

### **3.10S Workforce Characterization**

In order to assess the environmental impacts of constructing and operating STP 3 & 4, particularly with regard to the potential socioeconomic impacts discussed in ER Sections 4.4 and 5.8, a description of the workforce required to construct and operate the new power units is required, including how the workforce will change over the course of construction, the availability of workers in the local area, and the potential for worker relocation and commuting constraints.

#### **3.10S.1 Construction Work Force**

The construction workforce would consist of two components: (1) Field Craft Labor; and (2) Field Nonmanual Labor. Field craft labor is the largest component of the construction workforce, with approximately 79% of the field workforce makeup in conventional Advanced Boiling Water Reactor (ABWR) nuclear plant construction. The field craft labor force comprises civil, electrical, mechanical, piping, and instrumentation personnel employed during the installation and startup of STP 3 & 4. The field nonmanual labor makes up the balance of the construction workforce, consisting of approximately 21%. The nonmanual labor force comprises field management, field supervision, field engineers, quality assurance/quality control (QA/QC), environmental, safety & health, and administrative/clerical staff.

Table 3.10S-1 illustrates the percent of the total work force for craft and field nonmanual labor makeup representative of conventional ABWR nuclear power plant construction.

It is assumed that 50% of the construction workforce would come from within a 50-mile radius of the STP site. The remainder of the construction labor work force is assumed to come from outside the 50-mile area.

The STP 3 & 4 construction will incorporate a number of large prefabricated modules. Modularization shifts some of the work (and workforce) to another location that could be outside the 50-mile radius of the site, and hence decrease the onsite construction workforce and duration. The estimated construction duration and onsite workforce presented assume a high degree of offsite fabrication.

The total onsite construction workforce for sequential construction of two units at the STP site is estimated to be approximately 20 jobhours per kilowatt of generating capacity. The schedule assumes 12 months for site preparation, 12 months for LWA activities, and 45 months from COL issuance to Unit 3 fuel load, and 9 months for startup. Unit 4 fuel load is scheduled 12 months after Unit 3 for a total schedule duration of 90 months. Based on this schedule, the peak onsite construction workforce for Units 3 & 4 is estimated to be 5,950 people. Table 3.10S-2 summarizes the onsite construction workforce by month of the project. Figure 3.10S-1 graphically depicts the workforce curve for the project.

#### **3.10S.2 Worker Relocation and Commuting**

Construction workers typically commute up to 50 miles to a jobsite. Assuming 5% (lower estimate) of the construction craft workforce will be recruited from within the 50-

mile radius, approximately 340 local craft people could be employed in Unit 3 & 4 construction. It is assumed that the balance of the construction workforce will come from outside the 50-mile radius. For the analysis of construction impacts in Chapter 4, it is assumed that the nonmanual labor workforce will relocate to the area from outside the 50-mile radius. Seventy to eighty percent of the construction workforce will be employed for more than four years. Most of the craft labor from outside the 50-mile radius will seek temporary housing, and most of the nonmanual staff will relocate to the area and seek permanent housing. Construction employees typically locate to within 50 miles of the construction area.

### 3.10S.3 Operation Work Force

A study commissioned by DOE (Reference 3.10S-1) estimated the additional operations work force for a new ABWR unit constructed at an existing site. Applying the DOE study analysis to the operation of STP 3 & 4, it is estimated that the additional onsite operations workforce would be approximately 405 people per unit, with an additional nonoperational offsite support staff of 39 people per unit. The total required additional operations personnel for STP 3 & 4 (both units) would be 810 onsite and 78 offsite support staff, for a total of 888 people. Figure 3.10S-2 graphically depicts the operations workforce for Units 3 & 4, while Table 3.10S-3 and Figure 3.10S-3 depict the total STP site employment, including construction, operations, and outage workers for all four units. The operations staff for each unit would be put in place approximately two years before fuel load of the unit, to allow time for simulator training and startup testing. It is assumed the operations workforce would be recruited from outside the 50-mile radius.

### 3.10S.4 References

- 3.10S-1 "Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Costs and Funding Requirements for Advanced Reactor Designs," U.S., Department of Energy, Volume 1. Prepared under Cooperative Agreement DE-FC07-03ID14492, Prepared by Dominion Energy, Inc., Bechtel Power Corporation, TLG, Inc., and MPR Associates, May 27, 2004.

Table 3.10S-1 Percent Construction Labor Force by Skill Set

| Labor                  | Installation Items - Responsibility  | Percent of Total Work Force for ABWR Construction |
|------------------------|--|---|
| Mechanical Equipment   | NSSS, Turbine Generator, Condenser, Process Equipment, HVAC                          | 3%  |
| Electrical             | Equipment, Cable, Cable Tray, Conduit, Wire, Connections                             | 12%   |
| Concrete               | Concrete and Reinforcing Steel   | 13%   |
| Structural steel       | Structural and Miscellaneous Steel   | 3%  |
| Other civil            | Piling, Architectural Items, Painting, Yard Pipe                                     | 4%  |
| Piping/instrumentation | Pipe, tubing, valves, hangers/ supports  | 14%   |
| Site support           | Scaffolding, equipment operation, transport, cleaning, maintenance, etc              | 15%   |
| Specialty labor        | Fireproofing, insulation, rigging, etc   | 15%   |
| Nonmanual labor        | Management, supervision, field engineering, QA/QC, safety and health, administration | 21%   |

**Table 3.10S-2 Estimated Construction Work Force and Construction Duration for Two ABWR Units**

| Month   | Workforce Strength | Month  | Workforce Strength | Month  | Workforce Strength | Month  | Workforce Strength |
|---------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|
| -24 [1] | 100                | 3      | 2800               | 29     | 5950               | 55     | 3000               |
| -23     | 200                | 4      | 2950               | 30     | 5950               | 56     | 2800               |
| -22     | 300                | 5      | 3100               | 31     | 5950               | 57     | 2600               |
| -21     | 400                | 6      | 3250               | 32     | 5950               | 58 [6] | 2400               |
| -20     | 500                | 7      | 3400               | 33     | 5950               | 59     | 2200               |
| -19     | 600                | 8      | 3550               | 34     | 5950               | 60     | 2000               |
| -18     | 700                | 9      | 3700               | 35     | 5950               | 61     | 1800               |
| -17     | 800                | 10     | 3830               | 36     | 5850               | 62     | 1600               |
| -16     | 900                | 11     | 3960               | 37     | 5750               | 63     | 1400               |
| -15     | 1000               | 12 [4] | 4090               | 38     | 5650               | 64     | 1200               |
| -14     | 1100               | 13     | 4220               | 39     | 5450               | 65     | 1100               |
| -13     | 1200               | 14     | 4350               | 40     | 5250               | 66     | 525                |
| -12 [2] | 1300               | 15     | 4480               | 41     | 5050               | 67     | 0                  |
| -11     | 1400               | 16     | 4610               | 42     | 4850               |        |                    |
| -10     | 1500               | 17     | 4740               | 43     | 4650               |        |                    |
| -9      | 1600               | 18     | 4870               | 44     | 4450               |        |                    |
| -8      | 1700               | 19     | 5000               | 45 [5] | 4250               |        |                    |
| -7      | 1800               | 20     | 5130               | 46     | 4050               |        |                    |
| -6      | 1900               | 21     | 5260               | 47     | 3900               |        |                    |
| -5      | 2000               | 22     | 5390               | 48     | 3800               |        |                    |
| -4      | 2100               | 23     | 5520               | 49     | 3700               |        |                    |
| -3      | 2200               | 24     | 5650               | 50     | 3600               |        |                    |
| -2      | 2300               | 25     | 5800               | 51     | 3500               |        |                    |
| -1      | 2400               | 26     | 5950               | 52     | 3400               |        |                    |
| 1 [3]   | 2500               | 27     | 5950               | 53     | 3300               |        |                    |
| 2       | 2650               | 28     | 5950               | 54     | 3200               |        |                    |

[1] Site preparation activities begin

[2] LWA activities begin

[3] COL Issued, Unit 3 construction initiates

[4] Unit 4 construction initiates

[5] Unit 3 fuel load

[6] Unit 4 fuel load

**Table 3.10S-3 Total STP Workforce During Construction Period for  
Units 3 & 4, and 18 Months Beyond**

|     | Event <sup>1</sup>            | Month | Unit 1 / 2<br>Staffing <sup>2</sup> | Unit 3 / 4<br>Staffing <sup>3</sup> | Construction<br>Workforce <sup>4</sup> | Outage<br>Workforce <sup>5</sup> | TOTAL<br>Workforce |
|-----|-------------------------------|-------|-------------------------------------|-------------------------------------|--|----------------------------------|--------------------|
| -24 | Site<br>Preparation<br>Starts | -24   | 1350                                | 99                                  | 100                                    |                                  | 1549               |
|     |                               | -23   | 1353                                | 107                                 | 200                                    |                                  | 1660               |
|     |                               | -22   | 1356                                | 116                                 | 300                                    |                                  | 1772               |
|     |                               | -21   | 1359                                | 124                                 | 400                                    |                                  | 1883               |
|     |                               | -20   | 1362                                | 133                                 | 500                                    | 45                               | 2040               |
|     |                               | -19   | 1364                                | 142                                 | 600                                    | 310                              | 2416               |
| -18 |                               | -18   | 1367                                | 150                                 | 700                                    | 1080                             | 3297               |
|     | <b>1RE15</b>                  | -17   | 1367                                | 159                                 | 800                                    | 1350                             | 3676               |
|     |                               | -16   | 1368                                | 167                                 | 900                                    | 60                               | 2495               |
|     |                               | -15   | 1368                                | 176                                 | 1000                                   |                                  | 2544               |
|     |                               | -14   | 1368                                | 184                                 | 1100                                   | 45                               | 2698               |
|     |                               | -13   | 1369                                | 193                                 | 1200                                   | 310                              | 3072               |
| -12 |                               | -12   | 1369                                | 202                                 | 1300                                   | 1080                             | 3951               |
|     | <b>2RE14</b>                  | -11   | 1369                                | 212                                 | 1400                                   | 1350                             | 4331               |
|     |                               | -10   | 1370                                | 221                                 | 1500                                   | 60                               | 3151               |
|     |                               | -9    | 1370                                | 230                                 | 1600                                   |                                  | 3200               |
|     | [2]                           | -8    | 1370                                | 240                                 | 1700                                   |                                  | 3310               |
|     |                               | -7    | 1371                                | 249                                 | 1800                                   |                                  | 3420               |
| -6  |                               | -6    | 1371                                | 258                                 | 1900                                   |                                  | 3529               |
|     |                               | -5    | 1368                                | 268                                 | 2000                                   |                                  | 3636               |
|     |                               | -4    | 1365                                | 277                                 | 2100                                   |                                  | 3742               |
|     |                               | -3    | 1362                                | 286                                 | 2200                                   |                                  | 3848               |
|     |                               | -2    | 1358                                | 296                                 | 2300                                   | 35                               | 3989               |
|     |                               | -1    | 1355                                | 305                                 | 2400                                   | 170                              | 4230               |

**Table 3.10S-3 Total STP Workforce During Construction Period for  
Units 3 & 4, and 18 Months Beyond (Continued)**

|    | Event <sup>1</sup>                           | Month | Unit 1 / 2<br>Staffing <sup>2</sup> | Unit 3 / 4<br>Staffing <sup>3</sup> | Construction<br>Workforce <sup>4</sup> | Outage<br>Workforce <sup>5</sup> | TOTAL<br>Workforce |
|----|--|-------|-------------------------------------|-------------------------------------|--|----------------------------------|--------------------|
|    | <b>COL<br/>Issued/Start<br/>Construction</b> | 1     | 1352                                | 314                                 | 2500                                   | 850                              | 5016               |
|    | <b>1RE16</b>                                 | 2     | 1349                                | 322                                 | 2650                                   | 1100                             | 5421               |
|    |  | 3     | 1346                                | 331                                 | 2800                                   | 60                               | 4536               |
|    |  | 4     | 1343                                | 339                                 | 2950                                   |                                  | 4632               |
|    |  | 5     | 1339                                | 348                                 | 3100                                   | 35                               | 4822               |
| 6  |  | 6     | 1336                                | 356                                 | 3250                                   | 170                              | 5112               |
|    |  | 7     | 1333                                | 365                                 | 3400                                   | 850                              | 5948               |
|    | <b>2RE15</b>                                 | 8     | 1328                                | 373                                 | 3550                                   | 1100                             | 6351               |
|    |  | 9     | 1324                                | 382                                 | 3700                                   | 60                               | 5465               |
|    |  | 10    | 1319                                | 390                                 | 3830                                   |                                  | 5539               |
|    |  | 11    | 1315                                | 399                                 | 3960                                   |                                  | 5673               |
| 12 |  | 12    | 1310                                | 407                                 | 4090                                   |                                  | 5807               |
|    |  | 13    | 1306                                | 431                                 | 4220                                   |                                  | 5957               |
|    |  | 14    | 1301                                | 455                                 | 4350                                   |                                  | 6106               |
|    |  | 15    | 1296                                | 479                                 | 4480                                   |                                  | 6256               |
|    |  | 16    | 1292                                | 503                                 | 4610                                   |                                  | 6405               |
|    |  | 17    | 1287                                | 527                                 | 4740                                   | 35                               | 6590               |
| 18 |  | 18    | 1283                                | 552                                 | 4870                                   | 170                              | 6874               |
|    |  | 19    | 1278                                | 576                                 | 5000                                   | 850                              | 7704               |
|    | <b>1RE17</b>                                 | 20    | 1272                                | 600                                 | 5130                                   | 1100                             | 8102               |
|    |  | 21    | 1267                                | 624                                 | 5260                                   | 60                               | 7210               |
|    |  | 22    | 1261                                | 648                                 | 5390                                   |                                  | 7299               |
|    |  | 23    | 1255                                | 672                                 | 5520                                   | 35                               | 7482               |
| 24 |  | 24    | 1250                                | 696                                 | 5650                                   | 170                              | 7766               |
|    |  | 25    | 1244                                | 715                                 | 5800                                   | 850                              | 8609               |
|    | <b>2RE16</b>                                 | 26    | 1238                                | 733                                 | 5950                                   | 1100                             | 9021               |
|    |  | 27    | 1233                                | 752                                 | 5950                                   | 60                               | 7994               |
|    |  | 28    | 1227                                | 770                                 | 5950                                   |                                  | 7947               |
|    |  | 29    | 1221                                | 789                                 | 5950                                   |                                  | 7960               |

**Table 3.10S-3 Total STP Workforce During Construction Period for  
Units 3 & 4, and 18 Months Beyond (Continued)**

|    | Event <sup>1</sup>  | Month | Unit 1 / 2<br>Staffing <sup>2</sup> | Unit 3 / 4<br>Staffing <sup>3</sup> | Construction<br>Workforce <sup>4</sup> | Outage<br>Workforce <sup>5</sup> | TOTAL<br>Workforce |
|----|---------------------|-------|-------------------------------------|-------------------------------------|--|----------------------------------|--------------------|
| 30 |                     | 30    | 1216                                | 807                                 | 5950                                   |                                  | 7973               |
|    |                     | 31    | 1210                                | 826                                 | 5950                                   |                                  | 7986               |
|    |                     | 32    | 1204                                | 844                                 | 5950                                   |                                  | 7998               |
|    |                     | 33    | 1199                                | 863                                 | 5950                                   |                                  | 8011               |
|    |                     | 34    | 1193                                | 881                                 | 5950                                   |                                  | 8024               |
|    |                     | 35    | 1187                                | 900                                 | 5950                                   | 35                               | 8072               |
| 36 |                     | 36    | 1181                                | 918                                 | 5850                                   | 170                              | 8119               |
|    |                     | 37    | 1176                                | 921                                 | 5750                                   | 850                              | 8697               |
|    | <b>1RE18</b>        | 38    | 1170                                | 925                                 | 5650                                   | 1100                             | 8845               |
|    |                     | 39    | 1164                                | 928                                 | 5450                                   | 60                               | 7602               |
|    |                     | 40    | 1158                                | 932                                 | 5250                                   |                                  | 7340               |
|    |                     | 41    | 1153                                | 935                                 | 5050                                   | 35                               | 7173               |
| 42 |                     | 42    | 1147                                | 939                                 | 4850                                   | 170                              | 7105               |
|    |                     | 43    | 1141                                | 942                                 | 4650                                   | 850                              | 7583               |
|    | <b>2RE17</b>        | 44    | 1135                                | 945                                 | 4450                                   | 1100                             | 7630               |
|    | <b>U3 Fuel Load</b> | 45    | 1128                                | 949                                 | 4250                                   | 60                               | 6387               |
|    |                     | 46    | 1122                                | 952                                 | 4050                                   |                                  | 6124               |
|    |                     | 47    | 1115                                | 956                                 | 3900                                   |                                  | 5971               |
| 48 |                     | 48    | 1109                                | 959                                 | 3800                                   |                                  | 5868               |
|    |                     | 49    | 1102                                | 959                                 | 3700                                   |                                  | 5761               |
|    |                     | 50    | 1096                                | 959                                 | 3600                                   |                                  | 5655               |
|    |                     | 51    | 1089                                | 959                                 | 3500                                   |                                  | 5548               |
|    |                     | 52    | 1083                                | 959                                 | 3400                                   |                                  | 5442               |
|    |                     | 53    | 1076                                | 959                                 | 3300                                   | 35                               | 5370               |

**Table 3.10S-3 Total STP Workforce During Construction Period for  
Units 3 & 4, and 18 Months Beyond (Continued)**

|    | Event <sup>1</sup>  | Month | Unit 1 / 2<br>Staffing <sup>2</sup> | Unit 3 / 4<br>Staffing <sup>3</sup> | Construction<br>Workforce <sup>4</sup> | Outage<br>Workforce <sup>5</sup> | TOTAL<br>Workforce |
|----|---------------------|-------|-------------------------------------|-------------------------------------|--|----------------------------------|--------------------|
| 54 | <b>CO U3</b>        | 54    | 1070                                | 959                                 | 3200                                   | 170                              | 5399               |
|    |                     | 55    | 1063                                | 959                                 | 3000                                   | 850                              | 5872               |
|    | <b>1RE19</b>        | 56    | 1063                                | 959                                 | 2800                                   | 1100                             | 5922               |
|    |                     | 57    | 1063                                | 959                                 | 2600                                   | 60                               | 4682               |
|    | <b>U4 Fuel Load</b> | 58    | 1063                                | 959                                 | 2400                                   |                                  | 4422               |
|    |                     | 59    | 1063                                | 959                                 | 2200                                   | 35                               | 4257               |
| 60 |                     | 60    | 1063                                | 959                                 | 2000                                   | 170                              | 4192               |
|    |                     | 61    | 1062                                | 959                                 | 1800                                   | 850                              | 4671               |
|    | <b>2RE18</b>        | 62    | 1062                                | 959                                 | 1600                                   | 1100                             | 4721               |
|    |                     | 63    | 1062                                | 959                                 | 1400                                   | 60                               | 3481               |
|    |                     | 64    | 1062                                | 959                                 | 1200                                   |                                  | 3221               |
|    |                     | 65    | 1062                                | 959                                 | 1100                                   |                                  | 3121               |
| 66 | <b>U4 CO</b>        | 66    | 1062                                | 959                                 | 525                                    |                                  | 2546               |
|    |                     | 67    | 1062                                | 959                                 | 0                                      |                                  | 2021               |
|    |                     | 68    | 1062                                | 959                                 | 0                                      |                                  | 2021               |
|    |                     | 69    | 1062                                | 959                                 | 0                                      | 35                               | 2056               |
|    |                     | 70    | 1062                                | 959                                 | 0                                      | 170                              | 2191               |
|    |                     | 71    | 1062                                | 959                                 | 0                                      | 885                              | 2906               |
| 72 | <b>3REO1</b>        | 72    | 1062                                | 959                                 | 0                                      | 1270                             | 3291               |
|    |                     | 73    | 1062                                | 959                                 | 0                                      | 910                              | 2931               |
|    | <b>1RE20</b>        | 74    | 1062                                | 959                                 | 0                                      | 1100                             | 3121               |
|    |                     | 75    | 1062                                | 959                                 | 0                                      | 60                               | 2081               |
|    |                     | 76    | 1062                                | 959                                 | 0                                      |                                  | 2021               |
|    |                     | 77    | 1062                                | 959                                 | 0                                      | 35                               | 2056               |
| 78 |                     | 78    | 1062                                | 959                                 | 0                                      | 170                              | 2191               |
|    |                     | 79    | 1062                                | 959                                 | 0                                      | 850                              | 2871               |
|    | <b>2RE19</b>        | 80    | 1062                                | 959                                 | 0                                      | 1135                             | 3156               |
|    |                     | 81    | 1062                                | 959                                 | 0                                      | 230                              | 2251               |
|    |                     | 82    | 1062                                | 959                                 | 0                                      | 850                              | 2871               |



**Table 3.10S-3 Total STP Workforce During Construction Period for  
Units 3 & 4, and 18 Months Beyond (Continued)**

|    | Event <sup>1</sup> | Month | Unit 1 / 2<br>Staffing <sup>2</sup> | Unit 3 / 4<br>Staffing <sup>3</sup> | Construction<br>Workforce <sup>4</sup> | Outage<br>Workforce <sup>5</sup> | TOTAL<br>Workforce |
|----|--------------------|-------|-------------------------------------|-------------------------------------|--|----------------------------------|--------------------|
|    | <b>4RE01</b>       | 83    | 1062                                | 959                                 | 0                                      | 1100                             | 3121               |
| 84 |                    | 84    | 1062                                | 959                                 | 0                                      | 60                               | 2081               |
|    |                    | 85    | 1062                                | 959                                 | 0                                      |                                  | 2021               |

<sup>1</sup> Events at indicated months are from Table 3.3.10S-2, Environmental Report, Rev 01, 15 Jan 2008 and South Texas Project Long Range Outage Plan, Rev 4b, 10/15/07. Outages numbering convention: for example, for 1RE15 ,

1 = Unit 1 (or 2, 3 or 4); RE = refueling; 15 = this is the 15<sup>th</sup> refueling for Unit 1.

<sup>2</sup> Units 1/2 estimates are from STP Staffing Plan, June 2007

<sup>3</sup> Units 3/4 estimates are from Owner's Estimate, 10/25/07

<sup>4</sup> Construction Workforce estimates are from Table 3.3.10S-2, Environmental Report, Rev 01, 15 Jan 2008

<sup>5</sup> Outage Supplemental Workforce estimates are based on South Texas Project 1RE14 Outage Report, 2008

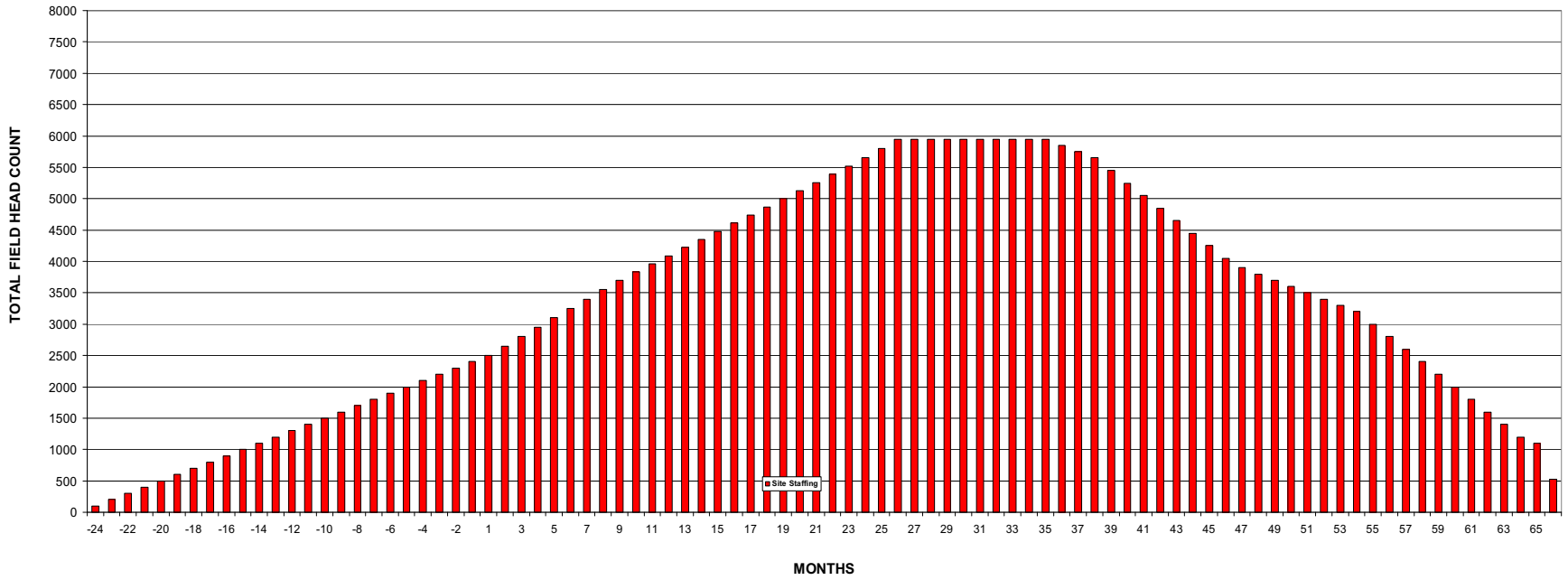


Figure 3.10S-1 Projected Construction Workforce by Month for Two ABWR Units

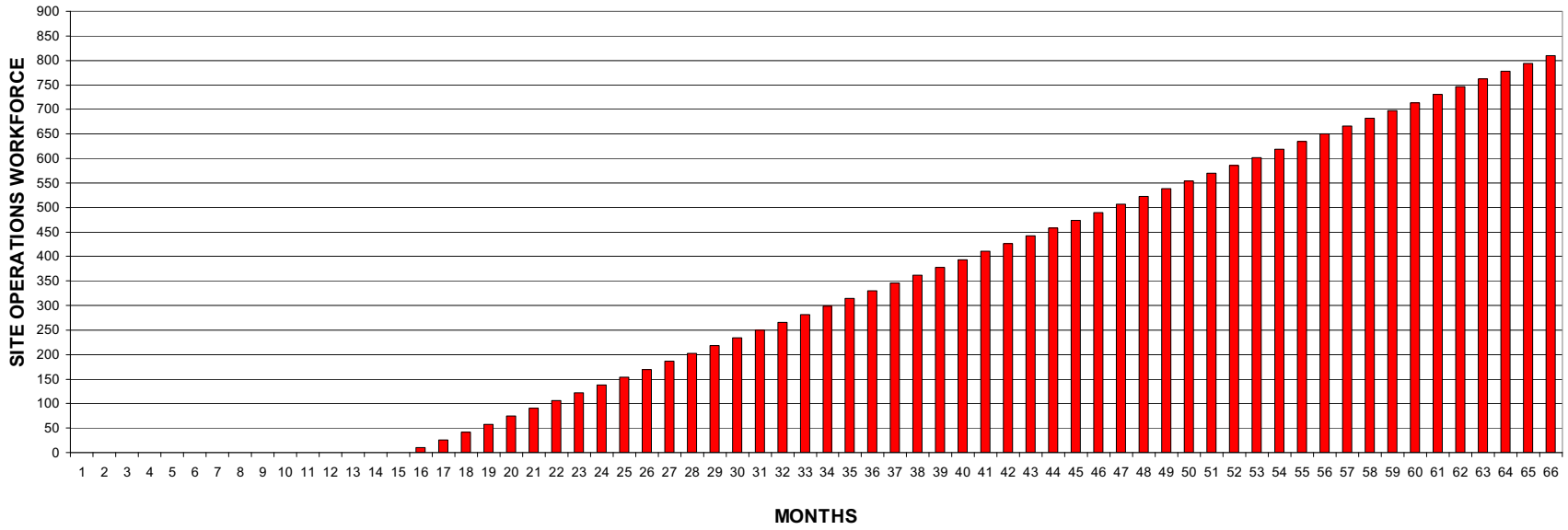


Figure 3.10S-2 Projected Operations Workforce by Month for Two ABWR Units

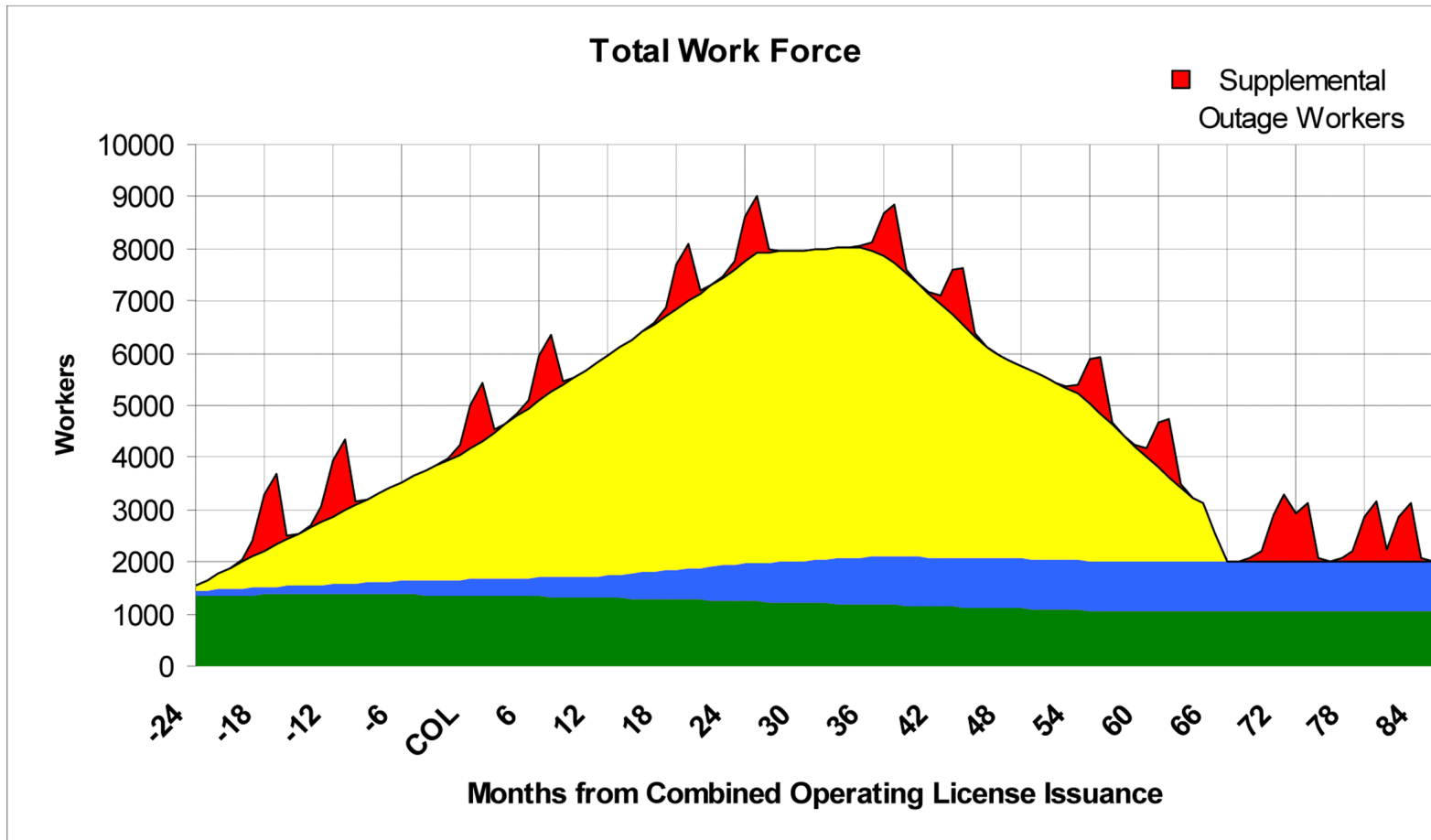


Figure 3.10S-3 Total Workforce, STP, Units 3 & 4 Construction Period and 18 Months Beyond