

Long-Range Projection of Power Loads
and Resources for Thermal Planning

WEST GROUP AREA
1973-74 through 1992-93

April 9, 1973

8409270323 840824
PDR FOIA
COHEN84-603 PDR

Long-Range Projection of Power Loads
and Resources for Thermal Planning

WEST GROUP AREA
1973-74 Through 1992-93

Introduction

This projection of power loads and resources has been prepared by the Subcommittee on Loads and Resources of the Pacific Northwest Utility Conference Committee at the request of the Joint Power Planning Council. The purpose of the report is to provide estimates of additional generating capability which will be required to serve estimated power loads through 1992-93. Estimates are prepared on an area basis and also by major supply groups. The operating area covered is the same as that in the West Group Forecast report.

This report summarizes loads and resources for January peak and critical period average energy conditions for each operating year, 1973-74 through 1992-93. Studies made for the 1973 West Group Forecast report, February 1, 1973, have been used as a basis for this report. The resources include those scheduled on an assured basis in the West Group Forecast report plus several hydro and combustion turbine additions. Hydro additions include one unit at Mossyrock, Mayfield, and Noxon, 8 units at Rock Island, and the effect of raising the height of Ross Dam commencing in September 1976. Combustion turbine additions include Seattle City Light's proposed unit in 1974-75 and PGE's proposed units in 1978-79. Potential resources are shown in a separate part on the summary sheet.

Summary

Loads and resources indicate deficiencies in meeting firm requirements commencing in 1983-84 except for a deficit on peak of about 300 megawatts in 1974-75. This is based on the assured resources of the West Group Forecast as modified for this report. Deficiencies are shown on line 27 of Table 1 and they increase to about 18,400 megawatts peak and 11,500 megawatts energy by 1992-93. The Area surplus or deficiency of assured resources over total requirements is shown on line 28 of Table 1.

* These figures reflect maximum recall of CSPE power assigned to California utilities commencing April 1, 1975. The NPR-Hanford project has been included as a firm energy resource during the first two years (1973-74 and 1974-75) of the reporting period. It is not considered a dependable resource for peaking purposes and is not included in Table 1. However, the private utilities have elected to include their share as a firm peak resource in Table 2.

Forced outage reserves on peak were assumed to be 5 percent of hydro, existing thermal, and combustion turbine capacity and 15 percent of installed peak capability for new large thermal plants. Forced outage reserves of 5 percent were assumed for existing thermal energy capability.

Area Loads and Resources

A summary of loads and resources for the West Group Area is shown on Table 1. This year Table 1 has two parts. Part one shows the usual load-resource balance based on resources existing, under construction, and under active consideration. Part two commencing in 1983-84 shows the area load-resource balance based on potential hydro and thermal projects as they might be installed in the future to meet area requirements.

The area firm load requirements are shown on this table along with the contractual arrangements to supply capacity and energy outside the West Group Area. Also included as a requirement is an item called Capacity Required for Industrial Interruptible Load. This item is computed at the bottom of the table (lines 32, 33, and 34) and assumes BPA will install capacity to carry industrial interruptible peak loads under all water conditions. During critical hydro conditions, secondary energy imports would be needed to meet industrial interruptible energy loads.

The existing and scheduled resources include only those resources in the West Group Area which are presently existing, under construction, or under active consideration. Firm arrangements for receipt of power from outside the area are also included.

Existing West Group thermal and miscellaneous resources are included in this study as firm resources in amounts as submitted by the respective systems. They were included as peak resources up to maximum capability; however, not all of the available energy was included. Seattle's combustion turbine (60 megawatts in September 1974) and PGE's combustion turbines (146 megawatts in September 1973) were also included in this category.

In deriving the energy capability for new large thermal plants, it was assumed that for Federal net-billed shares each unit would have a 50 percent annual plant availability for the initial 12 months of its commercial operation, 70 percent for the second 12 months of commercial operation, and 85 percent thereafter. For private utilities' and other non-net-billed shares of plant output, each new large thermal unit would have an 85 percent annual availability for the initial 12 months of its commercial operation and thereafter. The annual availability factor used for part two of Table 1 was 85 percent.

In order to provide an indication of the maintenance normally undertaken in the pool, estimated amounts are tabulated on line 23. These amounts of scheduled maintenance for hydro resources are based on a procedure which utilizes a percentage of peak and energy capabilities by months. The critical period energy capabilities for new large thermal plants are derived with maintenance taken into consideration.

New Federal system planning criteria are included in this report. The additional Federal system hydro peaking capability included brings the capacity up to the minimum peaking capacity that is estimated to have the probability of occurrence of once in 20 years. This differs from firm energy capability which is based on minimum historical stream-flow conditions during the 30-year period of record. The Federal hydro resources and the net-billed thermal increment have been reduced by a realization factor of 3 percent to recognize inability of the system to achieve its full peaking capability at any one specific instance.

No energy reserve for unforeseen load growth or other contingencies has been added to the load or deducted from resources; however, a load growth reserve is shown on line 5. The peak load growth reserve is computed as 10 percent of the area firm peak load less the estimated forced outage reserves shown on line 22. The energy load growth reserve is equal to one-half year's load growth of utility-type loads.

Estimated firm loads include Bonneville Power Administration's firm industrial contracts. BPA's estimated potential firm industrial loads are shown separately on line 4.

Potential hydro projects and additional unit installations not meeting the criteria for inclusion in the West Group Forecast but considered reasonably representative of those resources which could be in operation by 1992-93 are shown on line 32. The potential hydro resources are shown on Table 4 by project. The Subcommittee felt that it would be infeasible to attempt scheduling individual hydro projects and additional unit installations by years.

The amounts of potential hydro resources were estimated for each of the years from 1983-84 through 1992-93 and were assumed to be installed in equal increments throughout the 10-year period. In 1992-93 an arbitrary 500-megawatt pumped storage project was installed to meet peak deficits. Thermal projects were installed to meet remaining deficits at 85 percent annual availability factor. Installation dates were determined on basis of energy requirements.

Loads and Resources by Major Supply Groups

Table 2 summarizes the loads and resources by three major supply groups; (1) the Federal system, (2) the public agencies, and (3) the private utilities.

The estimated loads and resources for the public agency group include all the public agencies in the West Group Area as well as those in BPA's Southern Idaho area.

The Federal agencies are included with the Federal system. The estimated loads and resources for the private utility group include the following:

Pacific Power & Light Company
Portland General Electric Company
Puget Sound Power & Light Company
The Washington Water Power Company

This table assumes that the Federal system will supply the requirements of the public agencies throughout the period of this report based on net billing arrangements. The private utilities will require additional energy beginning in 1974-75 and thereafter except during 1975-76 and 1976-77.

Summary - Requirements of Private Utilities and Public Agencies

A summary of the individual peak and energy requirements of the four private utilities and the public agencies is shown on Table 3. Requirements for public agencies not listed separately are shown in one total. This table has been included to indicate the probable extent of participation in nuclear thermal generating plants by individual utilities based on their requirements.

Subcommittee on Loads and Resources
Pacific Northwest Utilities Conference Committee

FOOTNOTES FOR TABLE 1

- 1/ Area firm loads are estimated January peak and critical period average energy system loads of private utilities, public agencies, Federal agencies, and BPA industries. Loads also include transmission losses and a peak cold weather factor for the non-generating public agencies.
- 2/ Firm exports include deliveries to California utilities under the CSFE agreement, peak/energy exchange contracts with PSW, transfers of Centralia power to Central Valley Project, WWP Co. contracts with Montana Power Co., PP&L Co. transfers to PP&L Co. Wyoming Division, BPA wheeling payments to Idaho Power Co., BPA contracts with Montana Power Co. for headwater storage payments, geographic preference, wheeling payments, and WPPSS #1 exchange deliveries.
- 3/ Peak load growth reserves are computed as 10 percent of area firm peak load, without the cold weather factor, less estimated forced outage reserves. Energy load growth reserves are computed as one-half year's load growth of utility type loads.
- 4/ Industrial interruptible loads not included in area firm loads (line 1 above).
- 5/ Hydro resources include those shown in the 1973 West Group Forecast plus Mayfield addition in September 1976, High Ross addition in September 1976, Rock Island additions in September 1977, Mossyrock addition in 1981, and Noxon additions in 1982.
- 6/ Imports include energy return to PNW from peak/energy exchange contracts with PSW utilities; BPA-PGE-PP&L-So. Cal. Edison contract in 1973-74; FJE Co. contracts with Pacific Gas and Electric Co.; WWP Co. contracts with Idaho Power Co., Montana Power Co. and Utah Power Co.; PGE Co. contract with Utah Power Co.; PSP&L Co. contract with Montana Power Co.; PP&L Co. contracts with Idaho Power Co., Utah Power Co.; transfers from PP&L Wyoming system and imports from Montana Power Co. for delivery to U.S. Indian Irrigation District.
- 7/ Combustion turbines include proposed as well as scheduled units. Included are PP&L's Libby unit, PGE's Harborton & Bethel units in 1973-74, PGE's Group #2 in 1974-75 and PGE's proposed units in 1978-79, PSP&L's South Whidbey Island unit in 1973-74, Seattle City Light's proposed unit in 1974-75, and WWP's Othello unit in 1973-74.
- 8/ WPPSS #1 (Hanford) capabilities are based on production of 4 billion kilowatt-hours per year through 1974-75. The plant is assumed shut down thereafter. The plant is not considered dependable as a peaking resource. In 1974-75 the private utilities' portion of Table II reflects firm peaking allocation from WPPSS #1 and therefore contradicts Table 1. Commencing in July 1980, WPPSS #1 capability is based on plant conversion to a 1,233 megawatt plant.
- 9/ Estimated forced outage reserves on peak are computed as 5 percent of hydro, existing thermal and combustion turbine capacity and 15 percent of installed peak capability of new large thermal plants. Forced outage reserves on energy are computed as 5 percent of existing thermal capability.

- 10/ New Federal system planning criteria. The Federal system hydro peaking capability is the minimum peaking capacity that is estimated to have the probability of occurrence of once in 20 years. This differs from firm energy capability which is based on minimum historical streamflow conditions during the 30-year period of record. The Federal hydro resources and the net-billed thermal increment have been reduced by a factor of 3 percent to recognize inability of the system to achieve its full peaking capability at any one specific instance.
- 11/ Potential hydro shown on Table 4 was proportioned over the ten-year period, 1983-84 through 1992-93, installing one-tenth of the peak and energy capability each year.
- 12/ Potential thermal was installed to meet area deficits at 85 percent load factor. Installation dates were determined on basis of energy requirements. Plant sizes were arbitrarily chosen and could vary with technological advancement. Federal - Public Agency maturity factors of 50, 70, 85 percent and 6-month delay of units of 500 megawatts and larger were not considered because ownership was not determined.
- 13/ Additional peaking was required in 1992-93 and therefore a pumped storage project was installed to meet total peak load.
- 14/ Forced outage reserves on potential projects were computed on the same basis as the existing projects. See footnote 9.
- 15/ Resources provided by industrial interruptible loads for the period 1983-84 through 1992-93 are one-half Federal forced outage reserves. The Federal share of future potential forced outage reserves (line 50) was assumed to be the same proportion as the Federal deficits are to the area deficits. The Federal portion of the forced outage reserves were then added to the base Federal forced outage reserves (line 23, Table II).

REPORT ON FINANCIAL STATEMENTS FOR THE YEAR ENDING DECEMBER 31, 2023

Fund	General Fund	Special Revenue	Debt Service	Capital Projects	Other Funds	Total	2023		2022		2021		2020		2019		2018		2017		2016		2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2005		2004		2003		2002		2001		2000		1999		1998		1997		1996		1995		1994		1993		1992		1991		1990		1989		1988		1987		1986		1985		1984		1983		1982		1981		1980		1979		1978		1977		1976		1975		1974		1973		1972		1971		1970		1969		1968		1967		1966		1965		1964		1963		1962		1961		1960		1959		1958		1957		1956		1955		1954		1953		1952		1951		1950		1949		1948		1947		1946		1945		1944		1943		1942		1941		1940		1939		1938		1937		1936		1935		1934		1933		1932		1931		1930		1929		1928		1927		1926		1925		1924		1923		1922		1921		1920		1919		1918		1917		1916		1915		1914		1913		1912		1911		1910		1909		1908		1907		1906		1905		1904		1903		1902		1901		1900		1899		1898		1897		1896		1895		1894		1893		1892		1891		1890		1889		1888		1887		1886		1885		1884		1883		1882		1881		1880		1879		1878		1877		1876		1875		1874		1873		1872		1871		1870		1869		1868		1867		1866		1865		1864		1863		1862		1861		1860		1859		1858		1857		1856		1855		1854		1853		1852		1851		1850		1849		1848		1847		1846		1845		1844		1843		1842		1841		1840		1839		1838		1837		1836		1835		1834		1833		1832		1831		1830		1829		1828		1827		1826		1825		1824		1823		1822		1821		1820		1819		1818		1817		1816		1815		1814		1813		1812		1811		1810		1809		1808		1807		1806		1805		1804		1803		1802		1801		1800		1799		1798		1797		1796		1795		1794		1793		1792		1791		1790		1789		1788		1787		1786		1785		1784		1783		1782		1781		1780		1779		1778		1777		1776		1775		1774		1773		1772		1771		1770		1769		1768		1767		1766		1765		1764		1763		1762		1761		1760		1759		1758		1757		1756		1755		1754		1753		1752		1751		1750		1749		1748		1747		1746		1745		1744		1743		1742		1741		1740		1739		1738		1737		1736		1735		1734		1733		1732		1731		1730		1729		1728		1727		1726		1725		1724		1723		1722		1721		1720		1719		1718		1717		1716		1715		1714		1713		1712		1711		1710		1709		1708		1707		1706		1705		1704		1703		1702		1701		1700		1699		1698		1697		1696		1695		1694		1693		1692		1691		1690		1689		1688		1687		1686		1685		1684		1683		1682		1681		1680		1679		1678		1677		1676		1675		1674		1673		1672		1671		1670		1669		1668		1667		1666		1665		1664		1663		1662		1661		1660		1659		1658		1657		1656		1655		1654		1653		1652		1651		1650		1649		1648		1647		1646		1645		1644		1643		1642		1641		1640		1639		1638		1637		1636		1635		1634		1633		1632		1631		1630		1629		1628		1627		1626		1625		1624		1623		1622		1621		1620		1619		1618		1617		1616		1615		1614		1613		1612		1611		1610		1609		1608		1607		1606		1605		1604		1603		1602		1601		1600		1599		1598		1597		1596		1595		1594		1593		1592		1591		1590		1589		1588		1587		1586		1585		1584		1583		1582		1581		1580		1579		1578		1577		1576		1575		1574		1573		1572		1571		1570		1569		1568		1567		1566		1565		1564		1563		1562		1561		1560		1559		1558		1557		1556		1555		1554		1553		1552		1551		1550		1549		1548		1547		1546		1545		1544		1543		1542		1541		1540		1539		1538		1537		1536		1535		1534		1533		1532		1531		1530		1529		1528		1527		1526		1525		1524		1523		1522		1521		1520		1519		1518		1517		1516		1515		1514		1513		1512		1511		1510		1509		1508		1507		1506		1505		1504		1503		1502		1501		1500		1499		1498		1497		1496		1495		1494		1493		1492		1491		1490		1489		1488		1487		1486		1485		1484		1483		1482		1481		1480		1479		1478		1477		1476		1475		1474		1473		1472		1471		1470		1469		1468		1467		1466		1465		1464		1463		1462		1461		1460		1459		1458		1457		1456		1455		1454		1453		1452		1451		1450		1449		1448		1447		1446		1445		1444		1443		1442		1441		1440		1439		1438		1437		1436		1435		1434		1433		1432		1431		1430		1429		1428		1427		1426		1425		1424		1423		1422		1421		1420		1419		1418		1417		1416		1415		1414		1413		1412		1411		1410		1409		1408		1407		1406		1405		1404		1403		1402		1401		1400		1399		1398		1397		1396		1395		1394		1393		1392		1391		1390		1389		1388		1387		1386		1385		1384		1383		1382		1381		1380		1379		1378		1377		1376		1375		1374		1373		1372		1371		1370		1369		1368		1367		1366		1365		1364		1363		1362		1361		1360		1359		1358		1357		1356		1355		1354		1353		1352		1351		1350		1349		1348		1347		1346		1345		1344		1343		1342		1341		1340		1339		1338		1337		1336		1335		1334		1333		1332		1331		1330		1329		1328		1327		1326		1325		1324		1323		1322		1321		1320		1319		1318		1317		1316		1315		1314		1313		1312		1311		1310		1309		1308		1307		1306		1305		1304		1303		1302		1301		1300		1299		1298		1297		1296		1295		1294		1293		1292		1291		1290		1289		1288		1287		1286		1285		1284		1283		1282		1281		1280		1279		1278		1277		1276		1275		1274		1273		1272		1271		1270		1269		1268		1267		1266		1265		1264		1263		1262		1261		1260		1259		1258		1257		1256		1255		1254		1253		1252		1251		1250		1249		1248		1247		1246		1245		1244		1243		1242		1241		1240		1239		1238		1237		1236		1235		1234		1233		1232		1231		1230		1229		1228		1227		1226		1225		1224		1223		1222		1221		1220		1219		1218		1217		1216		1215		1214		1213		1212		1211		1210		1209		1208		1207		1206		1205		1204		1203		1202		1201		1200		1199		1198		1197		1196		1195		1194		1193		1192		1191		1190		1189		1188		1187		1186		1185		1184		1183		1182		1181		1180		1179		1178		1177		1176		1175		1174		1173		1172		1171		1170		1169		1168		1167		1166		1165		1164		1163		1162		1161		1160		1159		1158		1157		1156		1155		1154		1153		1152		1151		1150		1149		1148		1147		1146		1145		1144		1143		1142		1141		1140		1139		1138		1137		1136		1135		1134		1133		1132		1131		1130		1129		1128		1127		1126		1125		1124		1123		1122		1121		1120		1119		1118		1117		1116		1115		1114		1113		1112		1111		1110		1109		1108		1107		1106		1105		1104		1103		1102		1101		1100		1099		1098		1097		1096		1095		1094		1093		1092		1091		1090		1089		1088		1087		1086		1085		1084		1083		1082		1081		1080		1079		1078		1077		1076		1075		1074		1073		1072		1071		1070		1069		1068		1067		1066		1065		1064		1063		1062		1061		1060		1059		1058		1057		1056		1055		1054		1053		1052		1051		1050		1049		1048		1047		1046		1045		1044		1043		1042		1041		1040		1039		1038		1037		1036		1035		1034		1033		1032		1031		1030		1029		1028		1027		1026		1025		1024		1023		1022		1021		1020		1019		1018		1017		1016		1015		1014		1013		1012		1011		1010		10	
------	--------------	-----------------	--------------	------------------	-------------	-------	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	------	--	----	--

FOOTNOTES FOR TABLE 2

- 1/ Public Agency and Private Utility commitments include entitlement and supplemental capacity, CSPE replacement, geographic preference, headwater storage payments, peak sales, and peak deliveries under peak/energy exchange contracts.
- 2/ CSPE to West Group utilities is the amount retained by the utilities after 5(c)(1) adjustments.
- 3/ WPPSS #1 (Hanford) power allocation to West Group utilities is based on operating costs of 4.0 billion kilowatt-hours of production per year for 1973-74 and 1974-75 and amortization of the bonds thereafter through June 30, 1980. WPPSS #1 (NSSS) allocation to West Group private utilities, beginning July 1, 1980, is 320 megawatts peak and 272 megawatts energy. Allocation to the utilities for the period January 1, 1975, through June 30, 1980, is based on a 25 percent BPA rate increase. In 1974-75, the private utilities' portion reflects firm peaking allocation from WPPSS #1 and therefore contradicts Table 1.
- 4/ Includes deliveries under CSPE and peak/energy exchange contracts with California utilities, deliveries to Central Valley Project from Centralia, wheeling payments to Idaho Power Co., and deliveries to Montana Power Co. for headwater storage payments, geographic preference, wheeling payments, and Hanford exchange.
- 5/ BPA allocation is private utility 20-year contract requirements through August 31, 1973, and for 1973-74 and 1974-75 is the private utilities' share of BPA-PGE-PP&L-So. Cal. Edison Co. contract.
- 6/ The cold weather factor covers abnormal weather conditions of the non-generating public agencies not incorporated in the load estimates.
- 7/ Load growth reserves for peak are computed as 10 percent of area firm loads without the cold weather factor less estimated forced outage reserves. Energy load growth reserves are computed as one-half year's load growth of utility type loads.
- 8/ Losses include BPA's own system losses plus losses under WWP Co. peak/energy exchange contracts with San Diego Gas and Electric Co.
- 9/ WPPSS #1 capabilities are based on production of 4.0 billion kilowatt-hours per year in 1973-74 and 1974-75. The plant is assumed to be shut down thereafter. The plant is not considered dependable as a peaking resource. WPPSS #1 conversion commencing July 1980 is shown under new thermal net-billed.
- 10/ Contract thermal is Central Valley Project's purchase of Centralia power and BPA's purchase of Centralia and PP&L's Libby combustion turbine power.
- 11/ New thermal net-billed includes public agencies' portion of Trojan, WPPSS #2, Boardman, WPPSS #1 (NSSS) and WPPSS #3.

- 12/ Imports to Federal system consist of energy return under peak/energy exchange contracts with California utilities, imports from Montana Power Co. for delivery to U.S. Indian Irrigation District, and BPA-PGE-PP&L-So. Cal. Edison Co. contract in 1973-74.
- 13/ Contract resources to BPA from utilities inside the West Group area include WWP Co. losses under peak/energy exchange contracts with San Diego Gas and Electric Co. and PP&L Co. energy deliveries under the peak/energy exchange contract.
- 14/ Estimated forced outage reserves on peak are computed as 5% of hydro, existing thermal and combustion turbine capacity and 15% of installed peak capability of new large thermal plants. Forced outage reserves on energy are computed as 5% of existing thermal capability.
- 15/ New Federal system planning criteria. The Federal system hydro peaking capability is the minimum peaking capacity that is estimated to have the probability of occurrence of once in 20 years. This differs from firm energy capability which is based on minimum historical streamflow conditions during the 30-year period of record. The Federal hydro resources and the net-billed thermal increment have been reduced by a factor of 3 percent to recognize inability of the system to achieve its full peaking capability at any one specific instance.
- 16/ Public agencies' contracts are Seattle City Light's purchases from Pend Oreille Co. PUD and Douglas Co. PUD's purchases from Chelan Co. PUD.
- 17/ Hydro resources include those shown in the 1973 West Group Forecast plus Mayfield addition in September 1976, High Ross addition in September 1976, Rock Island additions in September 1977, Mossyrock addition in 1981, and Noxon additions in 1982.
- 18/ Large thermal is the public agencies' recall of Centralia power commencing January 1, 1982.
- 19/ Combustion turbine for the public agencies consist of a proposed unit by Seattle City Light commencing in 1974-75.
- 20/ Private utility exports include PGE Co. exchange contract with Pacific Gas and Electric Co. and So. Cal. Edison Co., WWP Co. peak/energy exchange contract with San Diego Gas and Electric Co., WWP Co. contracts with Idaho Power Co. and Montana Power Co., PSP&L Co. contract with Montana Power Co. and PP&L's transfers to PP&L Wyoming system.
- 21/ Private utility contracts include Cove replacement power, WWP Co. transfer to BPA for losses under peak/energy exchange contracts with San Diego Gas and Electric Co., WWP Co. deliveries to PSP&L Co. and PP&L Co. energy deliveries to BPA under the peak/energy exchange contract.
- 23/ Large thermal includes private utilities' share of Centralia, Trojan, Jim Bridger, Colstrip, Boardman, WPPSS #3.

- 24/ Imports include PGE Co. exchange contract with So. Cal. Edison Co. and Pacific Gas and Electric Co.; WWP Co. peak/energy exchange contract with San Diego Gas and Electric Co.; WWP Co. contracts with Idaho Power Co., Montana Power Co., and Utah Power Co.; PP&L Co. contracts with Idaho Power Co. and Utah Power Co.; PP&L Co. transfers from Wyoming; PGE Co. contract with Idaho Power Co.; and PSP&L Co. contract with Montana Power Co.
- 25/ Net area firm surplus or deficit is the arithmetic sum of Federal System Line 28, Public Agencies Line 19, and Private Utilities Line 19.

Note: Energy capabilities of new large thermal plants are computed on the basis of 85% annual plant factor for private utility shares. Public agency and net-billed Federal shares are computed on the basis of a 50% annual plant factor for the first full year of operation, 70% for the second full year, and 85% thereafter with a 6-month delay of peaking on units over 500 megawatts.

BLUE BOOK
POTENTIAL HYDRO RESOURCES

Units - Megawatts

	<u>Critical Period Average</u>	<u>Jan. 1932 Peak</u>
<u>FLATHEAD - CLARK FORK</u>		
<u>PEND OREILLE - KOOTENAY</u>		
Libby Reregulating	30	50
Sullivan Creek	<u>7</u>	<u>16</u>
Subtotal	37	66
<u>UPPER SNAKE AREA</u>		
Palisades Addition	0	39
Twin Springs	26	104
Lucky Peak	17	106
Upper Scriver	20	38
Lower Scriver	36	120
Lynn Crandall	93	205
Garden Valley	58	131
Garden Valley Rereg.	<u>16</u>	<u>23</u>
Subtotal	266	766
<u>MIDDLE SNAKE AREA</u>		
Dwornak Additions	0	660
<u>MIDDLE AND LOWER COLUMBIA AREA</u>		
Grand Coulee 3rd Powerplant	0	3,600
Grand Coulee P.T.	0	128
Ben Franklin	262	976
John Day Additions	0	621
Antilon Lake Pumped Storage	<u>-50</u>	<u>1,000</u>
Subtotal	212	6,325
<u>PACIFIC SLOPE AREA</u>		
High Ross	34	272
Klamath River	127	230
Muddy-Meadows	50	122
Cougar Additions	11	14
Strube	3	4
Copper Creek	<u>45</u>	<u>85</u>
Subtotal	270	727
TOTAL	785	8,544
Total New Projects	774	3,610
Total Additional Units	11	4,934

April 9, 1973

NEW GENERATING CAPACITY SCHEDULED FOR SERVICE
JANUARY 1973 THROUGH JUNE 1984

Sheet 1 of 4

<u>PLANT</u>		<u>UNIT NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>NAMEPLATE RATING-MW</u>	<u>CAPABILITY EXPECTED-MW</u>	<u>EXPECTED DATE OF COMMERCIAL OPERATION</u>
<u>Bonneville Power Administration</u>							
Dworshak	(USCE)	1	Absahka, Idaho	Hydraulic	90.0	103.5	Feb 1973 **
		2			90.0	103.5	Mar 1973
		3			220.0	253.0	Mar 1973
The Dalles	(USCE)	16	Pie Dalles, Oregon	Hydraulic	86.0 Each	98.9 Each	Feb 1973
		17					Feb 1973
		18					Mar 1973
		19					May 1973
		20					Jun 1973
		21					Aug 1973
		22					Sep 1973
Grand Coulee Pump-Generator Additions	(USBR)	P7	Grand Coulee, Washington	Hydraulic	50.0 Each	50.0 Each	Apr 1973
		P8					Jun 1973
3rd Power Plant		19		Hydraulic	600.0 Each	600.0 Each	Jun 1975
		20					Jan 1976
		21					May 1976
		22					Jul 1978
		23					Jan 1979
24	Jul 1979						
Lower Granite	(USCE)	1,2,3	Wacawai, Washington	Hydraulic	135.0 Each	155.25 Each	Apr 1975
		4 *					Feb 1979
		5 *					Mar 1979
		6 *					Apr 1979
Ice Harbor *	(USCE)	4	Pasco, Washington	Hydraulic	110.96 Each	127.6 Each	Feb 1975
		5					Mar 1975
		6					Apr 1975

* Additional units at existing plants included in critical-year regulations and 30-year studies. Incremental capabilities attributable to these units are shown on January peak and critical period energy capability summary tabulations.

** 1.7 MAF usable storage June 1973; 2.0 MAF usable storage June 1974.

Note: A chronological tabulation of new installations appears in the section on nameplate ratings.

NEW GENERATING CAPACITY SCHEDULED FOR SERVICE -contd.
 JANUARY 1973 THROUGH JUNE 1984

Sheet 2 of 4

PLANT		UNIT NO.	LOCATION	TYPE	NAMEPLATE RATING-MW	CAPABILITY EXPECTED-MW	EXPECTED DATE OF COMMERCIAL OPERATION
<u>Bonneville Power Administration -contd.</u>							
Libby	(USCE)	1	Jennings, Montana	Hydraulic	105.0 Each	120.75 Each	Jul 1975 **
		2					Oct 1975
		3					Jan 1976
		4					Apr 1976
		5					Oct 1982
		6					Jan 1983
		7					Apr 1983
		8					Jul 1983
Lost Creek	(USCE)	1	McLeod, Oregon	Hydraulic	24.5 Each	28.2 Each	Oct 1975
		2					Dec 1975
Teton	(USBR)	1	Teton, Idaho	Hydraulic	10.0 Each	10.0 Each	Jun 1976
		2					Sep 1976
		3					Jul 1979
Chief Joseph *	(USCE)	17	Bridgeport, Washington	Hydraulic	95.0 Each	109.25 Each	Mar 1977
		18					Jun 1977
		19					Sep 1977
		20					Dec 1977
		21					Mar 1978
		22					May 1978
		23					Jul 1978
		24					Sep 1978
		25					Nov 1978
		26					Jan 1979
		27					Mar 1979
Little Goose *	(USCE)	4	Riparia, Washington	Hydraulic	135.0 Each	155.25 Each	Feb 1979
		5					Mar 1979
		6					Apr 1979
Lower Monumental *	(USCE)	4	Matthew, Washington	Hydraulic	135.0 Each	155.25 Each	Feb 1980
		5					Mar 1980
		6					Apr 1980

* Additional units at existing plants included in critical-year regulations and 30-year studies. Incremental capabilities attributable to these units are shown on January peak and critical period energy capability summary tabulations.

** Full storage available July 1973, contingent upon filling after April 1973.

Note: A chronological tabulation of new installations appears in the section on nameplate ratings.

NEW GENERATING CAPACITY SCHEDULED FOR SERVICE -contd.
JANUARY 1971 THROUGH JUNE 1984

Sheet 3 of 4

<u>PLANT</u>	<u>UNIT NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>NAMEPLATE RATING-MW</u>	<u>CAPABILITY EXPECTED-MW</u>	<u>EXPECTED DATE OF COMMERCIAL OPERATION</u>
<u>Bonneville Power Administration -contd.</u>						
Bonneville * (USCE) 2nd Powerhouse	11	Bonneville, Washington	Hydraulic	68.0 Each	77.8 Each	May 1982
	12					Jul 1982
	13					Sep 1982
	14					Nov 1982
	15					Jan 1983
	16					Mar 1983
	17					May 1983
	18					Jul 1983
<u>Puget Sound Power & Light Company</u>						
South Whidbey Island	1	Langley, Washington	Comb. Turbine	26.5	28.7	Jan 1973
Colstrip (50% of units #1 and #2)	1	Colstrip, Montana	Steam	330.0 Each	350.0 Each	Jul 1975
	2					Jul 1976
<u>B. C. Hydro and Power Authority</u>						
Mica (Canadian Storage)	-	Near Argenta, B. C.	-	-	Downstream Benefits	Apr 1973
<u>Portland General Electric Company</u>						
Harborton	1 thru 4	Portland, Oregon	Comb. Turbine	63.6 Each	64.4 Each	Sep 1973
Bethel	1,2	Salem, Oregon	Comb. Turbine	63.6 Each	63.8 Each	Sep 1973
Combustion Turbines Group #2	-	-	Comb. Turbine	-	432.0	Aug 1974
Trojan	1	Near Prescott, Oregon	Nuclear	1,216.0	1,130.0	Jul 1975
<u>Pacific Power & Light Company</u>						
Jim Bridger (Imported from Outside of Area)	2	Rock Springs, Wyoming	Steam	500.0 Each	500.0 Each	Sep 1975
	3					Sep 1976
<u>Washington Public Power Supply System</u>						
WPPSS #2	1	Richland, Washington	Nuclear	1,100.0	1,100.0	Sep 1977
<u>The Washington Water Power Company</u>						
Othello	1	Othello, Washington	Comb. Turbine	-	32.8	Jun 1973

* Additional units at existing plants included in critical-year regulations and 30-year studies. Incremental capabilities attributable to these units are shown on January peak and critical period energy capability summary tabulations.

Note: A chronological tabulation of new installations appears in the section on nameplate ratings.

NEW GENERATING CAPACITY SCHEDULED FOR SERVICE -contd.
JANUARY 1973 THROUGH JUNE 1984

Sheet 4 of 4

Note: These new thermal units have been included as scheduled resources in this report although they do not meet the established criteria for inclusion in the West Group Forecast. The preliminary planning has been completed, and the units have also been included under the Hydro-Thermal Program as scheduled resources in meeting West Group planned requirements.

<u>PLANT</u>	<u>UNIT NO.</u>	<u>LOCATION</u>	<u>TYPE</u>	<u>NAMEPLATE RATING-MW</u>	<u>CAPABILITY EXPECTED-MW</u>	<u>EXPECTED DATE OF COMMERCIAL OPERATION</u>
<u>Puget Sound Power & Light Company</u>						
Colstrip (75% of units #3 and #4)	3	Colstrip, Montana	Steam	--	700.0 Each	Sep 1978
	4					Sep 1979
<u>Portland General Electric Company</u>						
Boardman	1	Boardman, Oregon	Nuclear	--	1150.0	Sep 1980
<u>Washington Public Power Supply System</u>						
WPPSS #1	1	Richland, Washington	Nuclear	--	1233.0	Sep 1980
WPPSS #3	1	--	Nuclear	--	1100.0	Sep 1981