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THE CONCEPT COMPUTER CODE*

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MASTER

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To be presented at
IAEA Nuclear Power Course on
Electric System Expansion Planning

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Argonne National Laboratory

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EAB

What is the CONCEPT code? What does it do?

CONCEPT is a computer code that will provide conceptual capital investment cost estimates for nuclear and coal-fired power plants:

- The code can develop an estimate for construction at any point in time.
- Any unit size within the range of about 400 to 1300 MW electric may be selected.
- Any of 23 reference site locations across the United States and Canada may be selected.
- PWR, BWR, and coal-fired plants burning high-sulfur and low-sulfur coal can be estimated.
- Multiple-unit plants can be estimated.
- Costs due to escalation/inflation and interest during construction are calculated.

The CONCEPT code generates capital cost estimates based on the following premise:

Any central station power plant involves approximately the same major cost components regardless of the location or date of initial operation.

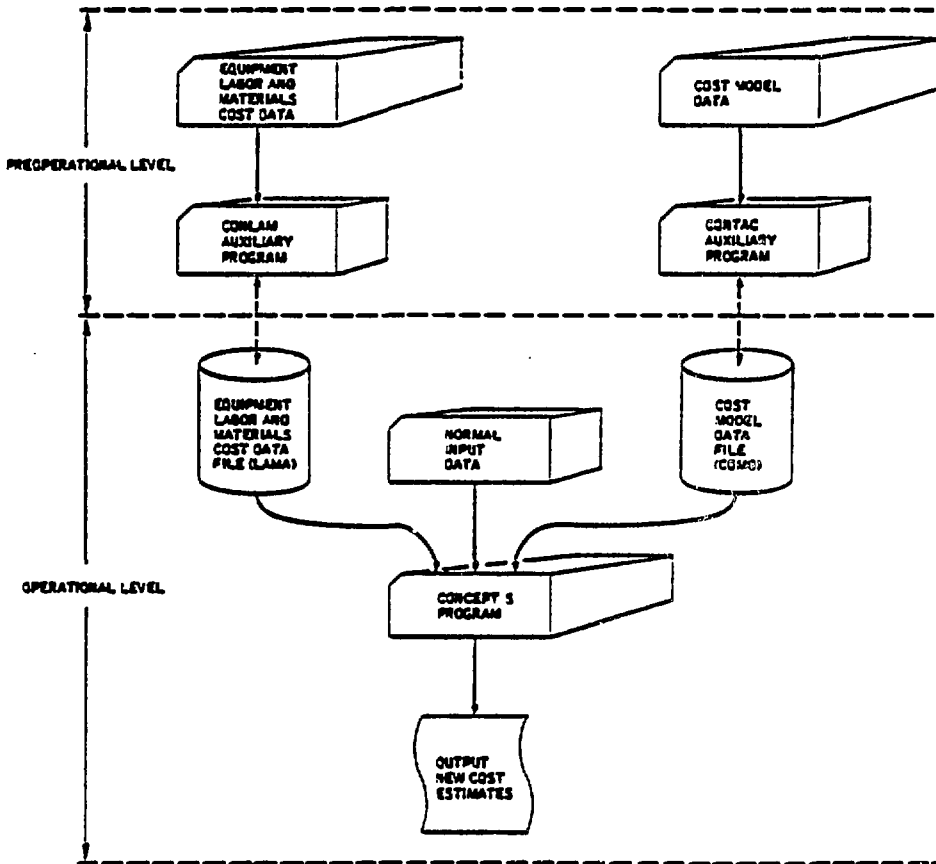
- Cost estimates produced by the CONCEPT code are not substitutes for detailed cost estimates for specific projects.
- However, they are useful for preliminary evaluation studies and can be used as a rough check of more detailed estimates.
- For example, the CONCEPT code has been used by the U.S. Nuclear Regulatory Commission in developing "independent" capital investment cost estimates for every PWR and BWR plant undergoing construction-permit licensing in the U.S. since 1974.

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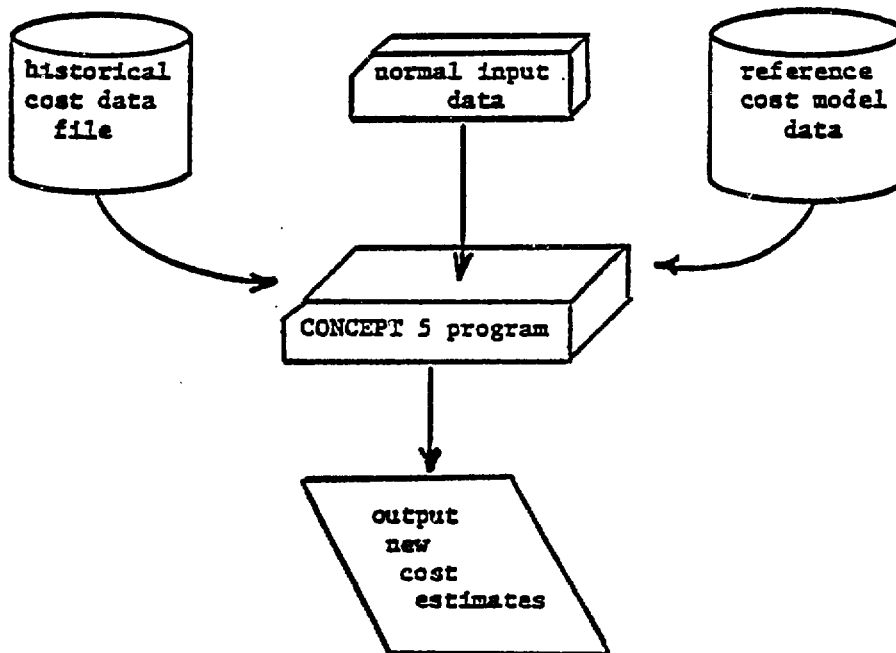
The CONCEPT code package has been distributed widely by the National Energy Software Center located at Argonne National Laboratory:

- Electric Utilities
- Architect-Engineers
- Manufacturers
- U.S. Government Agencies
- National Laboratories
- Universities
- State Public Utility Commissions
- Internationally
 - IAEA
 - Canada
 - Mexico
 - Italy
 - Australia
 - Taiwan
 - Japan
 - Brazil

The CONCEPT package consists of three separate computer programs:



The CONCEPT code interacts with reference and historical data:



CONCEPT takes a reference plant estimate and modifies it to account for a specific case:

- TIME (cost indices)
- LOCATION (cost indices)
- SIZE (scaling relation)

Each cost model contains 800-900 cards describing

- Account titles
- Detailed reference costs
- Cost scaling factors
- Reference cost index
- Reference cash flows

Reference plant costs are adjusted for the specified unit size using a classical exponential cost-size scaling relationship:

$$\frac{\text{Cost}_{\text{new}}}{\text{Cost}_{\text{ref}}} = \left(\frac{\text{Size}_{\text{new}}}{\text{Size}_{\text{ref}}} \right)^n$$

| Account | Scaling exponents | |
|---------------------------------------|-------------------|-------------|
| | Nuclear | Coal |
| Direct costs | | |
| Land and land rights | 0.0 | 0.0 |
| Structures and improvements | 0.50 | 0.45 |
| Reactor/boiler plant equipment | 0.60 | 0.60 |
| Turbine plant equipment | 0.80 | 0.70 |
| Electric plant equipment | 0.40 | 0.30 |
| Miscellaneous plant equipment | 0.30 | 0.20 |
| Main condenser heat rejection system | 0.80 | 0.80 |
| Indirect costs | | |
| Construction services | 0.45 | 0.50 |
| Home office engineering and services | 0.20 | 0.60 |
| Field office engineering and services | 0.40 | 0.50 |
| Owner's costs | 0.50 | 0.55 |
| Cost-weighted average | 0.50 | 0.55 |

The adjusted-size reference cost is modified for time and location by multiplying by an appropriate cost-index ratio. For labor, the adjustment is:

$$\frac{\text{Hourly labor rate at specified date}}{\text{Hourly labor rate for reference date}} \times \text{Reference labor cost}$$

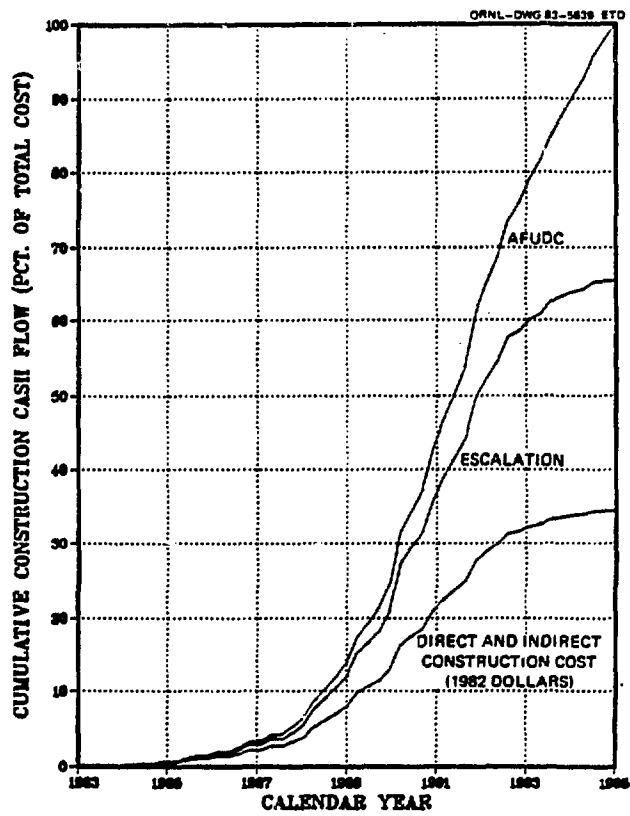
Equipment and materials costs are adjusted similarly using appropriate cost indexes:

$$\frac{\text{Cost index at specified date}}{\text{Cost index for reference date}} \times \text{Reference cost}$$

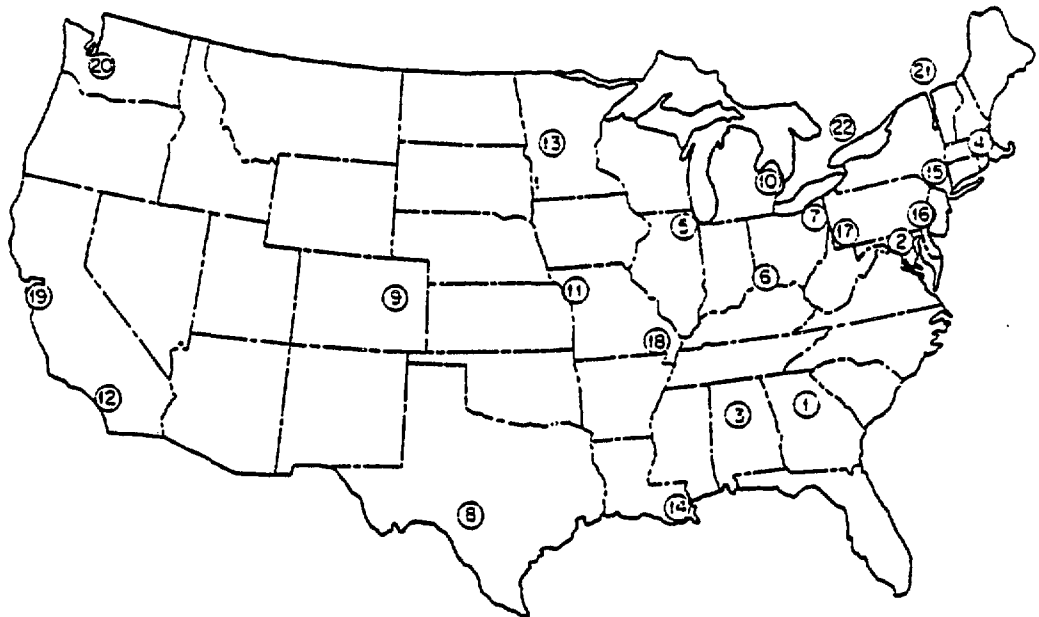
The component costs — adjusted for size, location, and time — are summed to the major accounts; contingency allowance is added; and escalation and interest are calculated:

| ACCOUNT NUMBER | ACCOUNT TITLE | TOTAL COSTS | EQUIPMENT | | | LABOR | | MATERIAL |
|----------------|---|--------------|-----------|-----------|------------------------------------|---------|----------|----------|
| | | | COSTS | MANHOURS | COSTS | COSTS | COSTS | |
| 20 . | LAND AND LAND RIGHTS | 6 | 0.0 | (0.0) | 0.0 | 6.125 | | |
| 21 . | STRUCTURES + IMPROVEMENTS | 214 | 12.530 | (5.042) | 141.502 | 60.033 | | |
| 22 . | REACTOR PLANT EQUIPMENT | 309 | 239.956 | (1.900) | 55.715 | 13.250 | | |
| 23 . | TURBINE PLANT EQUIPMENT | 249 | 190.813 | (1.713) | 50.201 | 7.724 | | |
| 24 . | ELECTRIC PLANT EQUIPMENT | 85 | 35.588 | (1.256) | 36.487 | 12.702 | | |
| 25 . | MISCELLANEOUS PLANT EQUIPT | 49 | 19.698 | (0.837) | 24.523 | 4.854 | | |
| 26 . | MAIN COND HEAT REJECT SYS | 48 | 25.945 | (0.679) | 19.557 | 2.621 | | |
| | SUBTOTAL | 960 | 524.530 | (11.427) | 327.905 | 107.309 | | |
| 91 . | CONSTRUCTION SERVICES | 192 | | | 14.6851 | | | |
| 92 . | HOME OFFICE ENGRG.&SERVICE | 237 | | (16.112) | TOTAL CRAFT MANHOURS | | | |
| 93 . | FIELD OFFICE ENGRG&SERVICE | 127 | | 14.647 | MANHOURS/KW | | | |
| 94 . | OWNER'S COSTS | 82 | | | | | | |
| | SUBTOTAL | 637 | | | | | | |
| | DIRECT & INDIRECT COSTS | (\$ 1452/KW) | 1597 | | | | | |
| | CONTINGENCY ALLOWANCE | | 240 | | | | | |
| | TOTAL DIRECT & INDIRECT COSTS | (\$ 1670/KW) | 1837 | | | | | |
| | ESCALATION DURING CONSTRUCTION | (7.0%/YR) | 632 | | | | | |
| | TOTAL ESCALATED DIRECT & INDIRECT COSTS | (\$ 2245/KW) | 2469 | | | | | |
| | INTEREST DURING CONSTRUCTION COMPOUND | (9.000%/YR) | | | | | | |
| | ON DIRECT & INDIRECT COSTS | | 710 | | | | | |
| | ON ESCALATION DURING CONSTRUCTION | | 202 | | | | | |
| | TOTAL INTEREST DURING CONSTRUCTION | (\$ 829/KW) | 912 | | | | | |
| | TOTAL PLANT CAPITAL INVESTMENT | (\$ 3074/KW) | 3381 | | | | | |
| | | | | | WEIGHTED AVERAGE ESCALATION (%/YR) | | | |
| | | | | | EQUIPMENT | LABOR | MATERIAL | |
| | | | | | 7.0 | 7.0 | 7.0 | |

Cumulative construction cash flow curve for LWR nuclear plant.



The CONCEPT code contains cost-index data for 20 major U.S. cities and two in Canada:



- | | | | |
|--------------|----------------|-----------------|------------------|
| 1 ATLANTA | 7 CLEVELAND | 13 MINNEAPOLIS | 19 SAN FRANCISCO |
| 2 BALTIMORE | 8 DALLAS | 14 NEW ORLEANS | 20 SEATTLE |
| 3 BIRMINGHAM | 9 DENVER | 15 NEW YORK | 21 MONTREAL |
| 4 BOSTON | 10 DETROIT | 16 PHILADELPHIA | 22 TORONTO |
| 5 CHICAGO | 11 KANSAS CITY | 17 PITTSBURGH | 23 MIDDLETOWN |
| 6 CINCINNATI | 12 LOS ANGELES | 18 ST. LOUIS | |

Examples of regional variations in power plant capital investment costs found with the CONCEPT code.

| City | Cost Factors ^a | |
|---------------|---------------------------|----------------|
| | Nuclear PWR | Fossil Coal |
| Boston | 1.02 | 1.03 |
| New York | 1.08 | 1.09 |
| Baltimore | 0.97 | 0.99 |
| Atlanta | 0.91 | 0.93 |
| Chicago | 1.00 | 1.00 |
| Dallas | 0.97 | 1.01 |
| Kansas City | 0.97 | 0.98 |
| Denver | 1.01 | 1.02 |
| San Francisco | 1.11 | 1.17 |
| Seattle | 1.01 | 1.03 |

^aUsing EEDB-VI cost models.

UNIT 1 CAPITAL INVESTMENT SUMMARY (MILLIONS OF DOLLARS)

1100 MWE PHRN (7-13-84) POWER PLANT AT CHICAGO JGD

PHRN MODEL, EEDB PHASE VI, 01/83 REGULATORY STATUS

COST BASIS: YEAR OF STEAM SUPPLY SYSTEM PURCHASE

DESIGN & CONSTRUCTION PERIOD: STEAM SUPPLY SYSTEM PURCHASE: 1987.000

CONSTRUCTION PERMIT: 1989.500

COMMERCIAL OPERATION: 1995.000

| ACCOUNT NUMBER | ACCOUNT TITLE | TOTAL COSTS | EQUIPMENT | | | LABOR | | | MATERIAL | | |
|----------------|---|--------------|-----------|-----------|-----------|-------|----------|---------|----------|----------------------|-------|
| | | | COSTS | MANHOURS | COSTS | COSTS | MANHOURS | COSTS | COSTS | MANHOURS | COSTS |
| 20 . | LAND AND LAND RIGHTS | 6 | 0.0 | (0.0) | 0.0 | | | 6.125 | | | |
| 21 . | STRUCTURES + IMPROVEMENTS | 214 | 12.530 | (5.042) | 141.502 | | | 60.033 | | | |
| 22 . | REACTOR PLANT EQUIPMENT | 309 | 239.956 | (1.900) | 55.715 | | | 13.250 | | | |
| 23 . | TURBINE PLANT EQUIPMENT | 249 | 190.813 | (1.713) | 50.201 | | | 7.724 | | | |
| 24 . | ELECTRIC PLANT EQUIPMENT | 85 | 35.588 | (1.256) | 36.487 | | | 12.702 | | | |
| 25 . | MISCELLANEOUS PLANT EQUIPT | 49 | 19.698 | (0.837) | 24.523 | | | 4.854 | | | |
| 26 . | MAIN COND HEAT REJECT SYS | 48 | 25.955 | (0.679) | 19.557 | | | 2.621 | | | |
| | SUBTOTAL | 960 | 524.530 | (11.427) | 327.985 | | | 107.309 | | | |
| 91 . | CONSTRUCTION SERVICES | 192 | | | 14.685 | | | | | | |
| 92 . | HOME OFFICE ENGRG.&SERVICE | 237 | | | (16.112) | | | | | TOTAL CRAFT MANHOURS | |
| 93 . | FIELD OFFICE ENGRG&SERVICE | 127 | | | 14.647 | | | | | MANHOURS/KW | |
| 94 . | OWNER'S COSTS | 82 | | | | | | | | | |
| | SUBTOTAL | 637 | | | | | | | | | |
| | DIRECT & INDIRECT COSTS | (\$ 1452/KW) | 1597 | | | | | | | | |
| | CONTINGENCY ALLOWANCE | | 240 | | | | | | | | |
| | TOTAL DIRECT & INDIRECT COSTS | (\$ 1670/KW) | 1837 | | | | | | | | |
| | ESCALATION DURING CONSTRUCTION | (7.0%/YR) | 632 | | | | | | | | |
| | TOTAL ESCALATED DIRECT & INDIRECT COSTS | (\$ 2245/KW) | 2469 | | | | | | | | |
| | INTEREST DURING CONSTRUCTION COMPOUND | (9.000%/YR) | | | | | | | | | |
| | ON DIRECT & INDIRECT COSTS | | 710 | | | | | | | | |
| | ON ESCALATION DURING CONSTRUCTION | | 202 | | | | | | | | |
| | TOTAL INTEREST DURING CONSTRUCTION | (\$ 829/KW) | 912 | | | | | | | | |
| | TOTAL PLANT CAPITAL INVESTMENT | (\$ 3074/KW) | 3381 | | | | | | | | |

WEIGHTED AVERAGE ESCALATION (%/YR)
 EQUIPMENT 7.0 LABOR 7.0 MATERIAL 7.0

DATE 08-17-84 CONCEPT COST ESTIMATES (PHASE 5)
 UNIT 1 CAPITAL INVESTMENT DETAIL COSTS (THOUSANDS OF DOLLARS)
 1100 MWE PHRN (7-13-84) POWER PLANT AT: CHICAGO JGO
 PHRN MODEL, EEDB PHASE VI, 01/83 REGULATORY STATUS
 COST BASIS: YEAR OF STEAM SUPPLY SYSTEM PURCHASE

STEAM SUPPLY SYSTEM PURCHASE: 1987.000
 CONSTRUCTION PERMIT: 1989.500
 COMMERCIAL OPERATION: 1995.000

| ACCOUNT NUMBER | ACCOUNT TITLE | FACTORY EQUIPMENT | SITE LABOR | SITE MATERIALS | TOTAL |
|--|-----------------------------|-------------------|------------|----------------|-----------|
| 26 . | MAIN COND HEAT REJECT SYS | | | | |
| 261. | STRUCTURES | | | | |
| 261.1 | MAKEUP WTR INT + DISCH STR | | | | |
| 261.11 | INTAKE STRUCTURE | \$ 10. | \$ 487. | \$ 225. | 721. |
| 261.12 | DISCHARGE STRUCTURE | 0. | 16. | 12. | 28. |
| | SUBTOTAL | \$ 10. | \$ 503. | \$ 237. | \$ 749. |
| 261.2 | CIRC WATER PUMP HOUSE | | | | |
| 261.21 | BUILDING STRUCTURE | \$ 0. | \$ 1077. | \$ 283. | 1359. |
| 261.22 | BUILDING SERVICE | 111. | 99. | 21. | 231. |
| | SUBTOTAL | \$ 111. | \$ 1176. | \$ 305. | \$ 1592. |
| 261.3 | MAKEUP WTR PRETREATMNT BLDG | | | | |
| 261.31 | BUILDING STRUCTURE | \$ 0. | \$ 477. | \$ 378. | 855. |
| 261.32 | BUILDING SERVICES | 75. | 138. | 21. | 240. |
| | SUBTOTAL | \$ 75. | \$ 615. | \$ 406. | \$ 1095. |
| 261.4 | COOLING TWR SMGR BLDG | | | | |
| 261.41 | BUILDING STRUCTURE | \$ 0. | \$ 49. | \$ 43. | 91. |
| 261.42 | BUILDING SERVICES | 106. | 92. | 22. | 220. |
| | SUBTOTAL | \$ 106. | \$ 141. | \$ 64. | \$ 312. |
| | SUBTOTAL | \$ 302. | \$ 2434. | \$ 1013. | \$ 3748. |
| 262. | MECHANICAL EQUIPMENT | | | | |
| 262.1 | HEAT REJECTION SYSTEM | | | | |
| 262.11 | WATER INTAKE EQUIPMENT | \$ 325. | \$ 128. | \$ 9. | 462. |
| 262.12 | CIRCULATING WATER SYSTEM | 8378. | 4292. | 583. | 13253. |
| 262.13 | COOLING TOWERS | 14411. | 9630. | 1. | 24042. |
| 262.14 | COOLING TOWER BASINS | 0. | 1917. | 861. | 2778. |
| 262.15 | MAIN CT.MAKEUP+BLOWDN SYS. | 2530. | 1157. | 155. | 3842. |
| | SUBTOTAL | \$ 25644. | \$ 17124. | \$ 1609. | \$ 44376. |
| | SUBTOTAL | \$ 25644. | \$ 17124. | \$ 1609. | \$ 44376. |
| SUBTOTAL FOR ACCOUNT | | \$ 25945. | \$ 19557. | \$ 2621. | \$ 48124. |
| CONTINGENCY (15.0%EQP-15.0%LABOR-15.0%MTL) | | 3892. | 2934. | 393. | 7219. |
| TOTAL FOR ACCOUNT 26 | | \$ 29837. | \$ 22491. | \$ 3015. | \$ 55343. |

DATE 08-17-84 CONCEPT COST ESTIMATES (PHASE 5)
 UNIT 1 CAPITAL INVESTMENT DETAIL COSTS (THOUSANDS OF DOLLARS)
 1100 MWE PWRN (7-13-84) POWER PLANT AT: CHICAGO JGO
 PWRN MODEL, EEDB PHASE VI, 01/83 REGULATORY STATUS
 COST BASIS: YEAR OF STEAM SUPPLY SYSTEM PURCHASE

STEAM SUPPLY SYSTEM PURCHASE: 1987.000
 CONSTRUCTION PERMIT: 1989.500
 COMMERCIAL OPERATION: 1995.000

| ACCOUNT NUMBER | ACCOUNT TITLE | FACTORY EQUIPMENT | SITE LABOR | SITE MATERIALS | TOTAL |
|----------------|---|-------------------|------------|----------------|------------|
| 91 | CONSTRUCTION SERVICES | | | | |
| 911 | TEMPORARY CONSTRUCTION FAC | | | | |
| 911.1 | TEMPORARY BUILDINGS | | | | |
| 911.11 | FIELD OFFICE, SHOPS, WHSE. | \$ 0. | \$ 6686. | \$ 2303. | 9989. |
| 911.12 | JANITOR SERVICES | 0. | 4755. | 576. | 5330. |
| 911.13 | GUARDS - SECURITY | 0. | 28230. | 864. | 29094. |
| | SUBTOTAL | \$ 0. | \$ 39671. | \$ 3743. | \$ 43414. |
| 911.2 | TEMPORARY FACILITIES | | | | |
| 911.21 | ROADS, PARKING, LAYDOWN AREA | \$ 0. | \$ 21693. | \$ 1728. | 23420. |
| 911.22 | TEMPORARY ELECTRICAL SUCE | 0. | 13372. | 6526. | 19898. |
| 911.23 | TEMPORARY MECH. & PIPING | 0. | 8320. | 3359. | 11679. |
| 911.24 | TEMPORARY HEAT | 0. | 7429. | 1440. | 8869. |
| 911.26 | GENERAL CLEANUP | 0. | 27933. | 1728. | 29660. |
| 911.28 | WEATHER PROTECTION | 0. | 7875. | 672. | 8547. |
| | SUBTOTAL | \$ 0. | \$ 86622. | \$ 15552. | \$ 102073. |
| | SUBTOTAL | \$ 0. | \$ 126292. | \$ 19195. | \$ 145487. |
| 912 | CONSTRUCTION TOOLS & EQUIP | | | | |
| 912.1 | MAJOR EQUIPMENT | | | | |
| 912.11 | PURCHASE MAJOR EQUIPMENT | \$ 0. | \$ 0. | \$ 17179. | 17179. |
| 912.13 | EQUIPMENT MAINTENANCE | 0. | 8618. | 3839. | 12457. |
| 912.14 | FUEL + LUBRICANTS | 0. | 524. | 2303. | 2828. |
| | SUBTOTAL | \$ 0. | \$ 9212. | \$ 23321. | \$ 32533. |
| 912.2 | MISCELLANEOUS VEHICLES | 0. | 0. | 0. | 0. |
| 912.3 | PURCHASE OF SMALL TOOLS | 0. | 297. | 5183. | 5480. |
| 912.4 | EXPENDABLE SUPPLIES | 0. | 0. | 6526. | 6526. |
| 912.5 | SAFETY EQUIPMENT+INSPECT. | 0. | 227. | 288. | 585. |
| | SUBTOTAL | \$ 0. | \$ 9806. | \$ 35318. | \$ 45124. |
| 913 | PAYROLL INSURANCE & TAXES (.17L INCLUDED IN SITE LABOR) | | | | |
| 913.1 | SOCIAL SECUR. TAX | 0. | 0. | 0. | 0. |
| 913.2 | STATE+FED.UNEMPLOY | 0. | 0. | 0. | 0. |
| 913.3 | WORKMENS COMP.INS | 0. | 0. | 0. | 0. |
| 913.4 | P.L.+P.O. INS. | 0. | 0. | 0. | 0. |
| | SUBTOTAL | \$ 0. | \$ 0. | \$ 0. | \$ 0. |
| 914 | PERMITS, INS. & LOCAL TAXES | | | | |
| 914.1 | BUILDERS ALL RISK INS | 0. | 0. | 1152. | 1152. |
| 914.2 | FEES & PERMITS | 0. | 0. | 0. | 0. |
| 914.3 | STATE & LOCAL SALES TAXES | 0. | 0. | 0. | 0. |
| 914.4 | NUCLEAR LIABILITY INS. | 0. | 0. | 0. | 0. |
| | SUBTOTAL | \$ 0. | \$ 0. | \$ 1152. | \$ 1152. |
| 915 | TRANSPORTATION | \$ 0. | \$ 0. | \$ 0. | 0. |
| | SUBTOTAL FOR ACCOUNT | \$ 0. | \$ 136098. | \$ 55664. | \$ 191762. |
| | CONTINGENCY (15.0%EQP-15.0%LABOR-15.0%NTL) | 0. | 20415. | 8150. | 28765. |
| | TOTAL FOR ACCOUNT 91 | \$ 0. | \$ 156513. | \$ 64014. | \$ 220527. |

DATE 08-17-84 C O N C E P T C O S T E S T I M A T E S (PHASE 5)
 UNIT 1 CAPITAL INVESTMENT DETAIL COSTS (THOUSANDS OF DOLLARS)
 1100 MWE PHRN (7-13-84) POWER PLANT AT: CHICAGO JGD
 PHRN MODEL, EEDB PHASE VI, 01/83 REGULATORY STATUS
 COST BASIS: YEAR OF STEAM SUPPLY SYSTEM PURCHASE

STEAM SUPPLY SYSTEM PURCHASE: 1987.000
 CONSTRUCTION PERMIT: 1989.500
 COMMERCIAL OPERATION: 1995.000

| | 1987.0 | 1989.5 | 1992.0 | 1994.5 | 1997.0 | |
|---|--------|--------|--------|--------|--------|------|
| C | 3400 + | | | | | 3400 |
| A | - | | | * | | |
| P | 3200 + | | | * | | 3200 |
| I | - | | | * | | |
| T | - | | | * | | |
| A | 3000 + | | | * | | 3000 |
| L | - | | | * | | |
| C | 2800 + | | | * | | 2800 |
| O | - | | | * | | |
| S | - | | | * | | |
| T | 2600 + | | | * | | 2600 |
| (| - | | | * | | |
| M | 2400 + | | | * | | 2400 |
| I | - | | | * | | |
| L | 2200 + | | | * | | 2200 |
| L | - | | | * | | |
| I | 2000 + | | | * | | 2000 |
| O | - | | | * | | |
| V | - | | | * | | |
| S | - | | | * | | |
| D | 1800 + | | | * | | 1800 |
| F | - | | | * | | |
| D | 1600 + | | | * | | 1600 |
| O | - | | | * | | |
| L | 1400 + | | | * | | 1400 |
| L | - | | | * | | |
| A | 1200 + | | | * | | 1200 |
| S | - | | | * | | |
|) | 1000 + | | | * | | 1000 |
| - | - | | | * | | |
| - | 800 + | | | * | | 800 |
| - | - | | | * | | |
| - | 600 + | | | * | | 600 |
| - | - | | | * | | |
| - | 400 + | | | * | | 400 |
| - | - | | | * | | |
| - | 200 + | | | * | | 200 |
| - | - | | | * | | |
| 0 | 0 + | | | * | | 0 |

DATE 08-17-84 CONCEPT COST ESTIMATES (PHASE 5)
 UNIT 1 CAPITAL INVESTMENT DETAIL COSTS (THOUSANDS OF DOLLARS)
 1100 MWE PWRN (7-13-84) POWER PLANT AT: CHICAGO JGD
 PWRN MODEL, EEDB PHASE VI, 01/83 REGULATORY STATUS
 COST BASIS: YEAR OF STEAM SUPPLY SYSTEM PURCHASE

PAGE 25
 STEAM SUPPLY SYSTEM PURCHASE: 1987.000
 CONSTRUCTION PERMIT: 1989.500
 COMMERCIAL OPERATION: 1995.000

CUMULATIVE CASH FLOW

BOTH THE CASH FLOW CURVE SHOWN ABOVE AND THE FOLLOWING CASH FLOW TABLE
 HAVE COSTS EXPRESSED AS TOTAL COST INCURRED TO DATE (INCLUDING INTEREST CHARGES TO DATE).

| DATE | COST TO DATE (MILLIONS OF DOLLARS) |
|----------|------------------------------------|
| 1987.000 | 0.0 |
| 1987.160 | 9.298 |
| 1987.320 | 11.531 |
| 1987.480 | 11.691 |
| 1987.640 | 16.520 |
| 1987.800 | 20.825 |
| 1987.960 | 31.161 |
| 1988.120 | 43.879 |
| 1988.280 | 44.488 |
| 1988.440 | 61.987 |
| 1988.600 | 81.881 |
| 1988.760 | 104.604 |
| 1988.920 | 133.168 |
| 1989.080 | 135.018 |
| 1989.240 | 169.784 |
| 1989.400 | 208.230 |
| 1989.560 | 250.589 |
| 1989.720 | 295.516 |
| 1989.880 | 347.521 |
| 1990.040 | 406.423 |
| 1990.200 | 470.719 |
| 1990.360 | 605.670 |
| 1990.520 | 676.615 |
| 1990.680 | 738.570 |
| 1990.840 | 808.259 |
| 1991.000 | 926.719 |
| 1991.160 | 1067.268 |
| 1991.320 | 1202.346 |
| 1991.480 | 1301.232 |
| 1991.640 | 1391.821 |
| 1991.800 | 1493.503 |
| 1991.960 | 1603.302 |
| 1992.120 | 1741.318 |
| 1992.280 | 1951.087 |
| 1992.440 | 2089.686 |
| 1992.600 | 2225.303 |
| 1992.760 | 2355.858 |
| 1992.920 | 2467.649 |
| 1993.080 | 2570.166 |
| 1993.240 | 2656.238 |
| 1993.400 | 2720.524 |
| 1993.560 | 2808.642 |
| 1993.720 | 2875.706 |
| 1993.880 | 2939.995 |
| 1994.040 | 3039.642 |
| 1994.200 | 3101.479 |
| 1994.360 | 3157.150 |
| 1994.520 | 3210.330 |
| 1994.680 | 3283.344 |