

### **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**

<b>Labor</b>	<b>Installation Items - Responsibility</b>	<b>Percent of Total Work Force for ABWR Construction</b>
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 Staffing <sup>2</sup>	Unit 3 / 4 Staffing <sup>3</sup>	Construction Workforce <sup>4</sup>	Outage Workforce <sup>5</sup>	TOTAL Workforce
-24	Site Preparation 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
	1RE15	-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
	2RE14	-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 Staffing <sup>2</sup>	Unit 3 / 4 Staffing <sup>3</sup>	Construction Workforce <sup>4</sup>	Outage Workforce <sup>5</sup>	TOTAL Workforce
	<b>COL Issued/Start 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)**

	<b>Event<sup>1</sup></b>	<b>Month</b>	<b>Unit 1 / 2 Staffing<sup>2</sup></b>	<b>Unit 3 / 4 Staffing<sup>3</sup></b>	<b>Construction Workforce<sup>4</sup></b>	<b>Outage Workforce<sup>5</sup></b>	<b>TOTAL Workforce</b>
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)**

	<b>Event<sup>1</sup></b>	<b>Month</b>	<b>Unit 1 / 2 Staffing<sup>2</sup></b>	<b>Unit 3 / 4 Staffing<sup>3</sup></b>	<b>Construction Workforce<sup>4</sup></b>	<b>Outage Workforce<sup>5</sup></b>	<b>TOTAL Workforce</b>
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)**

	<b>Event<sup>1</sup></b>	<b>Month</b>	<b>Unit 1 / 2 Staffing<sup>2</sup></b>	<b>Unit 3 / 4 Staffing<sup>3</sup></b>	<b>Construction Workforce<sup>4</sup></b>	<b>Outage Workforce<sup>5</sup></b>	<b>TOTAL Workforce</b>
	<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

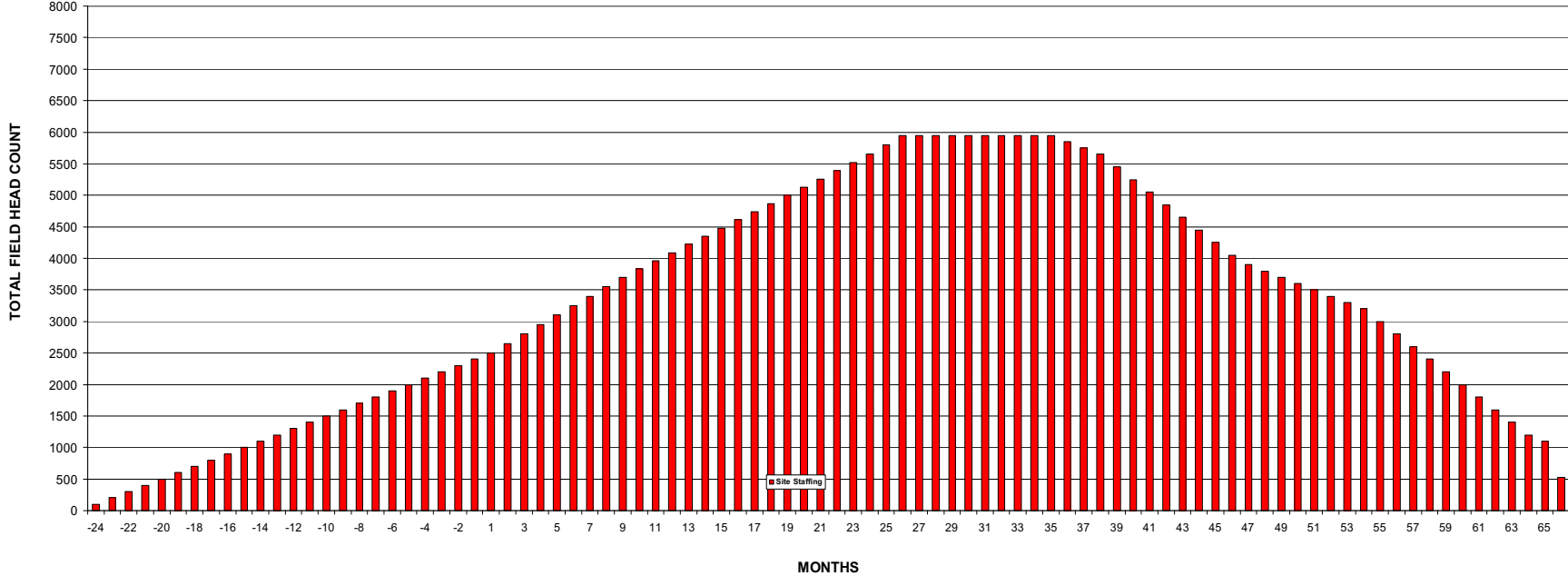


Figure 3.10S-1 Projected Construction Workforce by Month for Two ABWR Units

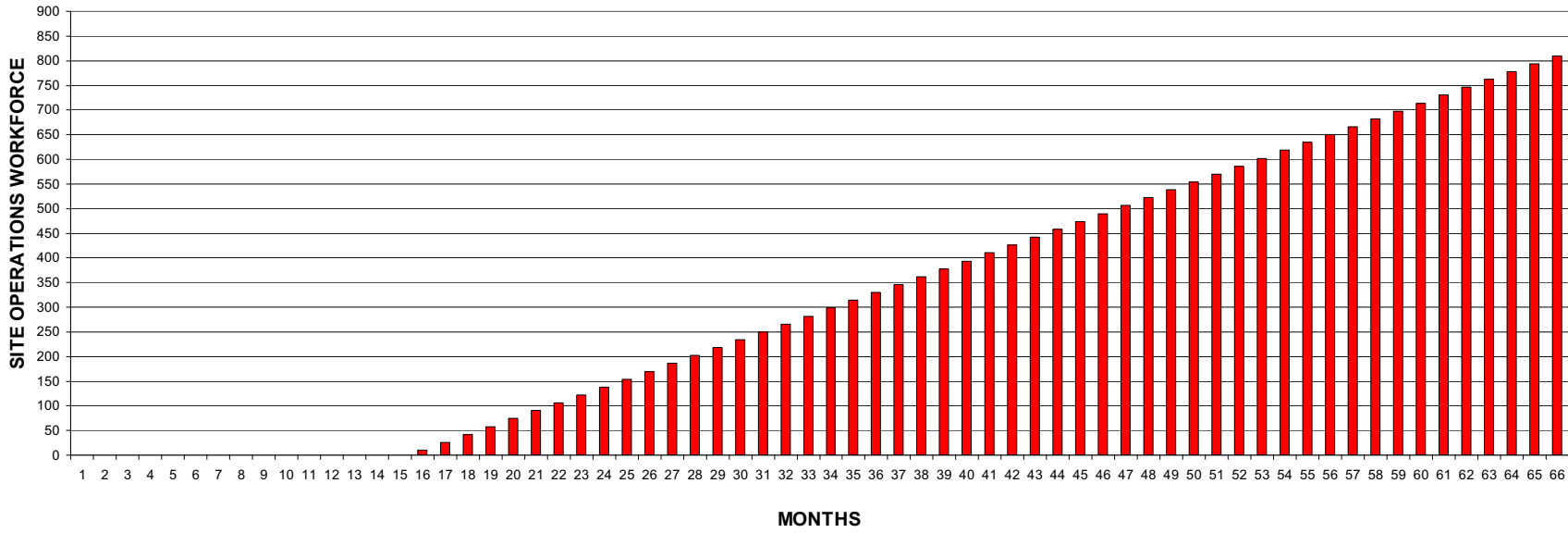


Figure 3.10S-2 Projected Operations Workforce by Month for Two ABWR Units

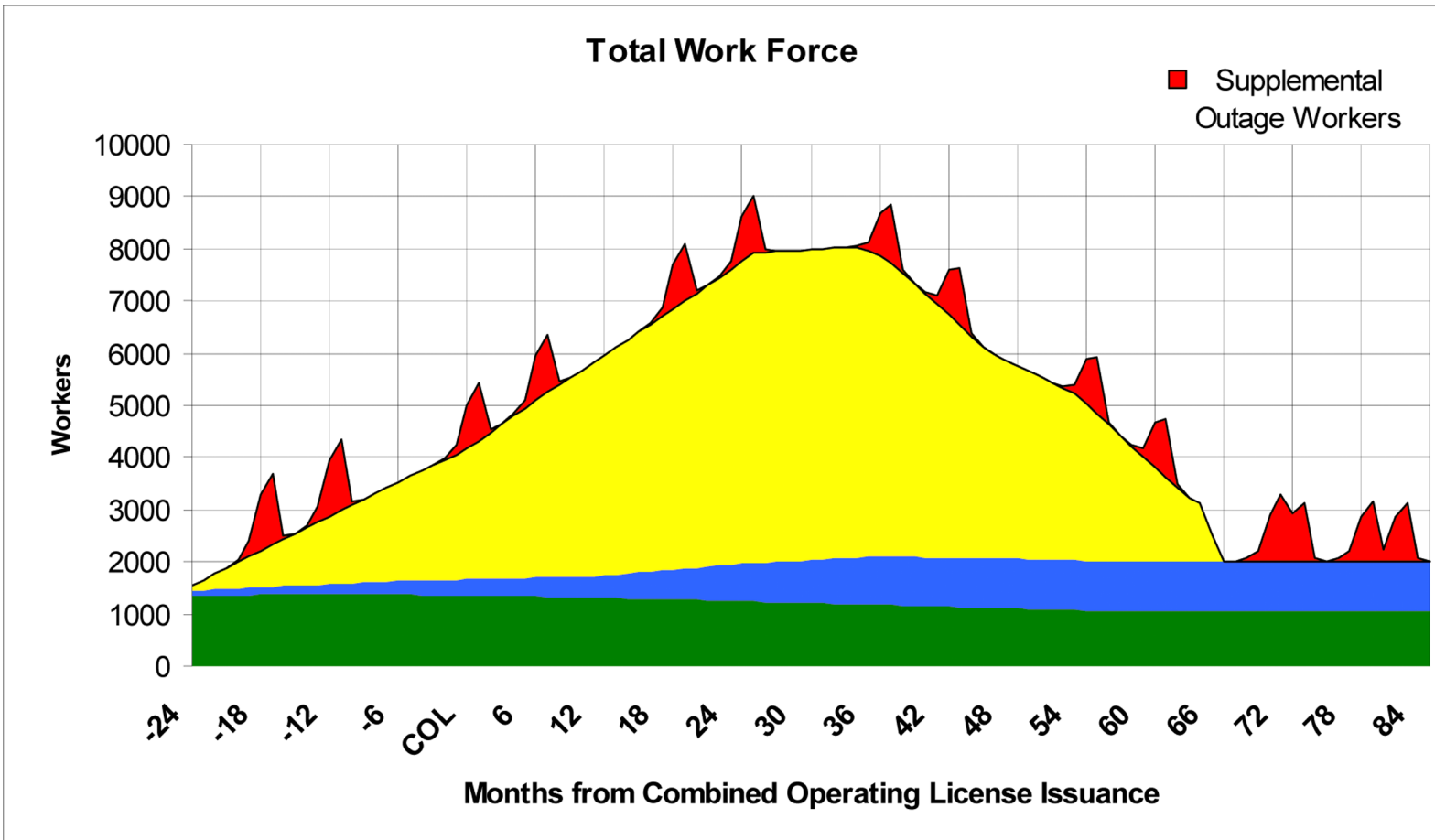


Figure 3.10S-3 Total Workforce, STP, Units 3 & 4 Construction Period and 18 Months Beyond