28352 MH	366,786	116,648	2,421,659
	251. TRANSPORTATION & LIFT EQPT		1,938,225		28352 MH	366,786	116,648	2,421,659
252.	AIR,WATER+STEAM SERVICE SY							
252.1	AIR SYSTEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.11	COMPRESSED AIR SYSTEM							
252.111	ROTATING MACHINERY							
252.1111	AIR COMPRESSORS + MOTORS	3 EA	70,950	1 LT	2551 MH	33,715	3,372	
252.11111	AIR COMPRESSORS							
252.11112	AIR COMPRESSOR MOTOR							
	252.1111 AIR COMPRESSORS + MOTORS		70,950		2551 MH	33,715	3,372	108,037
	252.111 ROTATING MACHINERY		70,950		2551 MH	33,715	3,372	108,037
252.113	TANKS AND PRESSURE VESSELS							
252.1131	AIR RECEIVERS	2 EA	4,300	1 LT	200 MH	2,616	262	
252.1132	AIR DRYERS	2 EA	15,050	1 LT	352 MH	4,555	456	
	252.113 TANKS AND PRESSURE VESSELS		19,350		552 MH	7,171	718	27,239
252.115	PIPING							
252.1151	2IN + SMALLER							
252.11511	CS/NNS			32100 LB	15407 MH	199,683	41,730	
	252.1151 2IN + SMALLER				15407 MH	199,683	41,730	241,413
252.1152	2.5IN + LARGER							
252.11521	CS/NNS	3440 LB	5,160	1 LT	825 MH	10,691	1,069	
	252.1152 2.5IN + LARGER		5,160		825 MH	10,691	1,069	16,920
	252.115 PIPING		5,160		16232 MH	210,374	42,799	258,333

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.116	VALVES	1 LT	21,500					
252.1161	GATE							
252.1162	CHECK							
252.1163	GLOBE							
252.1165	RELIEF							
	252.116 VALVES		21,500					21,500
252.117	PIPING - MISC ITEMS							
252.1171	HANGERS + SUPPORTS	7100 LB	10,650					
252.1172	INSULATION							
252.1173	SPECIALTIES							
	252.117 PIPING - MISC ITEMS		10,650					10,650
252.118	INSTRUMENTATION+CONTROL	1 LT	18,350	1 LT	141 MH	1,725	86	
	252.11 COMPRESSED AIR SYSTEM		145,960		19476 MH	252,985	46,975	445,920
252.12	CONTAIN BLDG INST AIR SYS							
252.121	ROTATING MACHINERY							
252.1211	CONT INSTR AIR COMPRES PKG	2 EA	282,000	1 LT	1800 MH	23,286	2,329	
	252.121 ROTATING MACHINERY		282,000		1800 MH	23,286	2,329	307,615
252.123	TANKS+PRESSURE VESSELS							
252.1231	CONT INSTR AIR DRYER PKG	2 EA	292,000	1 LT	1200 MH	15,525	1,553	
	252.123 TANKS+PRESSURE VESSELS		292,000		1200 MH	15,525	1,553	309,078

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.125	PIPING							
252.1251	2 IN + SMALLER							
252.12511	CS/NNS			2290 LB	1099 MH	14,244	2,977	
	252.1251 2 IN + SMALLER				1099 MH	14,244	2,977	17,221
252.1252	2.5 IN + LARGER							
252.12521	CS/NNS	190 LB	285	1 LT	45 MH	583	58	
	252.1252 2.5 IN + LARGER		285		45 MH	583	58	926
	252.125 PIPING		285		1144 MH	14,827	3,035	18,147
252.126	VALVES	1 LT	2,000					
252.127	PIPING-MISC ITEMS							
252.1271	HANGERS AND SUPPORTS	496 LB	744					
252.1272	INSULATION							
252.1273	SPECIALTIES							
	252.127 PIPING-MISC ITEMS		744					744
	252.12 CONTAIN BLDG INST AIR SYS		577,029		4144 MH	53,638	6,917	637,584
	252.1 AIR SYSTEMS		722,989		23620 MH	306,623	53,892	1,083,504
252.2	WATER SYSTEMS							
252.21	SERVICE WATER SYSTEM							
252.211	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.2111	SERVICE WATER PUMP & MOTOR	3 EA	344,000	1 LT	1500 MH	19,825	1,983	
252.21111	SERVICE WATER PUMP							
252.21112	SERVICE WATER PUMP MOTOR							
	252.2111 SERVICE WATER PUMP & MOTOR		344,000		1500 MH	19,825	1,983	365,808
	252.211 ROTATING MACHINERY		344,000		1500 MH	19,825	1,983	365,808
252.215	PIPING							
252.2151	2IN & SMALLER							
252.21511	CS/NNS			600 LB	288 MH	3,730	780	
	252.2151 2IN & SMALLER				288 MH	3,730	780	4,510
252.2152	2.5IN & LARGER							
252.21521	CS/NNS	280560 LB	420,840	1 LT	67335 MH	872,690	87,269	
	252.2152 2.5IN & LARGER		420,840		67335 MH	872,690	87,269	1,380,799
	252.215 PIPING		420,840		67623 MH	876,420	88,049	1,385,309
252.216	VALVES	1 LT	30,000					
252.2161	GATE							
252.2162	CHECK							
252.2163	GLOBE							
252.2166	BUTTERFLY							
	252.216 VALVES		30,000					30,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.217	PIPING-MISC ITEMS							
252.2171	HANGERS AND SUPPORTS	26000 LB	39,000					
252.2172	INSULATION							
252.2173	SPECIALTIES							
252.2174	PIPE TRENCHING							
	252.217 PIPING-MISC ITEMS		39,000					39,000
252.218	INSTRUMENTATION & CONTROL							
	252.21 SERVICE WATER SYSTEM		833,840		69123 MH	896,245	90,032	1,820,117
252.22	YARD FIRE PROTECTION							
252.221	ROTATING MACHINERY							
252.2211	DIESEL ENGINE FIRE PUMPS	2 EA	43,000	1 LT	500 MH	6,609	661	
252.2212	MOTOR DRIVEN FIRE PUMPS	2 EA	19,350	1 LT	400 MH	5,286	529	
252.22121	FIRE PUMP							
252.22122	FIRE PUMP MOTOR							
	252.2212 MOTOR DRIVEN FIRE PUMPS		19,350		400 MH	5,286	529	25,165
252.2213	JOCKEY PUMP + MOTOR	1 EA	2,150	1 LT	51 MH	673	67	
252.22131	JOCKEY PUMP							
252.22132	JOCKEY PUMP MOTOR							
	252.2213 JOCKEY PUMP + MOTOR		2,150		51 MH	673	67	2,890
252.2214	HOT WATER CIRC PUMP+MOTOR	2 EA	2,150	1 LT	100 MH	1,322	132	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.22141	HOT WATER CIRC PUMP							
252.22142	HOT WATER CIRC PUMP MOTOR							
	252.2214 HOT WATER CIRC PUMP+MOTOR		2,150		100 MH	1,322	132	3,604
	252.221 ROTATING MACHINERY		66,650		1051 MH	13,890	1,389	81,929
252.222	HEAT TRANSFER EQUIPMENT							
252.2221	HOT WATER HEAT EXCHANGER	2 EA	2,150	1 LT	100 MH	1,308	131	
	252.222 HEAT TRANSFER EQUIPMENT		2,150		100 MH	1,308	131	3,589
252.223	TANKS AND PRESSURE VESSELS							
252.2231	FIRE WATER STORAGE TANKS	2 EA	72,000	1 LT	8319 MH	108,810	10,881	
	252.223 TANKS AND PRESSURE VESSELS		72,000		8319 MH	108,810	10,881	191,691
252.225	PIPING							
252.2251	2IN + SMALLER							
252.22511	CS/NNS			3660 LB	1757 MH	22,771	4,758	
	252.2251 2IN + SMALLER				1757 MH	22,771	4,758	27,529
252.2252	2.5IN + LARGER							
252.22521	CS/NNS	397980 LB	596,970	1 LT	95515 MH	1,237,913	123,791	
252.22522	CS/NNS	81480 LB	122,220	1 LT	19555 MH	253,441	25,344	
252.22523	CS/NNS	5760 LB	8,640	1 LT	1382 MH	17,914	1,791	
	252.2252 2.5IN + LARGER		727,830		116452 MH	1,509,268	150,926	2,388,024

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	252.225 PIPING		727,830		118209 MH	1,532,039	155,684	2,415,553
252.226	VALVES	1 LT	120,507					
252.2261	STANDARD VALVES							
252.22611	GATE							
252.22612	GLOBE							
252.22613	CHECK							
252.22615	RELIEF							
	252.2261 STANDARD VALVES							
252.2262	E-RATED VALVES							
252.22621	GATE							
252.22622	CHECK							
252.22623	GLOBE							
252.22624	DIAPHRAGM							
252.22625	RELIEF							
252.22629	SPECIAL VALVES							
252.226291	POST INDICATOR GATE							
252.226292	DELUGE							
	252.22629 SPECIAL VALVES							
	252.2262 E-RATED VALVES							
	252.226 VALVES		120,507					120,507

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.227	PIPING - MISC ITEMS							
252.2271	HANGERS + SUPPORTS	9000 LB	13,500					
252.2272	INSULATION							
252.2273	SPECIALTIES							
252.22731	HOSE HOUSES	24 EA	23,220	1 LT	1200 MH	15,553	1,555	
252.22732	FIRE HYDRANTS	24 EA	12,900	1 LT	1200 MH	15,379	1,538	
	252.2273 SPECIALTIES		36,120		2400 MH	30,932	3,093	70,145
	252.227 PIPING - MISC ITEMS		49,620		2400 MH	30,932	3,093	83,645
252.228	INSTRUMENTATION+CONTROL	1 LT	6,820	1 LT	57 MH	696	35	
	252.22 YARD FIRE PROTECTION		1,045,577		130136 MH	1,687,675	171,213	2,904,465
252.24	POTABLE WATER SYSTEM							
252.245	PIPING							
252.2451	2IN + SMALLER							
252.24511	GALV/NNS			1200 LB	576 MH	7,466	1,140	
252.24512	CU/NNS			1150 LF	265 MH	3,433	2,300	
	252.2451 2IN + SMALLER				841 MH	10,899	3,440	14,339
252.2452	2.5IN + LARGER							
252.24521	GALV/NNS	20880 LB	35,496	1 LT	5011 MH	64,947	6,495	
	252.2452 2.5IN + LARGER		35,496		5011 MH	64,947	6,495	106,938

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	252.245 PIPING		35,496		5852 MH	75,846	9,935	121,277
252.246	VALVES	1 LT	26,230					
252.2461	GATE							
252.2462	CHECK							
252.2463	GLOBE							
252.2465	SAFETY/RELIEF							
252.2469	SPECIAL VALVES							
252.24691	SAFETY SHOWER							
252.24692	EYE WASH							
252.24693	HOSE BIBBS							
	252.2469 SPECIAL VALVES							
	252.246 VALVES		26,230					26,230
252.247	PIPING-MISC ITEMS							
252.2471	HANGERS + SUPPORTS	4400 LB	6,600					
252.2472	INSULATION							
252.2473	SPECIALTIES							
	252.247 PIPING-MISC ITEMS		6,600					6,600
252.248	INSTRUMENTATION + CONTROL	1 LT	1,000	1 LT	20 MH	243	12	
	252.24 POTABLE WATER SYSTEM		69,326		5872 MH	76,089	9,947	155,362
	252.2 WATER SYSTEMS		1,948,743		205131 MH	2,660,009	271,192	4,879,944

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.3	AUXILIARY STEAM SYSTEM							
252.31	AUXILIARY BOILER SYSTEM							
252.312	HEAT TRANSFER EQUIPMENT							
252.3121	AUXILIARY BOILERS	2 EA	511,700	1 LT	3500 MH	45,279	4,528	
	252.312 HEAT TRANSFER EQUIPMENT		511,700		3500 MH	45,279	4,528	561,507
252.315	PIPING							
252.3151	2IN + SMALLER							
252.31511	CS/NNS			600 LB	288 MH	3,730	780	
	252.3151 2IN + SMALLER				288 MH	3,730	780	4,510
252.3152	2.5IN + LARGER							
252.31521	CS/NNS	14760 LB	22,140	1 LT	3542 MH	45,907	4,591	
	252.3152 2.5IN + LARGER		22,140		3542 MH	45,907	4,591	72,638
	252.315 PIPING		22,140		3830 MH	49,637	5,371	77,148
252.316	VALVES	10 EA	2,150					
252.3161	GATE							
252.3162	CHECK							
252.3163	GLOBE							
	252.316 VALVES		2,150					2,150
252.317	PIPING - MISC ITEMS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.3171	HANGERS + SUPPORTS	3100 LB	4,650					
252.3172	INSULATION							
252.3173	SPECIALTIES							
	252.317 PIPING - MISC ITEMS		4,650					4,650
	252.31 AUXILIARY BOILER SYSTEM		540,640		7330 MH	94,916	9,899	645,455
252.32	AUX BOILER FEEDWATER SYS							
252.321	ROTATING MACHINERY							
252.3211	AUX FW PUMPS+ MOTORS	3 EA	5,375	1 LT	300 MH	3,965	397	
252.32111	AUX FW PUMPS							
252.32112	AUX FW MOTORS							
	252.3211 AUX FW PUMPS+ MOTORS		5,375		300 MH	3,965	397	9,737
	252.321 ROTATING MACHINERY		5,375		300 MH	3,965	397	9,737
252.325	PIPING							
252.3251	2 IN + SMALLER							
252.32511	CS/NNS			300 LB	144 MH	1,866	390	
	252.3251 2 IN + SMALLER				144 MH	1,866	390	2,256
252.3252	2.5 IN + LARGER	2230 LB	3,345	1 LT	535 MH	6,936	694	
252.32521	CS/NNS							
	252.3252 2.5 IN + LARGER		3,345		535 MH	6,936	694	10,975

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	252.325 PIPING		3,345		679 MH	8,802	1,084	13,231
252.326	VALVES	23 EA	19,350					
252.3261	GATE							
252.3262	CHECK							
252.3263	GLOBE							
	252.326 VALVES		19,350					19,350
252.327	PIPING - MISC. ITEMS							
252.3271	HANGERS + SUPPORTS	500 LB	750					
252.3272	INSULATION							
252.3273	SPECIALTIES							
	252.327 PIPING - MIS . ITEMS		750					750
	252.32 AUX BOILER FEEDWATER SYS		28,820		979 MH	12,767	1,481	43,068
252.33	AUX FUEL OIL SYSTEM							
252.331	ROTATING MACHINERY							
252.3311	FUEL OIL PUMPS + MOTORS	3 EA	1,612	1 LT	151 MH	1,996	200	
252.33111	FUEL OIL PUMP							
252.33112	FUEL OIL PUMP MOTOR							
	252.3311 FUEL OIL PUMPS + MOTORS		1,612		151 MH	1,996	200	3,808
	252.331 ROTATING MACHINERY		1,612		151 MH	1,996	200	3,808

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.335	PIPING							
252.3351	2IN + SMALLER							
252.33511	CS/NNS			1200 LB	576 MH	7,466	1,560	
	252.3351 2IN + SMALLER				576 MH	7,466	1,560	9,026
252.3352	2.5IN + LARGER							
252.33521	CS/NNS							
	252.3352 2.5IN + LARGER							
	252.335 PIPING				576 MH	7,466	1,560	9,026
252.336	VALVES	12 EA	4,300					
252.3361	GATE							
252.3362	CHECK							
252.3363	GLOBE							
	252.336 VALVES		4,300					4,300
252.337	PIPING - MISC ITEMS							
252.3371	HANGERS + SUPPORTS	240 LB	360					
252.3372	INSULATION							
252.3373	SPECIALTIES							
	252.337 PIPING - MISC ITEMS		360					360
	252.33 AUX FUEL OIL SYSTEM		6,272		727 MH	9,462	1,760	17,494

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.34	AUX DEAR + MAKEUP SYSTEM							
252.341	ROTATING MACHINERY							
252.3411	TRANSFER PUMP + MOTOR	2 EA	2,150	1 LT	120 MH	1,586	159	
252.34111	TRANSFER PUMP							
252.34112	TRANSFER PUMP MOTOR							
	252.3411 TRANSFER PUMP + MOTOR		2,150		120 MH	1,586	159	3,895
	252.341 ROTATING MACHINERY		2,150		120 MH	1,586	159	3,895
252.343	TANKS AND PRESSURE VESSELS							
252.3431	DEAERATOR	1 EA	17,200	1 LT	300 MH	3,923	392	
	252.343 TANKS AND PRESSURE VESSELS		17,200		300 MH	3,923	392	21,515
252.345	PIPING							
252.3451	2 IN + SMALLER							
252.3452	2.5 IN + LARGER							
252.34521	CS/NNS	2940 LB	4,410	1 LT	704 MH	9,127	913	
	252.3452 2.5 IN + LARGER		4,410		704 MH	9,127	913	14,450
	252.345 PIPING		4,410		704 MH	9,127	913	14,450
252.346	VALVES	9 EA	3,225					
252.3461	GATE							
252.3462	CHECK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.3463	GLOBE							
	252.346 VALVES		3,225					3,225
252.347	PIPING - MISC. ITEMS							
252.3471	HANGERS + SUPPORTS	600 LB	900					
252.3472	INSULATION							
252.3473	SPECIALTIES							
	252.347 PIPING - MISC. ITEMS		900					900
	252.34 AUX DEAR + MAKEUP SYSTEM		27,885		1124 MH	14,636	1,464	43,985
252.35	AUX CHEM FEED SYSTEM							
252.351	ROTATING MACHINERY							
252.3511	CHEM FEED PUMPS + MOTORS	4 EA	4,837	1 LT	200 MH	2,643	264	
252.35111	CHEM FEED PUMP							
252.35112	CHEM FEED PUMP MOTOR							
	252.3511 CHEM FEED PUMPS + MOTORS		4,837		200 MH	2,643	264	7,744
	252.351 ROTATING MACHINERY		4,837		200 MH	2,643	264	7,744
252.353	TANKS AND PRESSURE VESSELS							
252.3531	CHEM FEED TANKS	2 EA	3,225	1 LT	60 MH	785	79	
	252.353 TANKS AND PRESSURE VESSELS		3,225		60 MH	785	79	4,089
252.355	PIPING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
252.3551	2 IN + SMALLER							
252.35511	SS/NNS			240 LB	288 MH	3,730	1,200	
	252.3551 2 IN + SMALLER				288 MH	3,730	1,200	4,930
252.3552	2.5 IN + LARGER							
	252.355 PIPING				288 MH	3,730	1,200	4,930
252.356	VALVES	16 EA	2,581					
252.3561	GATE							
252.3562	CHECK							
252.3563	GLOBE							
252.3569	SPECIAL VALVES							
252.35691	NEEDLE							
	252.3569 SPECIAL VALVES							
	252.356 VALVES		2,581					2,581
252.357	PIPING - MISC ITEMS							
252.3571	HANGERS + SUPPORTS	40 LB	60					
252.3572	INSULATION							
252.3573	SPECIALTIES							
	252.357 PIPING - MISC ITEMS		60					60
	252.35 AUX CHEM FEED SYSTEM		10,703		548 MH	7,158	1,543	19,404
252.36	AUX.STEAM+CONDENSATE RETRN							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.361	ROTATING MACHINERY							
252.3611	AUX CONDENSATE PUMP+MOTOR	2 EA	4,515	1 LT	151 MH	1,996	200	
252.36111	AUX CONDENSATE PUMP							
252.36112	AUX CONDENSATE PUMP MOTOR							
	252.3611 AUX CONDENSATE PUMP+MOTOR		4,515		151 MH	1,996	200	6,711
	252.361 ROTATING MACHINERY		4,515		151 MH	1,996	200	6,711
252.363	TANKS AND PRESSURE VESSELS							
252.3631	CONDENSATE RECEIVER	1 EA	430	1 LT	52 MH	678	68	
	252.363 TANKS AND PRESSURE VESSELS		430		52 MH	678	68	1,176
252.365	PIPING							
252.3651	2 IN + SMALLER							
252.36511	CS/NNS			840 LB	403 MH	5,224	1,092	
	252.3651 2 IN + SMALLER				403 MH	5,224	1,092	6,316
252.3652	2.5 IN + LARGER							
252.36521	CS/NNS	3600 LB	5,400	1 LT	864 MH	11,195	1,120	
	252.3652 2.5 IN + LARGER		5,400		864 MH	11,195	1,120	17,715
	252.365 PIPING		5,400		1267 MH	16,419	2,212	24,031
252.366	VALVES	10 EA	2,365					

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
252.3661	GATE							
252.3662	CHECK							
252.3663	GLOBE							
	252.366 VALVES		2,365					2,365
252.367	PIPING - MISC.ITEMS							
252.3671	HANGERS + SUPPORTS	900 LB	1,350					
252.3672	INSULATION							
252.3673	SPECIALTIES							
	252.367 PIPING - MISC.ITEMS		1,350					1,350
	252.36 AUX.STEAM+CONDENSATE RETRN		14,060		1470 MH	19,093	2,480	35,633
252.37	AUX BOILER STACKS + DUCT							
252.38	AUX BOILER BLOWDOWN							
252.383	TANKS AND PRESSURE VESSELS							
252.3831	AUX BOILER BLOWDOWN TANK	1 EA	6,987	1 LT	100 MH	1,308	131	
	252.383 TANKS AND PRESSURE VESSELS		6,987		100 MH	1,308	131	8,426
252.385	PIPING							
252.3851	2 IN + SMALLER							
252.38511	CS/NNS			200 LB	97 MH	1,256	260	
	252.3851 2 IN + SMALLER				97 MH	1,256	260	1,516
252.3852	2.5 IN + LARGER							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	LABOR HRS	LABOR COST	MATERIAL COST	TOTAL COSTS
	252.385 PIPING				97 MH	1,256	260	1,516
252.386	VALVES	6 EA	1,935					
252.3861	GATE							
252.3862	CHECK							
252.3869	SPECIAL VALVES							
252.38691	BLOWDOWN							
	252.3869 SPECIAL VALVES							
	252.386 VALVES		1,935					1,935
252.387	PIPING - MISC ITEMS							
252.3871	HANGERS + SUPPORTS	5 EA	8					
252.3872	INSULATION							
252.3873	SPECIALTIES							
	252.387 PIPING - MISC ITEMS		8					8
	252.38 AUX BOILER BLOWDOWN		8,930		197 MH	2,564	391	11,885
252.39	AUX STEAM SYS COMPLETE I+C	1 LT	85,000	1 LT	680 MH	8,313	416	
	252.3 AUXILIARY STEAM SYSTEM		722,310		13055 MH	168,909	19,434	910,653
252.4	PLANT FUEL OIL SYSTEM							
252.43	TANKS AND PRESSURE VESSELS							
252.431	PLANT FUEL OIL STORAGE TK	1 EA	40,000	1 LT	3600 MH	47,087	4,709	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	252.43 TANKS AND PRESSURE VESSELS		40,000		3600 MH	47,087	4,709	91,796
252.49	FOUNDATIONS/SKIDS							
252.491	PLANT FUEL OIL STG TK FNDT							
252.4911	EXCAVATION WORK							
252.49111	EARTH EXCAVATION			600 CY	150 MH	1,607	600	
252.49112	BACKFILL			250 CY	75 MH	746	250	
	252.4911 EXCAVATION WORK				225 MH	2,353	850	3,203
252.4912	CONCRETE WORK							
252.49121	FORMWORK			1700 SF	1360 MH	15,016	1,700	
252.49122	REINFORCING STEEL			5 TN	175 MH	2,261	2,000	
252.49123	CONCRETE			50 CY	91 MH	930	1,750	
	252.4912 CONCRETE WORK				1626 MH	18,207	5,450	23,657
252.4913	COMPACTED SAND BED			300 CY	300 MH	2,986	1,800	
252.4914	DIKE			900 CY	900 MH	8,956	2,700	
	252.491 PLANT FUEL OIL STG TK FNDT				3051 MH	32,502	10,800	43,302
	252.49 FOUNDATIONS/SKIDS				3051 MH	32,502	10,800	43,302
	252.4 PLANT FUEL OIL SYSTEM		40,000		6651 MH	79,589	15,509	135,098
	252. AIR,WATER+STEAM SERVICE SY		3,434,042		248457 MH	3,215,130	360,027	7,009,199
253.	COMMUNICATIONS EQUIPMENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
253.1	LOCAL COMMUNICATIONS SYS							
253.11	GEN.PURPOSE TELEPHONE SYS			1 LT	3000 MH	36,886	35,475	
253.12	SOUND POW TELEPHONE SYS							
253.15	PA + INTERCOM SYS.			1 LT	12500 MH	153,693	107,500	
	253.1 LOCAL COMMUNICATIONS SYS				15500 MH	190,579	142,975	333,554
253.2	SIGNAL SYSTEMS							
253.21	FIRE DETECTION SYSTEM	1 LT	241,875	1 LT	1968 MH	24,196	2,420	
253.211								
253.212								
	253.21 FIRE DETECTION SYSTEM		241,875		1968 MH	24,196	2,420	268,491
253.22	SECURITY SYSTEM	1 LT	725,625	1 LT	5904 MH	72,594	7,259	
	253.2 SIGNAL SYSTEMS		967,500		7872 MH	96,790	9,679	1,073,969
	253. COMMUNICATIONS EQUIPMENT		967,500		23372 MH	287,369	152,654	1,407,523
254.	FURNISHINGS + FIXTURES							
254.1	SAFETY EQUIPMENT							
254.11	PORTABLE FIRE EXTINGUISHRS			100 EA	200 MH	1,864	8,600	
	254.1 SAFETY EQUIPMENT				200 MH	1,864	8,600	10,464
254.2	CHEMICAL LAB + INSTR SHOP							
254.223	INSTRUMENT SHOP APPARATUS	1 LT	50,000		152 MH	1,966		

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
254.23	SPEC LAB FURNITURE+FIXTURE	1 LT	99,975	1 LT	750 MH	8,700	870	
	254.2 CHEMICAL LAB + INSTR SHOP		149,975		902 MH	10,666	870	161,511
254.3	OFFICE EQUIP+FURNISHINGS							
254.31	OFFICE FURNITURE	1 LT	110,725					
	254.3 OFFICE EQUIP+FURNISHINGS		110,725					110,725
254.4	CHANGE ROOM EQUIPMENT							
254.41	LOCKERS+BENCHES	1 LT	18,275	1 LT	80 MH	928	93	
	254.4 CHANGE ROOM EQUIPMENT		18,275		80 MH	928	93	19,296
254.5	ENVIRONMENT MONIT EQUIP							
254.51	OFF SITE RADIOLOGICAL MONT	1 LT	177,500	1 LT	733 MH	9,014	901	
254.52	METEOROLOGICAL MONIT.EQUIP	1 LT	97,370	1 LT	811 MH	9,973	997	
254.53	WATER QUALITY MONITORING	1 LT	50,000	1 LT	416 MH	5,087	509	
254.54	THERMAL EFFLUENT MONITOR	1 LT	30,000	1 LT	251 MH	3,068	307	
254.55	SEISMIC MONITORING	1 LT	40,000	1 LT	333 MH	4,069	407	
	254.5 ENVIRONMENT MONIT EQUIP		394,870		2544 MH	31,211	3,121	429,202
254.6	DINING FACILITIES							
254.61	CAFETERIA EQUIPMENT	1 LT	183,825	1 LT	3920 MH	45,472	4,547	
	254.6 DINING FACILITIES		183,825		3920 MH	45,472	4,547	233,844
	254. FURNISHINGS + FIXTURES		857,670		7646 MH	90,141	17,231	965,042
	25 . MISCELLANEOUS PLANT EQUIPT		7,197,437		307827 MH	3,959,426	646,560	11,803,423

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
26 .	MAIN COND HEAT REJECT SYS							
261.	STRUCTURES							
261.1	MAKEUP WTR INT + DISCH STR							
261.11	INTAKE STRUCTURE							
261.111	EXCAVATION WORK							
261.1111	EARTH EXCAVATION			825 CY	207 MH	2,419	825	
261.1112	ROCK EXCAVATION			1165 CY	932 MH	10,896	4,660	
261.1113	SHEETING (TEMP COFFERDAM)			15 TN	300 MH	4,116	2,550	
261.1114	STRCT STL (TEMP COFFERDAM)			3 TN	60 MH	823	450	
261.1115	PUMPING			1 LT	1875 MH	17,475	15,000	
	261.111 EXCAVATION WORK				3374 MH	35,729	23,485	59,214
261.112	BEARING PILES (STEEL)							
261.113	SUBSTRUCTURE CONCRETE							
261.1131	FORMWORK			10125 SF	8100 MH	89,444	10,125	
261.1132	REINFORCING STEEL			67 TN	2345 MH	30,281	26,800	
261.1133	CONCRETE			675 CY	1181 MH	12,060	23,625	
261.1134	EMBEDDED STEEL			10 TN	1500 MH	18,039	15,000	
261.1135	CONCRETE FINISH			6750 SF	135 MH	1,378	68	
261.1136	WATERPROOFING							
261.1137	CONSTRUCTION JOINTS							
261.1138	RUBBING CONCRETE SURFACES							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	261.113 SUBSTRUCTURE CONCRETE				13261 MH	151,202	75,618	226,820
261.114	SUPERSTRUCTURE							
261.1141	CONCRETE WORK							
261.1142	STRUCTURAL + MISC. STEEL							
261.11421	STRUCTURAL STEEL			9 TN	180 MH	2,341	6,750	
261.11422	GRATING (GALV)			150 SF	30 MH	389	450	
261.11423	HANDRAIL			75 LF	56 MH	730	750	
	261.1142 STRUCTURAL + MISC. STEEL				266 MH	3,460	7,950	11,410
261.1143	EXTERIOR WALLS							
261.11431	CONCRETE							
261.11432	MASONRY			2025 SF	506 MH	5,773	5,670	
	261.1143 EXTERIOR WALLS				506 MH	5,773	5,670	11,443
261.1144	ROOF DECK							
261.11441	METAL ROOF DECK			1425 SF	114 MH	1,485	1,425	
	261.1144 ROOF DECK				114 MH	1,485	1,425	2,910
261.1145	ROOFING + FLASHING							
261.11451	B.U. ROOFG, INSULTN, + FLA			1425 SF	100 MH	1,348	1,781	
	261.1145 ROOFING + FLASHING				100 MH	1,348	1,781	3,129
261.1146	INTERIOR WALLS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.11461	CONCRETE WALLS							
261.11462	MASONRY WALLS			375 SF	90 MH	1,027	1,050	
261.11463	PARTITIONS							
	261.1146 INTERIOR WALLS				90 MH	1,027	1,050	2,077
261.1147	DOORS + WINDOWS							
261.11471	ROLLING STEEL DOORS							
261.11472	PERSONNEL DOORS			150 SF	120 MH	1,392	1,800	
261.11473	SASH + GLAZING							
	261.1147 DOORS + WINDOWS				120 MH	1,392	1,800	3,192
261.1149	PAINTING							
261.11491	CONCRETE							
261.11492	STEELWORK			11 TN	55 MH	526	66	
261.11493	METAL DECK			1425 SF	29 MH	278	143	
261.11494	HANDRAIL			75 LF	15 MH	144	8	
	261.1149 PAINTING				99 MH	948	217	1,165
	261.114 SUPERSTRUCTURE				1295 MH	15,433	19,893	35,326
261.117	BULKHEAD							
261.1171	STEEL SHEETING			32 TN	320 MH	4,390	11,200	
261.1172	STRUCTURAL STEEL			2 TN	40 MH	520	1,500	
261.1173	GRAVEL FILL			265 CY	80 MH	796	1,325	
261.1174	DREDGING			11500 CY	2300 MH	28,704	23,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.1175	RIP-RAP (12 IN. THICK)			10 CY	20 MH	199	100	
261.1176	CHAIN LINK FENCE(7FT HIGH)			262 LF	79 MH	736	1,703	
	261.117 BULKHEAD				2839 MH	35,345	38,828	74,173
261.118	PROTECTIVE DOLPHINS							
261.1181	WOOD PILES			675 LF	135 MH	1,852	2,700	
	261.118 PROTECTIVE DOLPHINS				135 MH	1,852	2,700	4,552
261.119	BUILDING SERVICES							
261.1191	FLOOR DRAINS + PIPING			6 EA	751 MH	9,731	6,000	
261.1192	HEATING + VENTILATING							
261.11921	AXIAL WALL FANS	1 EA	1,500	1 LT	41 MH	529	53	
261.11922	ELECTRIC UNIT HEATERS	2 EA	1,500	1 LT	100 MH	1,230	123	
261.11923	INSTRUMENTATION + CONTROL	1 LT	1,500	1 LT	12 MH	146	7	
	261.1192 HEATING + VENTILATING		4,500		153 MH	1,905	183	6,588
	261.119 BUILDING SERVICES		4,500		904 MH	11,636	6,183	22,319
	261.11 INTAKE STRUCTURE		4,500		21808 MH	251,197	166,707	422,404
261.12	DISCHARGE STRUCTURE							
261.121	EXCAVATION WORK							
261.1211	EARTH EXCAVATION			80 CY	20 MH	215	80	
261.1212	BACKFILL			80 CY	24 MH	239	80	
261.1213	DREDGING			2000 CY	400 MH	4,292	4,000	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	261.121 EXCAVATION WORK				444 MH	5,446	4,160	9,606
261.122	BEARING PILES (STEEL)			200 LF	60 MH	823	2,400	
261.127	RIP-RAP (12 IN. THICK)			45 CY	68 MH	678	450	
261.126	MARKER PILES (WOOD)			240 LF	48 MH	657	960	
	261.12 DISCHARGE STRUCTURE				620 MH	7,606	7,970	15,576
	261.1 MAKEUP WTR INT + DISCH STR		4,500		22428 MH	258,803	174,677	437,980
261.2	CIRC WATER PUMP HOUSE							
261.21	BUILDING STRUCTURE							
261.211	EXCAVATION WORK							
261.2111	EARTH EXCAVATION			2200 CY	550 MH	5,891	2,200	
261.2112	ROCK EXCAVATION			4770 CY	3816 MH	40,871	19,080	
261.2113	CONCRETE FILL							
261.2114	BACKFILL			350 CY	105 MH	1,045	350	
261.2115	PUMPING			1 LT	375 MH	3,495	3,000	
	261.211 EXCAVATION WORK				4846 MH	51,302	24,630	75,932
261.213	SUBSTRUCTURE CONCRETE							
261.2131	FORMWORK			1300 SF	1040 MH	11,485	1,300	
261.2132	REINFORCING STEEL			100 TN	3500 MH	45,196	40,000	
261.2133	CONCRETE			1230 CY	2153 MH	21,988	43,050	
261.2134	EMBEDDED STEEL			9 TN	1350 MH	16,237	13,500	
261.2135	FLOOR FINISH			9100 SF	181 MH	1,848	91	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.2136	WATERPROOFING			10300 SF	206 MH	1,920	1,030	
261.2137	CONSTRUCTION JOINTS			550 SF	550 MH	6,074	550	
261.2138	RUBBING CONCRETE SURFACES							
261.2139	WIRE FABRIC			9100 SF	183 MH	2,362	1,092	
	261.213 SUBSTRUCTURE CONCRETE				9163 MH	107,110	100,613	207,723
261.214	SUPERSTRUCTURE							
261.2141	CONCRETE WORK							
261.21411	FORMWORK							
261.214111	FORMWORK-WOOD			30800 SF	27720 MH	306,095	30,800	
261.214112	FORMWORK-METAL							
	261.21411 FORMWORK				27720 MH	306,095	30,800	336,895
261.21412	REINF. STEEL			116 TN	4640 MH	59,917	46,400	
261.21413	CONCRETE			1160 CY	2320 MH	23,692	40,600	
261.21414	EMBEDDED STEEL			6 TN	900 MH	10,824	9,000	
261.21415	FLOOR FINISH			5000 SF	100 MH	1,021	50	
261.21416	WATERPROOFING			7200 SF	144 MH	1,342	720	
261.21417	RUBBING CONCRETE SURFACES			2900 SF	87 MH	811	29	
261.21418	CONSTRUCTION JOINTS			750 SF	750 MH	8,281	750	
	261.2141 CONCRETE WORK				36661 MH	411,983	128,349	540,332
261.2142	STRUCT + MISC. STEEL							
261.21421	STRUCT. STEEL							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.21423	MISC. FRAMES, ETC.			3 TN	180 MH	2,341	3,600	
261.21425	FLOOR GRATING (GALV.)			750 SF	150 MH	1,953	2,250	
261.21426	STAIR TREADS							
261.21427	HANDRAILS			180 LF	135 MH	1,757	1,800	
	261.2142 STRUCT + MISC. STEEL				465 MH	6,051	7,650	13,701
261.2143	EXTERIOR WALLS							
261.21431	CONCRETE WALLS							
261.21432	MASONRY WALLS			2530 SF	633 MH	7,223	7,084	
	261.2143 EXTERIOR WALLS				633 MH	7,223	7,084	14,307
261.2144	ROOF DECK							
261.21441	METAL ROOF DECK			2500 SF	200 MH	2,603	2,500	
	261.2144 ROOF DECK				200 MH	2,603	2,500	5,103
261.2145	ROOFING + FLASHING							
261.21451	B.U. ROOFING, FLASHING+INS			2500 SF	175 MH	2,359	3,125	
	261.2145 ROOFING + FLASHING				175 MH	2,359	3,125	5,484
261.2146	INTERIOR WALLS + PARTIT.							
261.21461	CONCRETE WALLS							
261.21463	PARTITIONS							
	261.2146 INTERIOR WALLS + PARTIT.							
261.2147	DOORS + WINDOWS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.21472	PERSONNEL DOORS			70 SF	56 MH	650	840	
261.21473	SASH + GLAZING			80 SF	40 MH	464	960	
	261.2147 DOORS + WINDOWS				96 MH	1,114	1,800	2,914
261.2149	PAINTING							
261.21491	CONCRETE							
261.21492	STEELWORK			3 TN	15 MH	144	18	
261.21493	METAL DECK			2500 SF	50 MH	479	250	
261.21494	HANDRAIL			180 LF	36 MH	345	18	
	261.2149 PAINTING				101 MH	968	286	1,254
	261.214 SUPERSTRUCTURE				38331 MH	432,301	150,794	583,095
	261.21 BUILDING STRUCTURE				52340 MH	590,713	276,037	866,750
261.22	BUILDING SERVICE							
261.221	PLUMBING + DRAINS							
261.2211	ROOF DRAINS & PIPING							
261.22111	DRAINS			8 EA	79 MH	1,028	1,600	
261.22115	PIPING (ALL 2.5 IN + LGR)							
261.221151	GALV STEEL/NNS	9120 LB	15,504	1 LT	2189 MH	28,367	2,837	
	261.22115 PIPING (ALL 2.5 IN + LGR)		15,504		2189 MH	28,367	2,837	46,708
	261.2211 ROOF DRAINS & PIPING		15,504		2268 MH	29,395	4,437	49,336

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.2212	FLOOR DRAINS & PIPING							
261.22121	DRAINS			30 EA	300 MH	3,889	6,000	
261.22125	PIPING (ALL 2.5 IN + LGR)							
261.221251	CI/NNS	23440 LB	5,157	1 LT	469 MH	6,077	608	
261.221252	PVC/NNS	300 LF	3,300	1 LT	121 MH	1,565	157	
	261.22125 PIPING (ALL 2.5 IN + LGR)		8,457		590 MH	7,642	765	16,864
	261.2212 FLOOR DRAINS & PIPING		8,457		890 MH	11,531	6,765	26,753
	261.221 PLUMBING + DRAINS		23,961		3158 MH	40,926	11,202	76,089
261.222	HEATING, VENT, + AIR COND	1 LT	30,000	1 LT	216 MH	2,793	279	
261.2221	ROTATING MACHINERY							
261.22211	PROPELLER FAN + MOTOR							
261.222111	PROPELLER FAN							
261.222112	PROPELLER FAN MOTOR							
	261.22211 PROPELLER FAN + MOTOR							
	261.2221 ROTATING MACHINERY							
261.2222	HEAT TRANSFER EQUIPMENT							
261.22221	ELECTRIC UNIT HEATERS+MTR							
261.222211	ELECTRIC UNIT HEATERS							
261.222212	ELECTRIC UNIT HTR MOTORS							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	261.22221 ELECTRIC UNIT HEATERS+MTR							
	261.2222 HEAT TRANSFER EQUIPMENT							
261.2226	VALVES + DAMPERS							
261.22269	SPECIAL VALVES + DAMPERS							
261.222691	INTAKE LOUVERS							
	261.22269 SPECIAL VALVES + DAMPERS							
	261.2226 VALVES + DAMPERS							
	261.222 HEATING, VENT, + AIR COND		30,000		216 MH	2,793	279	33,072
261.224	LIGHTING & SERVICE POWER			2500 SF	750 MH	9,222	4,500	
261.228	INSTRUMENTATION + CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	261.22 BUILDING SERVICE		55,961		4140 MH	53,137	15,991	125,089
	261.2 CIRC WATER PUMP HOUSE		55,961		56480 MH	643,850	292,028	991,839
261.3	MAKEUP WTR PRETREATMNT BLG							
261.31	BUILDING STRUCTURE							
261.311	EXCAVATION WORK							
261.3111	EARTH EXCAVATION			3503 CY	875 MH	9,372	3,503	
261.3112	ROCK EXCAVATION			375 CY	300 MH	3,213	1,500	
261.3113	CONCRETE FILL			94 CY	94 MH	961	3,008	
261.3114	FILL + BACKFILL			3030 CY	3030 MH	32,452	3,030	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.3115	DEWATERING							
	261.311 EXCAVATION WORK				4299 MH	45,998	11,041	57,039
261.313	SUBSTRUCTURE CONCRETE							
261.3131	FORMWORK			2930 SF	2344 MH	25,885	2,930	
261.3132	REINFORCING STEEL			29 TN	1015 MH	13,108	11,600	
261.3133	CONCRETE			570 CY	1003 MH	10,242	19,950	
261.3134	EMBEDDED STEEL			750 LB	60 MH	721	600	
261.3135	FLOOR FINISH			9015 SF	180 MH	1,838	90	
261.3136	WATERPROOFING			9015 SF	180 MH	1,678	902	
261.3137	CONSTRUCTION JOINTS			94 SF	94 MH	1,040	94	
261.3138	RUBBING CONCRETE SURFACES			379 SF	11 MH	113	4	
	261.313 SUBSTRUCTURE CONCRETE				4887 MH	54,625	36,170	90,795
261.314	SUPERSTRUCTURE							
261.3141	CONCRETE WORK							
261.31411	FORMWORK							
261.314111	FORMWORK-WOOD			248 SF	228 MH	2,518	248	
261.314112	FORMWORK-METAL			4736 SF	379 MH	4,932	4,262	
	261.31411 FORMWORK				607 MH	7,450	4,510	11,960
261.31412	REINFORCING STEEL			10 TN	444 MH	5,733	4,000	
261.31413	CONCRETE			105 CY	211 MH	2,155	3,675	
261.31414	EMBEDDED STEEL			750 LB	60 MH	721	600	

PLANT CODE 148 COST BASIS 07/76

UNITED ENGINEERS & CONSTRUCTORS INC.
2.5 IN HG AV - MIDDLETOWN,USA
1139 MWE PRESSURIZED WATER REACTOR

04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.31415	FLOOR FINISH			4736 SF	95 MH	970	47	
261.31416	WATERPROOFING							
261.31417	RUBBING CONCRETE SURFACES							
261.31418	CONSTRUCTION JOINTS			30 SF	30 MH	331	30	
	261.3141 CONCRETE WORK				1447 MH	17,360	12,862	30,222
261.3142	STRUCTURAL + MISC STEEL							
261.31421	STRUCTURAL STEEL			203 TN	4060 MH	52,852	152,250	
261.31423	MISCELLANEOUS FRAMES,ETC.			1 TN	60 MH	782	1,200	
261.31425	FLOOR GRATING (GALV.)			225 SF	45 MH	586	675	
261.31426	STAIR TREADS			38 EA	38 MH	494	1,330	
261.31427	HANDRAIL			68 LF	51 MH	664	680	
	261.3142 STRUCTURAL + MISC STEEL				4254 MH	55,379	156,135	211,513
261.3143	EXTERIOR WALLS							
261.31431	CONCRETE WALLS							
261.31432	MASONRY WALLS							
261.31433	METAL INSULATED SIDING			6900 SF	1380 MH	17,963	27,600	
261.31434	WINDOW WALL							
	261.3143 EXTERIOR WALLS				1380 MH	17,963	27,600	45,563
261.3144	ROOF DECK							
261.31441	METAL ROOF DECK							
261.31442	PRECAST CONCRETE PANELS			9090 SF	728 MH	9,475	11,817	
261.31443	CONCRETE FILL			113 CY	226 MH	2,307	3,616	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.31444	REINFORCING STEEL			8 TN	320 MH	4,133	3,200	
	261.3144 ROOF DECK				1274 MH	15,915	18,633	34,548
261.3145	ROOFING + FLASHING							
261.31451	B.U. ROOFING,INSUL.+FLASH.							
261.31452	B.U. ROOF+FLASH(NO INSUL)			9090 SF	455 MH	6,133	9,090	
	261.3145 ROOFING + FLASHING				455 MH	6,133	9,090	15,223
261.3146	INTERIOR WALLS + PARTITION							
261.31461	CONCRETE WALLS							
261.31462	CONCRETE BLOCK			750 SF	188 MH	2,145	1,125	
261.31463	METAL PARTITIONS							
261.31464	PLASTER BD PARTITIONS							
	261.3146 INTERIOR WALLS + PARTITION				188 MH	2,145	1,125	3,270
261.3147	DOORS + WINDOWS							
261.31471	ROOLING STEEL DOORS			660 SF	396 MH	5,154	9,240	
261.31472	PERSONNEL DOORS			225 SF	180 MH	2,088	2,700	
261.31473	SASH + GLAZING							
	261.3147 DOORS + WINDOWS				576 MH	7,242	11,940	19,182
261.3148	WALLS,FLOORS+CEILG FINISHS							
261.3149	PAINTING							
261.31491	CONCRETE			14051 SF	281 MH	2,689	1,405	
261.31492	STEELWORK			167 TN	835 MH	7,991	1,002	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.31493	METAL DECK			5760 SF	115 MH	1,101	576	
261.31494	SPECIAL METALLIC PAINT			3225 SF	65 MH	622	1,613	
261.31495	HANDRAIL			68 LF	14 MH	134	7	
261.31496	EPOXY			14513 SF	290 MH	2,775	7,257	
	261.3149 PAINTING				1600 MH	15,312	11,860	27,172
	261.314 SUPERSTRUCTURE				11174 MH	137,443	249,245	386,693
	261.31 BUILDING STRUCTURE				20360 MH	238,071	296,456	534,527
261.32	BUILDING SERVICES							
261.321	PLUMBING + DRAINS							
261.3211	ROOF DRAINS + PIPING							
261.32111	DRAINS			4 EA	33 MH	428	800	
261.32115	PIPING (ALL 2.5 IN+LARGER)							
261.321151	GALV STEEL/NNS	5700 LB	9,690	1 LT	1367 MH	17,716	1,772	
	261.32115 PIPING (ALL 2.5 IN+LARGER)		9,690		1367 MH	17,716	1,772	29,178
	261.3211 ROOF DRAINS + PIPING		9,690		1400 MH	18,144	2,572	30,406
261.3212	FLOOR DRAINS + PIPING							
261.32121	DRAINS			6 EA	47 MH	610	1,200	
261.32125	PIPING (ALL 2.5 IN+LARGER)							
261.321251	CS/NNS	4500 LB	6,750	1 LT	1079 MH	13,987	1,399	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.321252	CI/NNS	3600 LB	792	1 LT	73 MH	947	95	
	261.32125 PIPING (ALL 2.5 IN+LARGER)		7,542		1152 MH	14,934	1,494	23,970
	261.3212 FLOOR DRAINS + PIPING		7,542		1199 MH	15,544	2,694	25,780
	261.321 PLUMBING + DRAINS		17,232		2599 MH	33,688	5,266	56,186
261.322	HEATING, VENT, + AIR COND							
261.3221	ROTATING MACHINERY							
261.32211	ROOF VENTILATORS + MOTORS	4 EA	8,000	1 LT	400 MH	5,175	518	
261.322111	ROOF VENTILATORS							
261.322112	ROOF VENTILATORS MOTORS							
	261.32211 ROOF VENTILATORS + MOTORS		8,000		400 MH	5,175	518	13,693
	261.3221 ROTATING MACHINERY		8,000		400 MH	5,175	518	13,693
261.3222	HEAT TRANSFER EQUIPMENT							
261.32221	ELECTRIC UNIT HEATER+MOTOR	4 EA	5,000	1 LT	119 MH	1,463	146	
261.322211	ELECTRIC UNIT HEATER							
261.322212	ELECTRIC UNIT HEATER+MOTOR							
	261.32221 ELECTRIC UNIT HEATER+MOTOR		5,000		119 MH	1,463	146	6,609
	261.3222 HEAT TRANSFER EQUIPMENT		5,000		119 MH	1,463	146	6,609
261.3226	VALVES + DAMPERS							

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261.32269	SPECIAL VALVES							
261.322691	INTAKE LOUVERS	4 EA	4,000	1 LT	121 MH	1,564	156	
	261.32269 SPECIAL VALVES		4,000		121 MH	1,564	156	5,720
	261.3226 VALVES + DAMPERS		4,000		121 MH	1,564	156	5,720
261.3228	INSTRUMENTATION + CONTROL	1 LT	2,000	1 LT	16 MH	196	20	
	261.322 HEATING, VENT. + AIR COND		19,000		656 MH	8,398	840	28,238
261.324	LIGHTING + SERVICE POWER			6000 SF	1800 MH	22,131	10,800	
	261.32 BUILDING SERVICES		36,232		5055 MH	64,217	16,906	117,355
	261.3 MAKEUP WTR PRETREATMNT BLG		36,232		25415 MH	302,288	313,362	651,882
261.4	CHLORINATION BUILDING							
261.41	BUILDING STRUCTURE							
261.411	EXCAVATION WORK							
261.4111	EARTH EXCAVATION			31 CY	7 MH	74	31	
261.4114	BACKFILL			24 CY	7 MH	68	24	
	261.411 EXCAVATION WORK				14 MH	142	55	197
261.413	SUBSTRUCTURE CONCRETE							
261.4131	FORMWORK			160 SF	128 MH	1,414	160	
261.4132	REINF.STEEL			1 TN	35 MH	454	400	
261.4133	CONCRETE			7 CY	12 MH	123	245	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.4134	EMBEDDED STEEL							
261.4135	FLOOR FINISH			60 SF	1 MH	9	1	
261.4136	WATERPROOFING							
261.4137	CONSTRUCTION JOINTS			30 SF	30 MH	331	30	
261.4138	RUBBING CONCRETE SURFACES							
261.4139	WIRE FABRIC			60 SF	1 MH	13	7	
	261.413 SUBSTRUCTURE CONCRETE				207 MH	2,344	843	3,187
261.414	SUPERSTRUCTURE							
261.4141	CONCRETE WORK							
261.4142	STRUCT. + MISC. STEEL							
261.41421	STRUCT. STEEL							
261.41423	MISC. FRAMES, ETC.			1 TN	60 MH	782	1,200	
	261.4142 STRUCT. + MISC. STEEL				60 MH	782	1,200	1,982
261.4143	EXTERIOR WALLS							
261.41432	MASONRY			230 SF	58 MH	662	644	
	261.4143 EXTERIOR WALLS				58 MH	662	644	1,306
261.4144	ROOF DECK							
261.41441	METAL ROOF DECK			100 SF	7 MH	92	100	
	261.4144 ROOF DECK				7 MH	92	100	192
261.4145	ROOFING + FLASHING							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
261.41451	B.U.ROOFING,FLASHING+INSUL			100 SF	7 MH	94	125	
	261.4145 ROOFING + FLASHING				7 MH	94	125	219
261.4147	DOORS + WINDOWS							
261.41472	PERSONNEL DOORS			50 SF	40 MH	464	600	
261.41473	SASH + GLAZING			25 SF	13 MH	151	300	
	261.4147 DOORS + WINDOWS				53 MH	615	900	1,515
261.4149	PAINTING							
261.41492	STEELWORK			1 TN	5 MH	48	6	
261.41493	METAL DECK			100 SF	2 MH	19	10	
	261.4149 PAINTING				7 MH	67	16	83
	261.414 SUPERSTRUCTURE				192 MH	2,312	2,985	5,297
	261.41 BUILDING STRUCTURE				413 MH	4,798	3,883	8,681
261.424	LIGHTING + SERVICE POWER							
	261.4 CHLORINATION BUILDING				413 MH	4,798	3,883	8,681
	261. STRUCTURES		96,693		104736 MH	1,209,739	783,950	2,090,382
262.	MECHANICAL EQUIPMENT							
262.1	HEAT REJECTION SYSTEM							
262.11	WATER INTAKE EQUIPMENT							
262.111	ROTATING MACHINERY							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.1111	SCREEN WASH PUMP+MOTOR	2 EA	6,450	1 LT	200 MH	2,643	264	
262.11111	SCREEN WASH PUMP							
262.11112	SCREEN WASH PUMP MOTOR							
	262.1111 SCREEN WASH PUMP+MOTOR		6,450		200 MH	2,643	264	9,357
	262.111 ROTATING MACHINERY		6,450		200 MH	2,643	264	9,357
262.114	PURIFICATION+FILTRATION EQ							
262.1141	TRAVELING SCREENS	2 EA	74,000	1 LT	2900 MH	37,518	3,752	
262.1142	TRASH RACK	2 EA	10,500	1 LT	360 MH	4,687	469	
262.1143	TRASH RAKE	1 LT	42,000	1 LT	800 MH	10,350	1,035	
262.1144	STOP LOGS			40 EA	600 MH	5,592	1,300	
262.1145	SCREEN WASH STRAINER	1 EA	16,125	1 LT	100 MH	1,293	129	
	262.114 PURIFICATION+FILTRATION EQ		142,625		4760 MH	59,440	6,685	208,750
262.115	PIPING-SCREEN WASH							
262.1151	2 IN. + SMALLER							
262.1152	2.5 IN. + LARGER							
262.11521	CS/NNS	1820 LB	2,730	1 LT	436 MH	5,654	565	
	262.1152 2.5 IN. + LARGER		2,730		436 MH	5,654	565	8,949
	262.115 PIPING-SCREEN WASH		2,730		436 MH	5,654	565	8,949
262.116	VALVES-SCREEN WASH	1 LT	12,900					
262.1162	CHECK							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.1166	BUTTERFLY							
	262.116 VALVES-SCREEN WASH		12,900					12,900
262.117	PIPING-MISC ITEMS							
262.1171	HANGERS + SUPPORTS	270 LB	405					
262.1172	INSULATION							
262.1173	SPECIALTIES							
	262.117 PIPING-MISC ITEMS		405					405
	262.11 WATER INTAKE EQUIPMENT		165,110		5396 MH	67,737	7,514	240,361
262.12	CIRCULATING WATER SYSTEM							
262.121	ROTATING MACHINERY							
262.1211	CIRCULATING WATER PUMP+MTR	4 EA	2,472,500	1 LT	13000 MH	171,819	17,182	
262.12111	CIRC WATER PUMP							
262.12112	CIRC WATER PUMP MOTOR							
	262.1211 CIRCULATING WATER PUMP+MTR		2,472,500		13000 MH	171,819	17,182	2,661,501
	262.121 ROTATING MACHINERY		2,472,500		13000 MH	171,819	17,182	2,661,501
262.125	PIPE							
262.1251	2 IN + SMALLER							
262.1252	2.5 IN + LARGER							
262.12521	CONCRETE/NNS	2870 LF	1,073,839	1 LT	11164 MH	143,079	14,308	

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.12522	CS/NNS	130930 LB	196,395	1 LT	31424 MH	407,267	40,727	
	262.1252 2.5 IN + LARGER		1,270,234		42588 MH	550,346	55,035	1,875,615
	262.125 PIPE		1,270,234		42588 MH	550,346	55,035	1,875,615
262.126	VALVES							
262.1266	BUTTERFLY	16 EA	420,000	1 LT	1500 MH	19,441	1,944	
	262.126 VALVES		420,000		1500 MH	19,441	1,944	441,385
262.127	PIPING / MISC. ITEMS							
262.1271	HANGERS + SUPPORTS							
262.1272	INSULATION							
262.1273	SPECIALTIES							
262.1274	PIPE TRENCHING							
262.12741	EXCAVATION							
262.127411	EARTH EXCAVATION			19240 CY	4810 MH	51,[illegible]16	19,240	
262.127412	ROCK EXCAVATION			15900 CY	12720 MH	136,237	63,600	
	262.12741 EXCAVATION				17530 MH	187,753	82,840	270,593
262.12742	BACKFILL			25270 CY	7581 MH	75,446	25,270	
262.12743	COMPACTED SAND BED			2020 CY	2020 MH	20,103	12,120	
262.12744	SUBSTRUCTURE CONCRETE							
262.127441	FORMWORK			5100 SF	4080 MH	45,053	5,100	
262.127442	REINF STEEL			16 TN	560 MH	7,232	6,400	

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.127443	CONCRETE			630 CY	1103 MH	11,263	20,160	
	262.12744 SUBSTRUCTURE CONCRETE				5743 MH	63,548	31,660	95,208
	262.1274 PIPE TRENCHING				32874 MH	346,850	151,890	498,740
	262.127 PIPING / MISC. ITEMS				32874 MH	346,850	151,890	498,740
262.128	INSTRUMENTATION + CONTROL	1 LT	5,350	1 LT	45 MH	548	27	
262.129	SKIDS / FOUNDATIONS							
262.1291	CHLORINATION SYSTEM	1 LT	52,675	1 LT	1300 MH	16,817	1,682	
262.1292	SULPHURIC ACID FEED SYSTEM							
262.12921	ROTATING MACHINERY							
262.129211	SULFURIC ACID FEED PUMP+MT	2 EA	1,075	1 LT	100 MH	1,322	132	
262.129212	SULF ACID FEED PUMP MOTOR							
	262.12921 ROTATING MACHINERY		1,075		100 MH	1,322	132	2,529
262.12923	TANKS AND PRESSURE VESSELS							
262.129231	SULPHURIC ACID STORAGE TAN	1 EA	5,375	1 LT	200 MH	2,616	262	
	262.12923 TANKS AND PRESSURE VESSELS		5,375		200 MH	2,616	262	8,253
262.12925	PIPING							
262.129251	2 IN + SMALLER-CS/NNS			820 LB	394 MH	5,105	1,066	
262.129252	2.5 IN + LARGER							
	262.12925 PIPING				394 MH	5,105	1,066	6,171

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.12926	VALVES	1 LT	1,075					
	262.1292 SULPHURIC ACID FEED SYSTEM		7,525		694 MH	9,043	1,460	18,028
	262.129 SKIDS / FOUNDATIONS		60,200		1994 MH	25,860	3,142	89,202
	262.12 CIRCULATING WATER SYSTEM		4,228,284		92001 MH	1,114,864	229,220	5,572,368
262.13	COOLING TOWERS							
262.132	HEAT XFER EQUIPMENT							
262.1321	COOLING TOWERS(CT)-MAIN	3 EA	9,675,000	1 LT	125000 MH	1,617,113	161,711	
	262.132 HEAT XFER EQUIPMENT		9,675,000		125000 MH	1,617,113	161,711	11,453,824
262.138	INSTRUMENTATION + CONTROL	1 LT	53,950	1 LT	451 MH	5,514	276	
	262.13 COOLING TOWERS		9,728,950		125451 MH	1,622,627	161,987	11,513,564
262.15	MAIN CT.MAKEUP+BLOWDN SYS.							
262.151	MAKE-UP WATER SYSTEM							
262.1511	ROTATING MACHINERY							
262.15111	MAKE-UP PUMP + MOTOR	2 EA	333,250	1 LT	1700 MH	22,468	2,247	
262.151111	MAKE-UP PUMP							
262.151112	MAKE-UP PUMP MOTOR							
	262.15111 MAKE-UP PUMP + MOTOR		333,250		1700 MH	22,468	2,247	357,965
	262.1511 ROTATING MACHINERY		333,250		1700 MH	22,468	2,247	357,965

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
262.1515	PIPING							
262.15151	2IN.+ SMALLER							
262.15152	2.5IN + LARGER							
262.151521	CONCRETE/NNS	850 LF	32,674	1 LT	765 MH	9,806	981	
	262.15152 2.5IN + LARGER		32,674		765 MH	9,806	981	43,461
	262.1515 PIPING		32,674		765 MH	9,806	981	43,461
262.1516	VALVES	15 EA	134,375	1 LT	152 MH	1,944	194	
262.15162	CHECK VALVES							
262.15163	GLOBE VALVES							
262.15166	BUTTERFLY VALVES							
	262.1516 VALVES		134,375		152 MH	1,944	194	136,513
262.1517	PIPING - MISC. ITEMS							
262.15171	HANGERS + SUPPORTS							
262.15172	INSULATION							
262.15173	SPECIALTIES							
262.15174	PIPE TRENCHING							
262.151741	EXCAVATION			5220 CY	1305 MH	13,977	5,220	
262.151742	BACKFILL			4180 CY	1254 MH	12,480	4,180	
262.151743	COMPACTED SAND BED			850 CY	850 MH	8,460	5,100	
	262.15174 PIPE TRENCHING				3409 MH	34,917	14,500	49,417

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	262.1517 PIPING - MISC. ITEMS				3409 MH	34,917	14,500	49,417
262.1518	INSTRUMENTATION + CONTROL	1 LT	6,760	1 LT	51 MH	624	31	
	262.151 MAKE-UP WATER SYSTEM		507,059		6077 MH	69,759	17,953	594,771
262.152	BLOWDN SYSTEM							
262.1525	PIPING							
262.15251	2 IN. + SMALLER							
262.15252	2.5 IN. + LARGER							
262.152521	CONCRETE/NNS	1750 LF	17,500	1 LT	352 MH	4,507	451	
	262.15252 2.5 IN. + LARGER		17,500		352 MH	4,507	451	22,458
	262.1525 PIPING		17,500		352 MH	4,507	451	22,458
262.1526	VALVES	2 EA	32,250	1 LT	40 MH	513	51	
262.15265	BUTTERFLY							
	262.1526 VALVES		32,250		40 MH	513	51	32,814
262.1527	PIPING-MISC ITEMS							
262.15271	HANGERS + SUPPORTS							
262.15272	INSULATION							
262.15273	SPECIALTIES							
262.15274	PIPE TRENCHING							
	262.1527 PIPING-MISC ITEMS							

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262.1528	INSTRUMENTATION & CONTROL	1 LT	2,000	1 LT	16 MH	196	10	
	262.152 BLOWDN SYSTEM		51,750		408 MH	5,216	512	57,478
262.153	MAKEUP WTR PRETREATMNT SYS	1 LT	925,000	1 LT	38278 MH	495,200	99,040	
	262.15 MAIN CT.MAKEUP+BLOWDN SYS.		1,483,809		44763 MH	570,175	117,505	2,171,489
	262.1 HEAT REJECTION SYSTEM		15,606,153		267611 MH	3,375,403	516,226	19,497,782
	262. MECHANICAL EQUIPMENT		15,606,153		267611 MH	3,375,403	516,226	19,497,782
	26 . MAIN COND HEAT REJECT SYS		15,702,846		372347 MH	4,585,142	1,300,176	21,588,164

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
2	TOTAL DIRECT COSTS		221,095,420		10819241 MH	133,138,710	66,722,881	420,957,011

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9 .	TOTAL INDIRECT COSTS							
91 .	CONSTRUCTION SERVICES							
911.	TEMPORARY CONSTRUCTION FAC							
911.1	TEMPORARY BUILDINGS							
911.11	FIELD OFFICE,SHOPS,WHSE.			1 LT	95000 MH	1,121,000	1,250,000	
911.12	JANITOR SERVICES			1 LT	140000 MH	1,309,000	150,000	
911.13	GUARDS - SECURITY			1 LT	295000 MH	2,065,000	150,000	
	911.1 TEMPORARY BUILDINGS				530000 MH	4,495,000	1,550,000	6,045,000
911.2	TEMPORARY FACILITIES							
911.21	ROADS,PARKING,LAYDOWN AREA			1 LT	150000 MH	1,537,500	750,000	
911.22	TEMPORARY ELECTRICAL SUCE			1 LT	250000 MH	3,075,000	3,300,000	
911.23	TEMPORARY MECH. & PIPING			1 LT	200000 MH	2,590,000	1,500,000	
911.24	TEMPORARY HEAT			1 LT	60000 MH	660,000	600,000	
911.25	BARGE UNLOAD.FAC. - NONE							
911.26	GENERAL CLEANUP			1 LT	430000 MH	4,020,500	200,000	
911.27	SNOW REMOVAL-INCL.IN911.21							
	911.2 TEMPORARY FACILITIES				1090000 MH	11,883,000	6,350,000	18,233,000
	911. TEMPORARY CONSTRUCTION FAC				1620000 MH	16,378,000	7,900,000	24,278,000
912.	CONSTRUCTION TOOLS & EQUIP							
912.1	MAJOR EQUIPMENT							

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
912.11	PURCHASE MAJOR EQUIPMENT			1 LT			10,000,000	
912.12	RENTAL INCLUDED IN 912.11							
912.13	EQUIPMENT MAINTENANCE			1 LT	250000 MH	3,075,000	1,700,000	
912.14	FUEL + LUBRICANTS			1 LT			400,000	
912.14	FUEL AND LUBRICANTS							
	912.14 FUEL + LUBRICANTS						400,000	400,000
	912.1 MAJOR EQUIPMENT				250000 MH	3,075,000	12,100,000	15,175,000
912.2	MISCELLANEOUS VEHICLES							
912.21	PURCHASE INCL. IN 912.11							
912.22	RENTAL-INCL. IN 912.12							
912.23	MAINTENANCE-INCL.IN 912.13							
912.24	FUEL&LUB.-INCL. IN 912.14							
	912.2 MISCELLANEOUS VEHICLES							
912.3	PURCHASE OF SMALL TOOLS			1 LT			2,750,000	
912.4	EXPENDABLE SUPPLIES			1 LT			2,750,000	
	912. CONSTRUCTION TOOLS & EQUIP				250000 MH	3,075,000	17,600,000	20,675,000
913.	PAYROLL INSURANCE & TAXES							
913.1	SOCIAL SECUR. TAX .055 X L		8,588,000					
913.2	STATE+FED.UNEMPLOY.035 X L		5,465,000					
913.3	WORKMENS COMP.INS .040 X L		6,246,000					
913.4	P.L.+P.D. INS. .005 X L		781,000					

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	913. PAYROLL INSURANCE & TAXES		21,080,000					21,080,000
914.	PERMITS,INS. & LOCAL TAXES							
914.1	BUILDERS ALL RISK INS			1 LT			4,000,000	
914.2	FEES & PERMITS							
914.3	STATE & LOCAL SALES TAXES							
914.4	NUCLEAR LIABILITY INS.							
	914. PERMITS,INS. & LOCAL TAXES						4,000,000	4,000,000
915.	TRANSPORTATION							
	91 . CONSTRUCTION SERVICES		21,080,000		1870000 MH	19,453,000	29,500,000	70,033,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
92 .	HOME OFFICE ENGRG.&SERVICE							
921.	HOME OFFICE SERVICES							
921.1	SALARIES		20,050,000					
921.11	ENGINEERING AND DESIGN	950000 MH						
921.12	ENGINEERING & DESIGN	950000 MH						
921.13	PURCHASING & EXPEDITING	112000 MH						
921.14	ESTIMATING & COST CONTROL	25000 MH						
921.16	PLANNING AND SCHEDULING	38000 MH						
921.17	REPRODUCTION	40000 MH						
	921.1 SALARIES		20,050,000					20,050,000
921.2	EXPENSES -		3,000,000					
921.3	DIRECT PAYROLL COST		5,010,000					
921.4	OVERHEAD LOADING		13,840,000					
921.5	OUTSIDE CONSULTANTS SVCS.							
921.6	FEE FOR H/O SERVICES 10%		3,890,000					
	921. HOME OFFICE SERVICES		45,790,000					45,790,000
922.	HOME OFFICE Q/A							
922.1	SALARIES	90000 MH	945,000					
922.2	DIRECT PAYROLL COST		235,000					
922.3	OVERHEAD LOADING		650,000					
922.4	EXPENSES		350,000					
	922. HOME OFFICE Q/A		2,180,000					2,180,000

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UNITED ENGINEERS & CONSTRUCTORS INC.
2.5 IN HG AV - MIDDLETOWN,USA
1139 MWE PRESSURIZED WATER REACTOR

04/12/77

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
923.	HOME OFFICE CONSTRCTN MGMT							
923.1	SALARIES	50000 MH	600,000					
923.2	DIRECT PAYROLL COST		150,000					
923.3	OVERHEAD LOADING		410,000					
923.4	EXPENSES -		90,000					
	923. HOME OFFICE CONSTRCTN MGMT		1,250,000					1,250,000
	92 . HOME OFFICE ENGRG.&SERVICE		49,220,000					49,220,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
93 .	FIELD OFFICE ENGRG&SERVICE							
931.	FIELD OFFICE EXPENSES							
931.1	OFFICE FURNITURE & EQUIP.			1 LT			200,000	
931.2	TELEPHONE & COMMUNICATIONS			1 LT			650,000	
931.3	OFFICE SUPPLIES			1 LT			2,000,000	
931.4	FIRST AID & MEDICAL EXP.			1 LT			150,000	
	931. FIELD OFFICE EXPENSES						3,000,000	3,000,000
932.	FIELD JOB SUPERVISION							
932.1	SALARIES	647153 MH	5,501,000					
932.2	SALARIES	647153 MH	5,501,000					
932.3	DIRECT PAYROLL COST		2,750,000					
932.4	OVERHEAD LOADING		2,063,000					
932.5	RELOCATION EXPENSE-ALLWNCE		800,000					
932.6	FEE FOR CONSTRUCTION SRVCS							
932.61	HOME OFFICE		120,000					
932.62	FIELD		1,661,000					
	932.6 FEE FOR CONSTRUCTION SRVCS		1,781,000					1,781,000
	932. FIELD JOB SUPERVISION		18,396,000					18,396,000
933.	FIELD QA/QC							
933.1	SALARIES	392000 MH	3,020,000					
933.2	DIRECT PAYROLL COST		755,000					

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ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
933.3	OVERHEAD LOADING		565,000					
933.4	EXPENSES		150,000					
	933. FIELD QA/QC		4,490,000					4,490,000
934.	PLANT STARTUP & TEST							
934.1	SALARIES	125000 MH	1,312,000					
934.2	DIRECT PAYROLL COST		328,000					
934.3	OVERHEAD LOADING		900,000					
934.4	EXPENSES -		195,000					
	934. PLANT STARTUP & TEST		2,735,000					2,735,000
	93 . FIELD OFFICE ENGRG&SERVICE		25,621,000				3,000,000	28,621,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
9	TOTAL INDIRECT COSTS		95,921,000		1870000 MH	19,453,000	32,500,000	147,874,000

ACCT NO.	ACCOUNT DESCRIPTION	FACTORY QUANTITY	FACTORY COSTS	SITE QUANTITY	SITE LABOR HRS	SITE LABOR COST	SITE MATERIAL COST	TOTAL COSTS
	TOTAL BASE COST		317,016,420		12689241 MH	152,591,710	99,222,881	568,831,011

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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