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DRB = Diego Rivera –

EO = Emrah Onder

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## Construction loads, areas and elevations of CCNPP Unit 3 Buildings


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**Purpose**

To determine the vertical loads, areas and foundation elevations for all buildings at the Calvert Cliffs Nuclear Power Plant Unit 3 Site (CCNPP). Values from different references are compared.

**Background**

The construction sequence and resulting load build-up of the Nuclear Island structural components and the other safety-related buildings of the AREVA US EPR have been under constant revision during the design process. The area and foundation elevations for most of the EPR structures have changed for different applications, resulting in different total loads and pressure distributions. For the CCNPP Unit 3 Site, there is available information for the total load, area, foundation elevation of all safety-related buildings. Starting and finishing dates for the construction are also available. However, a more detailed description for the loads-build up at the Nuclear Island Common mat is only available for the OL3 project.

**References**

1) AREVA, Erection Sequences for Construction Loads. Work package NI-0-0140 Project Olkiluoto 3 NPP (OL3) Attachment III Revision P, 2005

2) AREVA, EPR Design Certification Project, Dimensional Arrangement Reference Plant, Building Location Drawing. Serial Number DCD-CGE-UZT-3002 Rev. 0, June, 2007.

3) AREVA, Transmittal letter EPR #07-415, June 25, 2007 (Attached).

4) AREVA, US EPR Request for Information RFI-07-500&501, August 8, 2007 (Attached).

5) AREVA, Excavation, dewatering, rewatering, and backfill schedules for all CCNPP3 buildings, No. 25237-000-GRI-GXU-00005, Response to RIZZO RFI 094179-005, June 29, 2009 (Attached).

6) AREVA, CCNPP Unit 3 Foundations – Information and Source Summary Table, Document No. 25237-000-GRI-GXU-00008 Attachment 1, Response to RIZZO RFI 094179-008 Rev 1, July 21, 2009 (Attached).

7) AREVA, CCNPP Unit 3 Foundations – Information and Source Summary Table, Document No. 51-9118325-000, Appendix A RFI 09-061 Response for RIZZO RFI 094179-008 Rev 1, July 21, 2009 (Attached).

8) Bechtel drawing No. 3-P1-0010-00002 Rev.3 (Figure 1)

9) AREVA, "Tableau charges surfaces niveaux de foundation". CCNPP Unit 3 Foundations, April 25, 2008. E-mail received by RIZZO on July 7, 2009 (Attached).

**Methodology**

Construction loads and starting and finishing dates for the CCNPP Unit 3 buildings are presented based on available information provided by AREVA in Tables 1.1 through 1.7. The construction sequential loads were divided and grouped in 8 time steps. The cumulative loads for stages are presented in Tables 2.1 and 2.2. Total loads and starting and finishing dates of construction of all buildings are obtained from the latest information provided by AREVA and Bechtel (Ref 6 and 7). However, the load sequence during construction for the NI Common mat buildings from previous information provided by AREVA (OL3, Ref. 1 and 2) is used in the analysis as a general guide to distribute loads on each time step. This information provides a load sequence that corresponds to a more realistic condition than a linear load distribution. For example, the placement of the concrete base mat at the Reactor Building will impose a high load in a relatively short period of time, resulting in larger settlements for that corresponding time step. This effect is not captured if a linear distribution is adopted for the construction loads.

The geometry and foundation elevations for all buildings are based on available information presented by AREVA and Bechtel. Data is summarized and the values from different references are compared.

**Design Inputs**

All the information included in this report is obtained from the references presented above.

**Results**

The latest information of the geometry, elevations and total loads provided by AREVA and Bechtel (2009) for the CCNPP Unit 3 Site buildings presents some variations to the information that was provided previously by AREVA (2007). These changes are due to site specific adjustments and a long design process for most of the safety-related and non safety-related buildings. Information for all structures and comparison of results are presented in Table 3.

## 1. CONSTRUCTION LOADS

### 1.1 Nuclear Island Common Mat

Loads and construction load schedules for the Nuclear Island Common Mat (NI) that are used in the analysis are based on the information provided by AREVA: OL3 Drawings work package NI-0-0140 (Ref. 1). The starting and finishing dates of construction are obtained based on CCNPP Unit 3 Site information (Ref. 5). The duration of all construction activities, based on OL3 information, were adjusted using the CCNPP 3 dates. The loads of Table 1.1 correspond to the OL3 project and are adjusted (scaled) using CCNPP 3 total loads in order to obtain the loads for each time step (See Table 2.1).

**Table 1.1 Construction loads and sequence for the Nuclear Island Common mat buildings - CCNPP Unit 3**

| Activity Name | Duration CCNPP | P (1) | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| **Reactor Building, UJA** | **1950** | | **29-Nov-11** | **1-Apr-17** | | | | | | | | |
| UJA - Erection of Leveling Concrete for Tendon Galleries Level -25' 7" | 14.0 | 2053 | 15-Dec-11 | 29-Dec-11 | 16.3 | 30.3 | 16.3 | 30.9 | 4.4 | 2053.4 | 2053.4 | 4526.9 |
| UJA - Base Slab Leveling Concrete | 21.0 | 1540 | 3-Apr-12 | 24-Apr-12 | 127.0 | 148.0 | 79.8 | 125.3 | 17.9 | 1026.7 | 3080.1 | 6790.3 |
| UJA - Install Reactor Pit up to Level -13' 10" up to +7' 6 1/2" | 60.0 | 2546 | 3-Oct-12 | 2-Dec-12 | 309.3 | 369.3 | 127.0 | 148.1 | 21.2 | 1540.1 | 4620.2 | 10185.5 |
| UJA - Sacrificial Concrete Inside Reactor Pit | 65.0 | 1027 | 29-Aug-14 | 2-Nov-14 | 1004.3 | 1069.3 | 182.3 | 192.1 | 27.4 | 20534.0 | 25154.2 | 55454.5 |
| UJA - Erection of Galleries Level -25' 7" | 45.0 | 1027 | 16-Feb-12 | 1-Apr-12 | 79.8 | 124.8 | 226.3 | 275.1 | 39.3 | 5236.2 | 30390.3 | 66998.1 |
| UJA - Placement of Base Slab Concrete to Level -25' 7" | 9.0 | 20534 | 29-May-12 | 7-Jun-12 | 182.3 | 191.3 | 276.7 | 307.6 | 43.9 | 2566.8 | 32957.1 | 72656.7 |
| UJA - Installation of Reactor Pit Level +7' 6 1/2" to +24' 5" | 40.0 | 2567 | 5-Dec-12 | 14-Jan-13 | 372.7 | 412.7 | 276.7 | 307.6 | 43.9 | 4106.8 | 37063.9 | 81710.5 |
| UJA - Install Reactor Pit Level -20' 2" up to -13' 10 " | 30.0 | 2567 | 31-Aug-12 | 30-Sep-12 | 276.7 | 306.7 | 309.3 | 332.1 | 47.4 | 4928.2 | 41992.0 | 92575.0 |
| UJA - Slabs on Level +63' 11 1/2" | 40.0 | 2207 | 13-Dec-13 | 22-Jan-14 | 745.5 | 785.5 | 333.7 | 354.8 | 50.7 | 1026.7 | 43018.7 | 94838.5 |
| UJA - Inner Foundation Level -25' 7" up to -20' 2" | 48.0 | 5236 | 12-Jul-12 | 29-Aug-12 | 226.3 | 274.3 | 309.3 | 369.5 | 52.8 | 2546.2 | 45564.9 | 100451.8 |
| UJA - Inner Foundation Level -20' 2" to -14' 1" (Ring Wall Pour #04) | 22.0 | 4928 | 3-Oct-12 | 25-Oct-12 | 309.3 | 331.3 | 356.5 | 379.3 | 54.2 | 4620.2 | 50185.1 | 110637.3 |

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| Activity Name | Duration CCNPP | P (1) | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| UJA - Inner Foundation Level -14' 2" to -7' 6 1/2" (Wall Pour #06) | 22.0 | 4620 | 19-Nov-12 | 11-Dec-12 | 356.5 | 378.5 | 372.7 | 413.4 | 59.1 | 2566.8 | 52751.8 | 116296.0 |
| UJA - Install Outer Ring Foundation up to Level -17' 5" (Pour #03) | 30.0 | 4107 | 31-Aug-12 | 30-Sep-12 | 276.7 | 306.7 | 393.9 | 419.9 | 60.0 | 1334.7 | 54086.6 | 119238.4 |
| UJA - Slabs on Level -7' 6 1/2" | 26.0 | 1335 | 26-Dec-12 | 21-Jan-13 | 393.9 | 419.9 | 437.9 | 468.8 | 67.0 | 821.4 | 54907.9 | 121049.2 |
| UJA - Install Outer Ring Beam from Level -17' 5" to -7' 6 1/2" | 21.0 | 1027 | 27-Oct-12 | 17-Nov-12 | 333.7 | 354.7 | 459.0 | 489.9 | 70.0 | 1232.0 | 56140.0 | 123765.3 |
| UJA - Concrete Containment Wall to Level +24' 0" | 66.0 | 4321 | 4-May-13 | 9-Jul-13 | 522.5 | 588.5 | 481.8 | 512.7 | 73.2 | 2445.6 | 58585.6 | 129156.9 |
| UJA - Concrete Containment Wall to Level +48' 0" | 63.0 | 3624 | 21-Jul-13 | 22-Sep-13 | 600.6 | 663.6 | 485.1 | 516.0 | 73.7 | 1334.7 | 59920.3 | 132099.4 |
| UJA - Ring Wall from Level -7' 6 1/2" to +4' 11" | 30.0 | 821 | 8-Feb-13 | 10-Mar-13 | 437.9 | 467.9 | 503.0 | 550.2 | 78.6 | 3080.1 | 63000.4 | 138889.7 |
| UJA - Concrete Containment Wall to Level +72' 0 1/2" | 66.0 | 3635 | 1-Oct-13 | 6-Dec-13 | 672.2 | 738.2 | 529.0 | 551.8 | 78.8 | 2104.7 | 65105.1 | 143529.8 |
| UJA - Concrete Containment Wall to Level +96' 0" | 66.0 | 3635 | 11-Dec-13 | 15-Feb-14 | 743.9 | 809.9 | 517.6 | 564.8 | 80.7 | 3285.4 | 68390.5 | 150772.8 |
| UJA - Concrete Containment Wall to Level +120' 0" | 66.0 | 3635 | 1-Mar-14 | 6-May-14 | 823.6 | 889.6 | 522.5 | 589.2 | 84.2 | 4321.4 | 72711.9 | 160299.6 |
| UJA - Concrete Containment Wall to Level +144' 1" | 66.0 | 3635 | 8-May-14 | 13-Jul-14 | 892.0 | 958.0 | 573.0 | 595.7 | 85.1 | 2104.7 | 74816.7 | 164939.7 |
| UJA - Wall from Level -7' 6 1/2" up to Level +4' 11" | 30.0 | 1232 | 2-Mar-13 | 1-Apr-13 | 459.0 | 489.0 | 573.0 | 600.6 | 85.8 | 2361.4 | 77178.1 | 170145.6 |
| UJA - Slabs on Level +4' 11" | 30.0 | 1335 | 28-Mar-13 | 27-Apr-13 | 485.1 | 515.1 | 602.3 | 646.2 | 92.3 | 3285.4 | 80463.5 | 177388.7 |
| UJA - Radial Walls Level +18' 0 1/2" to +32' 2" | 47.0 | 3080 | 14-Apr-13 | 31-May-13 | 503.0 | 550.0 | 615.3 | 659.2 | 94.2 | 2104.7 | 82568.2 | 182028.7 |
| UJA - Radial Walls Level +32' 2" to +49' 1" | 47.0 | 3285 | 6-Sep-13 | 23-Oct-13 | 647.8 | 694.8 | 600.6 | 664.1 | 94.9 | 3624.3 | 86192.5 | 190018.7 |
| UJA - Radial Walls Level +49' 1" to +64' 5 1/2" | 47.0 | 2464 | 25-Oct-13 | 11-Dec-13 | 696.7 | 743.7 | 620.2 | 683.6 | 97.7 | 2566.8 | 88759.2 | 195677.3 |
| UJA - Walls from Level +4' 11" up to Level +24' 5" | 47.0 | 3285 | 29-Apr-13 | 15-Jun-13 | 517.6 | 564.6 | 647.8 | 695.0 | 99.3 | 3285.4 | 92044.7 | 202920.4 |
| UJA - Slabs on Levels +16' 11", +20' 8", +21' 11" and +24' 5" | 27.0 | 2361 | 23-Jun-13 | 20-Jul-13 | 573.0 | 600.0 | 628.3 | 695.0 | 99.3 | 2053.4 | 94098.1 | 207447.3 |
| UJA - Walls for Pits up to Level +63' 11 1/2" | 63.0 | 2567 | 10-Aug-13 | 12-Oct-13 | 620.2 | 683.2 | 675.5 | 696.7 | 99.5 | 2104.7 | 96202.8 | 212087.3 |

| Activity Name | Duration CCNPP | P [1] | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| UJA - Walls and Slab to Level +32' 2" | 43.0 | 3285 | 23-Jul-13 | 4-Sep-13 | 602.3 | 645.3 | 712.9 | 734.1 | 104.9 | 2104.7 | 98307.6 | 216727.4 |
| UJA - Walls and Slab to Level +49' 1" | 66.0 | 2053 | 18-Aug-13 | 23-Oct-13 | 628.3 | 694.3 | 672.2 | 739.0 | 105.6 | 3634.5 | 101942.1 | 224740.0 |
| UJA - Walls Level +49' 1" to +63' 11 1/2" | 56.0 | 3342 | 25-Oct-13 | 20-Dec-13 | 696.7 | 752.7 | 696.7 | 743.9 | 106.3 | 2464.1 | 104406.1 | 230172.3 |
| UJA - Walls and Slab to Level +79' 1" | 66.0 | 5200 | 24-Jan-14 | 31-Mar-14 | 787.8 | 853.8 | 696.7 | 753.6 | 107.7 | 3341.9 | 107748.1 | 237539.8 |
| UJA - Walls and Slabs from Level +63' 11 1/2" up to +113' 0 1/2" | 105.0 | 4466 | 24-Jan-14 | 9-May-14 | 787.8 | 892.8 | 745.5 | 786.2 | 112.3 | 2207.4 | 109955.5 | 242406.2 |
| UJA - UJB Erection of 1st Part APC Shell up to Level -1' 0" | 30.0 | 2446 | 24-Mar-13 | 23-Apr-13 | 481.8 | 511.8 | 756.9 | 800.8 | 114.4 | 2104.7 | 112060.2 | 247046.3 |
| UJA - UJB Erection of 2nd Part APC Shell up to Level +12' 1 1/2" | 22.0 | 2105 | 11-May-13 | 2-Jun-13 | 529.0 | 551.0 | 743.9 | 810.6 | 115.8 | 3634.5 | 115694.7 | 255058.9 |
| UJA - UJB Erection of 3rd Part APC Shell up to Level +25' 3" | 22.0 | 2105 | 23-Jun-13 | 15-Jul-13 | 573.0 | 595.0 | 822.0 | 843.2 | 120.5 | 2104.7 | 117799.5 | 259699.0 |
| UJA - UJB Erection of 1st Part APC Shell up to Level +38' 4 1/2" | 43.0 | 2105 | 5-Aug-13 | 17-Sep-13 | 615.3 | 658.3 | 787.8 | 854.5 | 122.1 | 5200.2 | 122999.7 | 271163.3 |
| UJA - UJB Erection of 2nd Part APC Shell up to Level +51' 6" | 21.0 | 2105 | 4-Oct-13 | 25-Oct-13 | 675.5 | 696.5 | 859.4 | 882.2 | 126.0 | 2104.7 | 125104.4 | 275803.4 |
| UJA - UJB Erection of 3rd Part APC Shell up to Level +64' 7 1/2" | 21.0 | 2105 | 10-Nov-13 | 1-Dec-13 | 712.9 | 733.9 | 823.6 | 890.4 | 127.2 | 3634.5 | 128738.9 | 283816.0 |
| UJA - UJB Erection of 1st Part APC Shell up to Level +77' 9" | 43.0 | 2105 | 24-Dec-13 | 5-Feb-14 | 756.9 | 799.9 | 787.8 | 893.6 | 127.7 | 4466.1 | 133205.1 | 293662.0 |
| UJA - UJB Erection of 2nd Part APC Shell up to Level +90' 10 1/2" | 21.0 | 2105 | 27-Feb-14 | 20-Mar-14 | 822.0 | 843.0 | 901.8 | 945.7 | 135.1 | 2104.7 | 135309.8 | 298302.1 |
| UJA - UJB Erection of 3rd Part APC Shell up to Level +104' 0" | 22.0 | 2105 | 6-Apr-14 | 28-Apr-14 | 859.4 | 881.4 | 892.0 | 958.7 | 137.0 | 3634.5 | 138944.3 | 306314.7 |
| UJA - UJB Erection of 1st Part APC Shell up to Level +117' 1 1/2" | 43.0 | 2105 | 18-May-14 | 30-Jun-14 | 901.8 | 944.8 | 962.0 | 983.1 | 140.4 | 2104.7 | 141049.1 | 310954.7 |
| UJA - UJB Erection of 2nd Part APC Shell up to Level +130' 3" | 21.0 | 2105 | 17-Jul-14 | 7-Aug-14 | 962.0 | 983.0 | 1002.7 | 1023.8 | 146.3 | 2104.7 | 143153.8 | 315594.8 |
| UJA - UJB Erection of 3rd Part APC Shell up to Level +143' 4 1/2" | 21.0 | 2105 | 27-Aug-14 | 17-Sep-14 | 1002.7 | 1023.7 | 1004.3 | 1069.4 | 152.8 | 1026.7 | 144180.5 | 317858.3 |
| UJA - UJB Erection of Outer Containment Dome APC Shell (LOE) | 307.0 | 5134 | 11-Apr-16 | 12-Feb-17 | 1595.2 | 1902.2 | 1595.2 | 1674.9 | 239.3 | 2464.1 | 146644.6 | 323290.5 |
| UJA - UJB Erection of Corner APC Shell up to Level +157' 6" | 79.0 | 2464 | 11-Apr-16 | 29-Jun-16 | 1595.2 | 1674.2 | 1694.4 | 1730.3 | 247.2 | 2464.1 | 149108.7 | 328722.8 |

| Activity Name | Duration CCNPP | P (1) | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| UJA - UJB Erection of Corner APC Shell up to Level +171' 3" | 35.0 | 2464 | 19-Jul-16 | 23-Aug-16 | 1694.4 | 1729.4 | 1715.6 | 1774.2 | 253.5 | 3490.8 | 152599.4 | 336418.5 |
| UJA - UJB Erection Top of Dome APC Shell up to Level +117' 10" | 58.0 | 3491 | 9-Aug-16 | 6-Oct-16 | 1715.6 | 1773.6 | 1775.8 | 1813.3 | 259.0 | 3490.8 | 156090.2 | 344114.3 |
| UJA - UJB Erection Top of Dome APC Shell up to Level +184' 4 1/2" | 37.0 | 3491 | 8-Oct-16 | 14-Nov-16 | 1775.8 | 1812.8 | 1816.5 | 1847.5 | 263.9 | 3490.8 | 159581.0 | 351810.0 |
| UJA - UJB Erection Top of Dome APC Shell up to Level +190' 11 1/2" | 30.0 | 3491 | 18-Nov-16 | 18-Dec-16 | 1816.5 | 1846.5 | 1850.7 | 1863.7 | 266.2 | 3490.8 | 163071.8 | 359505.7 |
| UJA - UJB Erection Top of Dome APC Shell up to Level +203' 5" | 13.0 | 3491 | 22-Dec-16 | 4-Jan-17 | 1850.7 | 1863.7 | 1595.2 | 1902.8 | 271.8 | 5133.5 | 168205.3 | 370822.9 |
| UJA - UJB Erection Head of Dome APC Shell | 22.0 | 3491 | 21-Jan-17 | 12-Feb-17 | 1880.0 | 1902.0 | 1880.0 | 1902.8 | 271.8 | 3490.8 | 171696.1 | 378518.7 |
| UJA - UJB Dome APC Shell Shoring Removal | 22.0 | 3491 | 9-Mar-17 | 31-Mar-17 | 1927.2 | 1949.2 | 1927.2 | 1950.0 | 278.6 | 3490.8 | 175186.8 | 386214.4 |
| **TOTAL =** | | 175187 | | | | | | | | | | |

| Fuel Building, UFA | 1400 | | 1-Dec-11 | 1-Oct-15 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UFA - Base Slab Leveling Concrete | 19.0 | 5134 | 1-Apr-12 | 20-Apr-12 | 122.5 | 139.0 | 122.5 | 139.0 | 19.9 | 5133.5 | 5133.5 | 11317.2 |
| UFA - Base Slab Concrete at Level -31' 6" | 7.0 | 3593 | 1-Jun-12 | 8-Jun-12 | 183.8 | 192.8 | 183.8 | 192.8 | 27.5 | 3593.5 | 8727.0 | 19239.3 |
| UFA - Erection APC Shell (1st Step up to Level -19' 8") | 57.0 | 2126 | 20-Apr-13 | 16-Jun-13 | 506.3 | 565.3 | 342.3 | 428.3 | 61.2 | 1701.2 | 10428.2 | 22989.8 |
| UFA - Inner Walls and Slabs at Level -31' 6" up to -20' 4" | 84.0 | 1701 | 7-Nov-12 | 30-Jan-13 | 342.3 | 428.3 | 427.0 | 508.0 | 72.6 | 2662.2 | 13090.4 | 28859.0 |
| UFA - Erection APC Shell (2nd Step up to Level -7' 10 1/2") | 32.0 | 2662 | 1-Jul-13 | 2-Aug-13 | 578.4 | 612.4 | 506.3 | 565.3 | 80.8 | 2126.3 | 15216.7 | 33546.6 |
| UFA - Walls and Slabs up to Level -11' 2" | 79.0 | 2662 | 31-Jan-13 | 20-Apr-13 | 427.0 | 508.0 | 506.3 | 580.3 | 82.9 | 2662.2 | 17879.0 | 39415.7 |
| UFA - Walls and Slabs up to Level +00.00 | 72.0 | 2662 | 20-Apr-13 | 1-Jul-13 | 506.3 | 580.3 | 578.4 | 612.4 | 87.5 | 2662.2 | 20541.2 | 45284.8 |
| UFA - Walls and Slabs up to Level +12' 1 1/2" (includes Fuel Pool Slab) | 84.0 | 3593 | 4-Aug-13 | 27-Oct-13 | 612.6 | 698.6 | 612.6 | 698.6 | 99.8 | 3593.5 | 24134.6 | 53206.9 |
| UFA - Walls and Slabs Level +12' 1 1/2" up to +24' 3 1/2" (with FP walls) | 79.0 | 3526 | 30-Oct-13 | 17-Jan-14 | 699.1 | 780.1 | 699.1 | 728.1 | 104.0 | 2126.3 | 26260.9 | 57894.5 |

| Activity Name | Duration CCNPP | P (1) | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| UFA - Walls and Slabs up to Level +36' 5" (includes Fuel Pool Walls) | 46.0 | 3593 | 19-Jan-14 | 6-Mar-14 | 780.2 | 828.2 | 699.1 | 780.1 | 111.4 | 3525.7 | 29786.6 | 65667.2 |
| UFA - Walls and Slabs up to Level +48' 6 1/2" (with Fuel Pool Walls) | 54.0 | 3717 | 8-Mar-14 | 1-May-14 | 828.8 | 884.8 | 780.2 | 819.2 | 117.0 | 2126.3 | 31912.9 | 70354.8 |
| UFA - Walls and Slabs up to Level +63' 11 1/2" (includes Fuel Pool Walls) | 64.0 | 3526 | 23-Jun-14 | 26-Aug-14 | 935.1 | 1001.1 | 780.2 | 828.2 | 118.3 | 3593.5 | 35506.4 | 78276.8 |
| UFA - Walls and Slabs up to Level +78' 9" | 64.0 | 3409 | 28-Aug-14 | 31-Oct-14 | 1001.8 | 1067.8 | 828.8 | 855.8 | 122.3 | 2126.3 | 37632.7 | 82964.4 |
| UFA - Walls and Slabs up to Level +93' 6" | 41.0 | 3514 | 3-Nov-14 | 14-Dec-14 | 1068.5 | 1111.5 | 828.8 | 884.8 | 126.4 | 3716.7 | 41349.3 | 91158.1 |
| UFA - Erection APC Shell (3rd Step up to Level +3' 11") | 27.0 | 2126 | 30-Oct-13 | 26-Nov-13 | 699.1 | 728.1 | 884.7 | 911.7 | 130.2 | 2126.3 | 43475.6 | 95845.7 |
| UFA - Erection APC Shell (4th Step up to Level +15' 9") | 37.0 | 2126 | 19-Jan-14 | 25-Feb-14 | 780.2 | 819.2 | 935.1 | 990.0 | 141.4 | 3525.7 | 47001.3 | 103618.4 |
| UFA - Erection APC Shell (5th Step up to Level +27' 6 1/2") | 25.0 | 2126 | 8-Mar-14 | 2-Apr-14 | 828.8 | 855.8 | 1001.8 | 1046.8 | 149.5 | 2126.3 | 49127.6 | 108306.0 |
| UFA - Erection APC Shell (6th Step up to Level +39' 4 1/2") | 25.0 | 2126 | 3-May-14 | 28-May-14 | 884.7 | 911.7 | 1001.8 | 1067.8 | 152.5 | 3408.6 | 52536.2 | 115820.6 |
| UFA - Erection APC Shell (7th Step up to Level +51' 2") | 43.0 | 2126 | 28-Aug-14 | 10-Oct-14 | 1001.8 | 1046.8 | 1068.5 | 1095.5 | 156.5 | 2126.3 | 54662.5 | 120508.2 |
| UFA - Erection APC Shell (8th Step up to Level +63' 0") | 25.0 | 2126 | 3-Nov-14 | 28-Nov-14 | 1068.5 | 1095.5 | 1068.5 | 1111.5 | 158.8 | 3514.4 | 58176.9 | 128256.0 |
| UFA - Erection APC Shell (9th Step up to Level +74' 9 1/2") | 25.0 | 2126 | 30-Nov-14 | 25-Dec-14 | 1095.5 | 1122.5 | 1095.5 | 1122.5 | 160.4 | 2126.3 | 60303.2 | 132943.6 |
| UFA - Erection APC Shell (10th Step up to Level +86' 7 1/2") | 41.0 | 2126 | 21-Feb-15 | 3-Apr-15 | 1178.4 | 1221.4 | 1111.7 | 1177.7 | 168.2 | 3593.5 | 63896.7 | 140865.7 |
| UFA - Erection APC Shell (11th Step up to Level +98' 5") | 25.0 | 2126 | 5-Apr-15 | 30-Apr-15 | 1221.6 | 1248.6 | 1178.4 | 1221.4 | 174.5 | 2126.3 | 66023.0 | 145553.3 |
| UFA - Erection APC Shell (12th Step up to Level +110' 3") | 25.0 | 2126 | 2-May-15 | 27-May-15 | 1248.6 | 1275.6 | 1178.4 | 1244.4 | 177.8 | 1540.1 | 67563.0 | 148948.5 |
| UFA - Walls and Slabs up to Level +103 8" | 64.0 | 3593 | 16-Dec-14 | 18-Feb-15 | 1111.7 | 1177.7 | 1221.6 | 1248.6 | 178.4 | 2126.3 | 69689.3 | 153636.1 |
| UFA - Fuel Pool Concrete Ceiling | 64.0 | 1540 | 21-Feb-15 | 26-Apr-15 | 1178.4 | 1244.4 | 1248.6 | 1275.6 | 182.2 | 2126.3 | 71815.6 | 158323.7 |
| UFA - Erection Roof Slab up to Level +111' 6 1/2" APC Shell (Completed) | 57.0 | 6330 | 29-May-15 | 25-Jul-15 | 1275.7 | 1334.7 | 1275.7 | 1334.7 | 190.7 | 6329.6 | 78145.2 | 172277.8 |
| **TOTAL =** | | 78145 | | | | | | | | | | |

| Activity Name | Duration CCNPP | P [1] | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| **Safeguard Building, UJH 1** | **1066** | | **1-Dec-11** | **1-Nov-14** | | | | | | | | |
| 1UJH - Base Slab Leveling Concrete | 20 | 2053 | 25-Mar-12 | 14-Apr-12 | 115.8 | 137.8 | 115.8 | 138.7 | 19.8 | 2053.4 | 2053.4 | 4526.9 |
| 1UJH - Base Slab Concrete Level -31' 6" | 6 | 7223 | 21-May-12 | 27-May-12 | 172.0 | 180.0 | 172.0 | 180.5 | 25.8 | 7222.8 | 9276.2 | 20450.3 |
| 1UJH - Walls and Slabs from Level -31' 6" to -16' 5" | 59 | 2680 | 1-Oct-12 | 29-Nov-12 | 305.5 | 366.5 | 305.5 | 367.0 | 52.4 | 2679.7 | 11955.9 | 26357.9 |
| 1UJH - Walls, Columns and Slabs from Level -16' 5" to +00.00 | 53 | 2464 | 25-Dec-12 | 16-Feb-13 | 390.7 | 445.7 | 390.7 | 445.8 | 63.7 | 2464.1 | 14420.0 | 31790.1 |
| 1UJH - Walls, Columns and Slabs from Level +0.0 to 15' 5" and 16' 11" | 54 | 1894 | 13-Jul-13 | 5-Sep-13 | 590.1 | 646.1 | 590.1 | 646.7 | 92.4 | 1894.3 | 16314.3 | 35966.2 |
| 1UJH - Walls, Columns and Slabs from Level +15' 5" to +26' 7" | 62 | 1951 | 13-Sep-13 | 14-Nov-13 | 652.8 | 716.8 | 652.8 | 717.5 | 102.5 | 1950.7 | 18265.0 | 40266.7 |
| 1UJH - Walls, Columns and Slabs from Level +26' 7" to +39' 4 1/2" | 61 | 2803 | 10-Nov-13 | 10-Jan-14 | 710.7 | 773.7 | 710.7 | 773.8 | 110.5 | 2802.9 | 21067.9 | 46446.0 |
| 1UJH - Walls, Columns and Slabs from Level +39' 4 1/2" to +55' 1 1/2" | 59 | 3126 | 2-Jan-14 | 2-Mar-14 | 763.7 | 824.7 | 763.7 | 825.2 | 117.9 | 3126.3 | 24194.2 | 53338.2 |
| 1UJH - Structures of 1UJE29 / 33 from Level +55' 1 1/2" to +96' 9 1/2" | 38 | 2669 | 22-Apr-14 | 30-May-14 | 873.1 | 913.1 | 873.1 | 913.6 | 130.521 | 2669.42 | 26863.606 | 59223.1 |
| 1UJH - Structures of 1UJK26 from Level +55' 1 1/2" to +82' 0 1/2" | 94 | 2053 | 14-May-14 | 16-Aug-14 | 895.6 | 991.6 | 895.6 | 992.4 | 141.8 | 2053.4 | 28917.0 | 63750.0 |
| **TOTAL =** | | 28917 | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Safeguard buildings, UJH 2-3** | **1066** | | **1-Dec-11** | **1-Nov-14** | | | | | | | | |
| 2/3UJH - Base Slab Leveling Concrete | 18 | 8214 | 24-Mar-12 | 11-Apr-12 | 114.7 | 134.7 | 114.7 | 135.3 | 19.3 | 8213.6 | 8213.6 | 18107.6 |
| 2/3UJH - Base Slab Concrete to Level -31' 6" | 6 | 5134 | 21-May-12 | 27-May-12 | 172.0 | 180.0 | 172.0 | 180.8 | 25.8 | 5133.5 | 13347.1 | 29424.8 |
| 2/3UJH - APC Shell (1st Step up to Level -19' 8") | 43 | 2123 | 17-Jan-13 | 1-Mar-13 | 413.2 | 458.2 | 320.5 | 415.2 | 59.3 | 4813.2 | 18160.3 | 40035.9 |
| 2/3UJH - Walls and Slabs from Level -31' 6" up to -16' 5" | 92 | 4813 | 16-Oct-12 | 16-Jan-13 | 320.5 | 414.5 | 413.2 | 459.1 | 65.6 | 2123.2 | 20283.5 | 44716.7 |

| Activity Name | Duration CCNPP | P [1] | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| 2/3UJH - APC Shell (2nd Step up to Level -7' 10 1/2") | 26 | 2122 | 1-May-13 | 27-May-13 | 517.8 | 545.8 | 413.2 | 519.8 | 74.3 | 4404.5 | 24688.0 | 54426.9 |
| 2/3UJH - APC Shell (3rd Step up to Level +3' 11") | 25 | 2122 | 14-Oct-13 | 8-Nov-13 | 683.1 | 710.1 | 517.8 | 546.8 | 78.1 | 2122.2 | 26810.2 | 59105.4 |
| 2/3UJH - Walls and Slabs from Level -16' 5" up to +00.00 | 104 | 4405 | 17-Jan-13 | 1-May-13 | 413.2 | 519.2 | 619.0 | 685.1 | 97.9 | 4271.1 | 31081.3 | 68521.4 |
| 2/3UJH - Walls and Slabs from Level +00.00 up to +15' 5", +16' 11" | 64 | 4271 | 11-Aug-13 | 14-Oct-13 | 619.0 | 685.0 | 683.1 | 710.4 | 101.5 | 2122.2 | 33203.5 | 73199.9 |
| 2/3UJH - Walls and Slabs from Level +15' 5" up to +26' 7" | 28 | 3464 | 15-Oct-13 | 12-Nov-13 | 684.8 | 714.8 | 684.8 | 715.5 | 102.2 | 3464.1 | 36667.6 | 80836.8 |
| 2/3UJH - Walls and Slabs from Level +26' 7" up to +39' 4 1/2" | 62 | 3799 | 23-Nov-13 | 24-Jan-14 | 723.6 | 787.6 | 715.2 | 752.6 | 107.5 | 2122.2 | 38789.8 | 85515.3 |
| 2/3UJH - Cable Ducts on Level +39' 4 1/2" | 60 | 0 | 2-Apr-14 | 1-Jun-14 | 853.5 | 915.5 | 723.6 | 788.0 | 112.6 | 3798.8 | 42588.5 | 93890.1 |
| 2/3UJH - Walls, Col and Slabs from Level +39' 4 1/2" up to +53' 5 1/2" | 65 | 3522 | 25-Jan-14 | 31-Mar-14 | 786.0 | 853.0 | 786.0 | 811.6 | 115.9 | 2122.2 | 44710.7 | 98568.6 |
| 2/3UJH - Walls and Slabs Level +53' 5 1/2" to +68' 11" | 59 | 4415 | 2-Apr-14 | 31-May-14 | 853.5 | 914.5 | 786.0 | 853.8 | 122.0 | 3521.6 | 48232.3 | 106332.3 |
| 2/3UJH - Walls and Slabs from Level +68' 11" up to +87' 3" | 32 | 4415 | 2-Jun-14 | 4-Jul-14 | 914.2 | 948.2 | 853.5 | 877.4 | 125.3 | 2122.2 | 50354.5 | 111010.8 |
| 2/3UJH - APC Shell (4th Step up to Level +15' 9") | 35 | 2122 | 15-Nov-13 | 20-Dec-13 | 715.2 | 752.2 | 853.5 | 914.5 | 130.6 | 4414.8 | 54769.3 | 120743.6 |
| 2/3UJH - APC Shell (5th Step up to Level +27' 6 1/2") | 23 | 2122 | 25-Jan-14 | 17-Feb-14 | 786.0 | 811.0 | 853.5 | 916.2 | 130.9 | 0.0 | 54769.3 | 120743.6 |
| 2/3UJH - APC Shell (6th Step up to Level +39' 4 1/2") | 21 | 2122 | 2-Apr-14 | 23-Apr-14 | 853.5 | 876.5 | 877.1 | 919.6 | 131.4 | 2122.2 | 56891.5 | 125422.2 |
| 2/3UJH - APC Shell (7th Step up to Level +51' 2") | 40 | 2122 | 26-Apr-14 | 5-Jun-14 | 877.1 | 919.1 | 919.3 | 943.2 | 134.7 | 2122.2 | 59013.7 | 130100.7 |
| 2/3UJH - APC Shell (8th Step up to Level +63' 0") | 21 | 2122 | 7-Jun-14 | 28-Jun-14 | 919.3 | 942.3 | 914.2 | 948.2 | 135.5 | 4414.8 | 63428.5 | 139833.6 |
| 2/3UJH - APC Shell (9th Step up to Level +74' 9 1/2") | 21 | 2122 | 5-Jul-14 | 26-Jul-14 | 947.9 | 970.9 | 947.9 | 971.9 | 138.8 | 2122.2 | 65550.7 | 144512.1 |
| 2/3UJH - APC Shell (10th Step up to Level +87' 3") | 37 | 2122 | 29-Jul-14 | 4-Sep-14 | 971.5 | 1010.5 | 971.5 | 1010.7 | 144.4 | 2122.2 | 67672.9 | 149190.6 |
| 2/3UJH - Roof Slab APC Shell up to Level +111' 6 1/2" | 45 | 8547 | 6-Sep-14 | 21-Oct-14 | 1010.3 | 1057.3 | 1010.3 | 1057.9 | 151.1 | 8547.3 | 76220.2 | 168033.9 |
| **TOTAL =** | | 76220 | | | | | | | | | | |

| Activity Name | Duration CCNPP | P (1) | Early Start CCNPP | Finish CCNPP | days from 29-nov-11 | | Sorted values from starting date: 29-nov-2011 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | start date | finish date | finish date | P (step) | P (total) | P (total) |
| | days | tons | | | start | finish | start | days | weeks | tons | tons | kips |
| **Safeguard Building, UJH 4** | **1066** | | **1-Dec-11** | **1-Nov-14** | | | | | | | | |
| 4UJH - Base Slab Leveling Concrete | 14 | 2053 | 3-Apr-12 | 17-Apr-12 | 124.8 | 140.8 | 124.8 | 139.0 | 19.9 | 2053.4 | 2053.4 | 4526.9 |
| 4UJH - Base Slab Concrete to Level -31' 6" | 6 | 7223 | 24-May-12 | 30-May-12 | 175.8 | 183.8 | 175.8 | 184.3 | 26.3 | 7222.8 | 9276.2 | 20450.3 |
| 4UJH - Walls and Slabs from Level -31' 6" to -16' 5" | 60 | 2680 | 8-Oct-12 | 7-Dec-12 | 312.1 | 374.1 | 312.1 | 374.9 | 53.6 | 2679.7 | 11955.9 | 26357.9 |
| 4UJH - Walls, Columns and Slabs from Level -16' 5" to +00.00 | 54 | 2464 | 3-Jan-13 | 26-Feb-13 | 399.1 | 455.1 | 399.1 | 455.3 | 65.0 | 2464.1 | 14420.0 | 31790.1 |
| 4UJH - Walls, Columns and Slabs from Level +00.00 to +15' 5" and +16' 11" | 55 | 1894 | 25-Jul-13 | 18-Sep-13 | 602.8 | 659.8 | 602.8 | 660.7 | 94.4 | 1894.3 | 16314.3 | 35966.2 |
| 4UJH - Walls, Columns and Slabs from Level +15' 5" to +26' 7" | 64 | 1951 | 27-Sep-13 | 30-Nov-13 | 666.9 | 732.9 | 666.9 | 732.9 | 104.7 | 1950.7 | 18265.0 | 40266.7 |
| 4UJH - Walls, Columns and Slabs from Level +26' 7" to +39' 4 1/2" | 62 | 2803 | 25-Nov-13 | 26-Jan-14 | 726.0 | 790.0 | 726.0 | 790.4 | 112.9 | 2802.9 | 21067.9 | 46446.0 |
| 4UJH - Walls, Columns and Slabs from Level +39' 4 1/2" to +55' 1 1/2" | 60 | 3126 | 20-Jan-14 | 21-Mar-14 | 781.8 | 843.8 | 781.8 | 844.6 | 120.7 | 3126.3 | 24194.2 | 53338.2 |
| 4UJH - Structures of 4UJE 29/33 from Level +55' 1 1/2" to +96' 9 1/2" | 41 | 2669 | 10-May-14 | 20-Jun-14 | 891.9 | 934.9 | 891.9 | 935.0 | 133.6 | 2669.4 | 26863.6 | 59223.1 |
| 4UJH - Structures of 4UJE 29/33 from Level +55' 1 1/2" to +96' 9 1/2" | 96 | 2053 | 10-May-14 | 14-Aug-14 | 891.9 | 989.9 | 891.9 | 990.8 | 141.5 | 2053.4 | 28917.0 | 63750.0 |
| **TOTAL =** | | 28917 | | | | | | | | | | |

**Total for the NI Common mat (OL3) =** **854,026 kips**

**Areva's value for CCNPP Unit 3 =** **943,240 kips**

**Difference =** **9.5%**

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**1.2 Nuclear Auxiliary Building (UKA)**

Loads for the Nuclear Auxiliary Building that are used in the analysis are based on the information provided by AREVA in Ref. 6 for the CCNPP Unit3. The total load for this building is the same than the total load reported in Ref. 4, the difference is less than 1%. The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time.

**Starting date =** **1-Jan-12**

**Finishing date =** **1-Nov-15**

**Table 1.2 Construction loads and sequence for the Nuclear Auxiliary Building - CCNPP Unit 3**

| | Activity | P tot | E. Date | Duration | | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Start of construction | 0 | 1-Jan-12 | 0.0 | 0.0 | 33.0 | 4.7 | 0 | 0 |
| 1 | Base Slab | 5031 | 1-Mar-12 | 60.0 | 8.6 | 93.0 | 13.3 | 5031 | 11091 |
| 2 | Structure -9.6 to -6.50 | 5031 | 21-Aug-12 | 233.3 | 33.3 | 266.3 | 38.0 | 10062 | 22182 |
| 3 | Structure -6.5 to -3.40 | 5031 | 16-Dec-12 | 350.0 | 50.0 | 383.0 | 54.7 | 15093 | 33273 |
| 4 | Structure -3.40 to 0 | 5031 | 11-Apr-13 | 466.7 | 66.7 | 499.7 | 71.4 | 20123 | 44364 |
| 5 | Structure 0 to 3.70 | 5031 | 6-Aug-13 | 583.3 | 83.3 | 616.3 | 88.0 | 25154 | 55455 |
| 6 | Structure 3.70 to 7.40 | 5031 | 1-Dec-13 | 700.0 | 100.0 | 733.0 | 104.7 | 30185 | 66545 |
| 7 | Structure 7.40 to 10.5 | 5031 | 27-Mar-14 | 816.7 | 116.7 | 849.7 | 121.4 | 35216 | 77636 |
| 8 | Structure 10.5 to 15.2 | 5031 | 22-Jul-14 | 933.3 | 133.3 | 966.3 | 138.0 | 40247 | 88727 |
| 9 | Structure 15.2 to 19.5 | 5031 | 16-Nov-14 | 1050.0 | 150.0 | 1083.0 | 154.7 | 45278 | 99818 |
| 10 | Structure 19.5 to 24.7 | 5031 | 12-Mar-15 | 1166.7 | 166.7 | 1199.7 | 171.4 | 50308 | 110909 |
| 11 | Structure 24.7to roof | 5031 | 7-Jul-15 | 1283.3 | 183.3 | 1316.3 | 188.0 | 55339 | 122000 |

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**1.3 Access Building (UKE)**

Loads for the Access Building that are used in the analysis are based on the information provided by AREVA in Ref. 6 for the CCNPP Unit3. The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time.

**Starting date =** **1-Dec-11**

**Finishing date =** **1-Apr-15**

**Table 1.3 Construction loads and sequence for the Access Building - CCNPP Unit 3**

| | Part | P tot | E. Date | Duration | Duration | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Start of construction | 0 | 1-Dec-11 | 0.0 | 0.0 | 2.0 | 0.3 | 0 | 0 |
| 1 | Base Slab | 3195 | 1-Feb-12 | 62.0 | 8.9 | 64.0 | 9.1 | 3195 | 7043 |
| 2 | Structure -9.6 to -4 | 3195 | 1-Sep-12 | 275.0 | 39.3 | 277.0 | 39.6 | 6389 | 14086 |
| 3 | Structure -4 to 0 | 3195 | 1-Mar-13 | 456.4 | 65.2 | 458.4 | 65.5 | 9584 | 21129 |
| 4 | Structure 0 to 3.85 | 3195 | 31-Jul-13 | 608.5 | 86.9 | 610.5 | 87.2 | 12779 | 28171 |
| 5 | Structure 3.85 to 7.70 | 3195 | 30-Dec-13 | 760.6 | 108.7 | 762.6 | 108.9 | 15973 | 35214 |
| 6 | Structure 7.70 to 12.0 | 3195 | 31-May-14 | 912.8 | 130.4 | 914.8 | 130.7 | 19168 | 42257 |
| 7 | Structure 12.0 to 16.5 | 3195 | 30-Oct-14 | 1064.9 | 152.1 | 1066.9 | 152.4 | 22362 | 49300 |

**1.4 Radioactive Waste Processing Building (UKS)**

Loads for the Radioactive Waste Building that are used in the analysis are based on the information provided by AREVA in Ref. 6 for the CCNPP Unit3. The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time.

**Starting date =** **1-Jan-14**

**Finishing date =** **1-Dec-15**

**Table 1.4 Construction loads and sequence for the Radioactive Waste Building - CCNPP Unit 3**

| | Part | P tot | E. Date | Duration | Duration | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Start of construction | 0 | 1-Jan-14 | 0.0 | 0.0 | 764.0 | 109.1 | 0 | 0 |
| 1 | Base Slab | 5529 | 1-Feb-14 | 31.0 | 4.4 | 795.0 | 113.6 | 5529 | 12189 |
| 2 | Drum storage | 5529 | 20-May-14 | 139.8 | 20.0 | 903.8 | 129.1 | 11058 | 24378 |
| 3 | Structure -9.6 to -6.5 | 5529 | 29-Jul-14 | 209.7 | 30.0 | 973.7 | 139.1 | 16587 | 36567 |
| 4 | Structure -6.5 to -3.40 | 5529 | 7-Oct-14 | 279.6 | 39.9 | 1043.6 | 149.1 | 22116 | 48756 |
| 5 | Structure -3.40 to 0 | 5529 | 16-Dec-14 | 349.5 | 49.9 | 1113.5 | 159.1 | 27644 | 60944 |
| 6 | Structure 0 to 3.70 | 5529 | 24-Feb-15 | 419.4 | 59.9 | 1183.4 | 169.1 | 33173 | 73133 |
| 7 | Structure 3.70 to 7.0 | 5529 | 5-May-15 | 489.3 | 69.9 | 1253.3 | 179.0 | 38702 | 85322 |
| 8 | Structure 7.0 to 11.0 | 5529 | 14-Jul-15 | 559.2 | 79.9 | 1323.2 | 189.0 | 44231 | 97511 |
| 9 | Structure 11.0 to 16.0 | 5529 | 22-Sep-15 | 629.1 | 89.9 | 1393.1 | 199.0 | 49760 | 109700 |

**1.5 EPGB (UBP)**

Loads for the EPGB that are used in the analysis are based on the information provided by AREVA in Ref. 6 for the CCNPP Unit3. The total load of this building is the same than the total load reported in Ref. 4, the difference is less than 1%.The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time.

**Starting date =** **1-Jun-14**

**Finishing date =** **1-Aug-15**

**Table 1.5 Construction loads and sequence for the EPGB - CCNPP Unit 3**

| | Part | P tot | E. Date | Duration | Duration | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Start of construction | 0 | 1-Jun-14 | 0.0 | 0.0 | 915.0 | 130.7 | 0 | 0 |
| 1 | Base Slab | 3039 | 31-Jul-14 | 60.9 | 8.7 | 975.9 | 139.4 | 3039 | 6700 |
| 2 | Structure -5.0 to 0 | 3039 | 30-Sep-14 | 121.7 | 17.4 | 1036.7 | 148.1 | 6078 | 13400 |
| 3 | Structure 0.0 to 4.75 | 3039 | 30-Nov-14 | 182.6 | 26.1 | 1097.6 | 156.8 | 9117 | 20100 |
| 4 | Structure 4.75 to 10 | 3039 | 30-Jan-15 | 243.4 | 34.8 | 1158.4 | 165.5 | 12156 | 26800 |
| 5 | Structure 10.0 to 14.0 | 3039 | 1-Apr-15 | 304.3 | 43.5 | 1219.3 | 174.2 | 15196 | 33500 |
| 6 | Structure 14.0 to 22.0 | 3039 | 1-Jun-15 | 365.1 | 52.2 | 1280.1 | 182.9 | 18235 | 40200 |

**1.6 ESWB (URB)**

Loads for the ESWB that are used in the analysis are based on the information provided by AREVA in Ref. 6 for the CCNPP Unit3. The total load of this building is the same than the total load reported in Ref. 4, the difference is less than 1%. The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time; the water pool load is considered to be imposed at the end of the construction.

**Starting date =** **1-Aug-13**

**Finishing date =** **1-Nov-14**

**Table 1.6 Construction loads and sequence for the ESWB - CCNPP Unit 3**

| | Part | Ptot | E. Date | Duration | | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Stage 0 | 0.0 | 1-Aug-13 | 0.0 | 0.0 | 611.0 | 87.3 | 0 | 0 |
| 1 | Stage 1 | 5912 | 16-Oct-13 | 76.2 | 10.9 | 687.2 | 98.2 | 5912 | 13033 |
| 2 | Stage 2 | 5912 | 31-Dec-13 | 152.3 | 21.8 | 763.3 | 109.0 | 11823 | 26065 |
| 3 | Stage 3 | 5912 | 17-Mar-14 | 228.5 | 32.6 | 839.5 | 119.9 | 17735 | 39098 |
| 4 | Stage 4 | 5912 | 1-Jun-14 | 304.7 | 43.5 | 915.7 | 130.8 | 23646 | 52131 |
| 5 | Stage 5 | 16588 | 16-Aug-14 | 380.8 | 54.4 | 991.8 | 141.7 | 40234 | 88700 |

**From Ref. 4:**

The pool water load corresponds to = 27% of the total ESWB load.

This load is considered to be imposed at the end of construction during Stage 5.

**1.7 Turbine Building (UMA)**

Loads for the Turbine Building that are used in the analysis are based on the information provided by AREVA in Ref. 6. The total load is approximately 3.5% higher than the total load reported in Ref. 3. The starting and finishing dates are obtained from Ref. 5. The durations and load distribution of each construction activity are divided linearly in time.

**Starting date =** **1-May-12**

**Finishing date =** **1-Nov-14**

**Table 1.7 Construction loads and sequence for the Turbine Building - CCNPP Unit 3**

| | Part | Ptot | E. Date | Duration | | Duration from 29-nov-11 | | P acum | P acum |
|---|---|---|---|---|---|---|---|---|---|
| | | [t] | | days | weeks | days | weeks | tons | kips |
| 0 | Stage 0 | 0.0 | 1-May-12 | 0.0 | 0.0 | 154.0 | 22.0 | 0 | 0 |
| 1 | Stage 1 | 13505 | 27-Jun-12 | 57.1 | 8.2 | 211.1 | 30.2 | 13505 | 29773 |
| 2 | Stage 2 | 13505 | 23-Aug-12 | 114.3 | 16.3 | 268.3 | 38.3 | 27010 | 59547 |
| 3 | Stage 3 | 13505 | 19-Oct-12 | 171.4 | 24.5 | 325.4 | 46.5 | 40516 | 89320 |
| 4 | Stage 4 | 13505 | 15-Dec-12 | 228.5 | 32.6 | 382.5 | 54.6 | 54021 | 119093 |
| 5 | Stage 5 | 13505 | 10-Feb-13 | 285.6 | 40.8 | 439.6 | 62.8 | 67526 | 148867 |
| 6 | Stage 6 | 13505 | 8-Apr-13 | 342.8 | 49.0 | 496.8 | 71.0 | 81031 | 178640 |
| 7 | Stage 7 | 13505 | 4-Jun-13 | 399.9 | 57.1 | 553.9 | 79.1 | 94536 | 208413 |
| 8 | Stage 8 | 13505 | 1-Aug-13 | 457.0 | 65.3 | 611.0 | 87.3 | 108041 | 238187 |
| 9 | Stage 9 | 13505 | 27-Sep-13 | 514.1 | 73.4 | 668.1 | 95.4 | 121547 | 267960 |
| 10 | Stage 10 | 13505 | 23-Nov-13 | 571.3 | 81.6 | 725.3 | 103.6 | 135052 | 297733 |
| 11 | Stage 11 | 13505 | 19-Jan-14 | 628.4 | 89.8 | 782.4 | 111.8 | 148557 | 327507 |
| 12 | Stage 12 | 13505 | 17-Mar-14 | 685.5 | 97.9 | 839.5 | 119.9 | 162062 | 357280 |
| 13 | Stage 13 | 13505 | 13-May-14 | 742.6 | 106.1 | 896.6 | 128.1 | 175567 | 387053 |
| 14 | Stage 14 | 13505 | 9-Jul-14 | 799.8 | 114.3 | 953.8 | 136.3 | 189073 | 416827 |
| 15 | Stage 15 | 13505 | 15-Aug-14 | 836.0 | 119.4 | 990.0 | 141.4 | 202578 | 446600 |

## 2. TIME STEPS AND CORRESPONDING TOTAL CUMULATIVE LOAD

The load time history that is obtained from the construction schedules is divided into 8 steps. The selection for the 8 steps is based on two parameters: important changes in loading and the starting and finishing dates of construction for all buildings. For the NI Common mat buildings, the starting and finishing dates of construction, and the total loads correspond to AREVA's latest information (Ref. 7); however, the load distribution on each time step is obtained from OL3 construction load sequence (Ref 1). For the other buildings, the starting and finishing dates of construction, and the total loads correspond to AREVA's and Bechtel's latest information (Ref. 6). Loads are considered to be linearly distributed in time for these buildings. Loads for the CCNPP3 NI Common mat buildings are obtained by adjusting (scaling) the loads of Table 1.1 (OL3). For example, the total load for the CCNPP3 Reactor building is 313,477 kips (Ref. 7) and the total load for OL3 Reactor building is 386,214 (Table 1.1), hence the scaling factor is 313,477/386,214 = 0.81. This factor is applied to the total load of each time step in order to obtain the adjusted load corresponding to CCNPP3 information.

**Table 2.1 Time steps and total cumulative load for all buildings - CCNPP Unit 3**

| Building | Step = | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Day = | 0 | 60 | 140 | 300 | 500 | 800 | 1000 | 1400 | 2000 |
| | Week = | 0 | 9 | 20 | 43 | 71 | 114 | 143 | 200 | 286 |
| Cumulative Total Load (kips) | Reactor Building, UJA | 0 | 3674 | 5511 | 54380 | 100456 | 196753 | 252391 | 257995 | 313477 |
| | Fuel Building, UFA | 0 | 0 | 14242 | 24212 | 28932 | 82640 | 130400 | 216806 | 216806 |
| | Safeguard 1, UJ1 | 0 | 0 | 7674 | 34666 | 53888 | 78732 | 108064 | 108064 | 108064 |
| | Safeguard 2&3, UJ2&3 | 0 | 0 | 21640 | 35165 | 53440 | 112206 | 172704 | 200814 | 200814 |
| | Safeguard 4, UJ4 | 0 | 0 | 7391 | 33387 | 51901 | 75828 | 104079 | 104079 | 104079 |
| | Nuclear Aux. Building, UKA | 0 | 0 | 11091 | 22182 | 44364 | 66545 | 88727 | 122000 | 122000 |
| | Access Building, UKE | 0 | 0 | 7043 | 14086 | 21129 | 35214 | 42257 | 49300 | 49300 |
| | Rad. Waste Building, UKS | 0 | 0 | 0 | 0 | 0 | 12189 | 36567 | 109700 | 109700 |
| | Emergency Power Generating Building, UBP | 0 | 0 | 0 | 0 | 0 | 0 | 6700 | 40200 | 40200 |
| | Emergency Service Water Building, URB | 0 | 0 | 0 | 0 | 0 | 26065 | 88700 | 88700 | 88700 |
| | Turbine Building, UMA | 0 | 0 | 0 | 59547 | 178640 | 327507 | 446600 | 446600 | 446600 |
| | | | | | | | | **Total for the NI =** | **943240** | **kips** |

**Table 2.2 Time steps and uniformly distributed cumulative loads for all buildings - CCNPP Unit 3**

| | Building | Step = | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Day = | 0 | 60 | 140 | 300 | 500 | 800 | 1000 | 1400 | 2000 |
| | | Week = | 0 | 9 | 20 | 43 | 71 | 114 | 143 | 200 | 286 |
| Cumulative Total Uniformly distributed Loads (ksf) | Reactor Building, UJA | | 0.00 | 0.14 | 0.21 | 2.07 | 3.82 | 7.49 | 9.61 | 9.82 | 11.93 |
| | Fuel Building, UFA | | 0.00 | 0.00 | 0.98 | 1.66 | 1.99 | 5.68 | 8.97 | 14.91 | 14.91 |
| | Safeguard 1, UJ1 | | 0.00 | 0.00 | 0.83 | 3.77 | 5.86 | 8.56 | 11.75 | 11.75 | 11.75 |
| | Safeguard 2&3, UJ2&3 | | 0.00 | 0.00 | 1.03 | 1.68 | 2.55 | 5.36 | 8.24 | 9.58 | 9.58 |
| | Safeguard 4, UJ4 | | 0.00 | 0.00 | 0.80 | 3.61 | 5.61 | 8.20 | 11.26 | 11.26 | 11.26 |
| | Nuclear Aux. Building, UKA | | 0.00 | 0.00 | 0.88 | 1.77 | 3.53 | 5.30 | 7.06 | 9.71 | 9.71 |
| | Access Building, UKE | | 0.00 | 0.00 | 0.92 | 1.85 | 2.77 | 4.62 | 5.55 | 6.47 | 6.47 |
| | Rad. Waste Building, UKS | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 | 2.15 | 6.46 | 6.46 |
| | Emergency Power Generating Building, UBP | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 3.19 | 3.19 |
| | Emergency Service Water Building, URB | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 5.45 | 5.45 | 5.45 |
| | Turbine Building, UMA | | 0.00 | 0.00 | 0.00 | 0.59 | 1.76 | 3.23 | 4.41 | 4.41 | 4.41 |

**Table 3. Geometry and Loads for CCNPP Unit 3 Buildings - comparison of different references**

**1) BECHTEL's & AREVA's latest information (08/aug/09)**

| Building | Responsible | Elevation (1) (ft msl) | Depth (1) (ft) | Area (1) (ft2) | Total load (DL+25%LL) (1) (kips) | Uniformly distributed load (ksf) |
|---|---|---|---|---|---|---|
| **NI Common Mat** components listed below | | | | | | |
| Reactor Building, UJA | AREVA | 36.4 | 35.4 | 26,134 | 313,477 | 12.0 |
| Fuel Building, UFA | AREVA | 41.3 | 40.3 | 13,057 | 216,806 | 16.6 |
| Safeguard 1, UJ1 | AREVA | 41.3 | 40.3 | 8,866 | 108,064 | 12.2 |
| Safeguard 2&3, UJ2&3 | AREVA | 41.3 | 40.3 | 23,457 | 200,814 | 8.6 |
| Safeguard 4, UJ4 | AREVA | 41.3 | 40.3 | 9,661 | 104,079 | 10.8 |
| Total of NI | AREVA | - | - | 81,175 | 943,240 | 11.6 |
| Nuclear Aux. Building, UKA | Bechtel | 46.5 | 39.5 | 12,506 | 122,000 | 9.8 |
| Rad. Waste Building, UKS | Bechtel | 48.5 | 37.5 | 16,864 | 109,700 | 6.5 |
| Access Building, UKE | Bechtel | 48.5 | 37.5 | 9,699 | 49,300 | 5.1 |
| Turbine Building, UMA | Bechtel | 58.9 | 27.1 | 111,650 | 446,600 | 4.0 |
| Emergency Power Generating Building, UBP | Bechtel | 78.5 | 6.0 | 12,621 | 40,200 | 3.2 |
| Emergency Service Water Building, URB | Bechtel | 64.0 | 22.0 | 16,284 | 88,700 | 5.4 |

(1) Data for the Nuclear Island common mat is obtained from Ref. 7; data for the other buildings is obtained from Ref. 6.

**2) Information used in the settlement and bearing capacity draft calculations**

| Building | Currently used in the models | Elevation (ft msl) (1) | Depth (ft) (1) | Area ($ft^2$) (2) | Difference % (4) | Total load (DL+25%LL) (kips) (3) | Difference % (4) | Uniformly distributed load (ksf) | Difference % (4) |
|---|---|---|---|---|---|---|---|---|---|
| **NI Common Mat** components listed below | | | | | | | | | |
| Reactor Building | RIZZO | 41.5 | 41.5 | 26,268 | -1% | 386,214 | -23% | 14.7 | -23% |
| Fuel Building | RIZZO | 41.5 | 41.5 | 14,545 | -11% | 172,278 | 21% | 11.8 | 29% |
| Safeguard 1 | RIZZO | 41.5 | 41.5 | 9,198 | -4% | 63,750 | 41% | 6.9 | 43% |
| Safeguard 2&3 | RIZZO | 41.5 | 41.5 | 20,952 | 11% | 168,034 | 16% | 8.0 | 6% |
| Safeguard 4 | RIZZO | 41.5 | 41.5 | 9,247 | 4% | 63,750 | 39% | 6.9 | 36% |
| Total of NI | RIZZO | - | - | 80,210 | 1% | 854,026 | 9% | 10.6 | 8% |
| Nuclear Aux. Building, UKA | RIZZO | 48.0 | 35.5 | 12,559 | 0% | 121,980 | 0% | 9.7 | 0% |
| Rad. Waste Building, UKS | RIZZO | 47.0 | 35.5 | 16,970 | -1% | 109,713 | 0% | 6.5 | 1% |
| Access Building, UKE | RIZZO | 48.0 | 35.5 | 7,620 | 21% | 49,303 | 0% | 6.5 | -27% |
| Turbine Building, UMA | RIZZO | 60.5 | 23.5 | 101,305 | 9% | 431,077 | 3% | 4.3 | -6% |
| Emergency Power Generating Building, UBP | RIZZO | 76.0 | 6.0 | 12,611 | 0% | 40,201 | 0% | 3.2 | 0% |
| Emergency Service Water Building, URB | RIZZO | 61.0 | 22.0 | 16,284 | 0% | 88,155 | 1% | 5.4 | 1% |

(1) From Ref. 9.
(2) From Ref. 8
(3)See Section 1: Construction Loads
(4) Difference from Table 3-1 values

**3) Information used in the RIZZO settlement and bearing capacity final calculations**

| Building | Currently used in the models | Elevation (ft msl) (1) | Depth (ft) (1) | Area ($ft^2$) (2) | Difference % (4) | Total load (DL+25%LL) (kips) (3) | Difference % (4) | Uniformly distributed load (ksf) | Difference % (4) |
|---|---|---|---|---|---|---|---|---|---|
| **NI Common Mat** components listed below | | | | | | | | | |
| Reactor Building | RIZZO | 41.5 | 41.5 | 26268 | -1% | 313,477 | 0% | 11.9 | 1% |
| Fuel Building | RIZZO | 41.5 | 41.5 | 14545 | -11% | 216,806 | 0% | 14.9 | 10% |
| Safeguard 1 | RIZZO | 41.5 | 41.5 | 9198 | -4% | 108,064 | 0% | 11.7 | 4% |
| Safeguard 2&3 | RIZZO | 41.5 | 41.5 | 20952 | 11% | 200,814 | 0% | 9.6 | -12% |
| Safeguard 4 | RIZZO | 41.5 | 41.5 | 9247 | 4% | 104,079 | 0% | 11.3 | -4% |
| Total of NI | RIZZO | - | - | 80,210 | 1% | 943,240 | 0% | 11.76 | -1% |
| Nuclear Aux. Building, UKA | RIZZO | 48.0 | 35.0 | 12,559 | 0% | 122,000 | 0% | 9.7 | 0% |
| Rad. Waste Building, UKS | RIZZO | 47.0 | 36.0 | 16,970 | -1% | 109,700 | 0% | 6.5 | 1% |
| Access Building, UKE | RIZZO | 48.0 | 35.0 | 7,620 | 21% | 49,300 | 0% | 6.5 | -27% |
| Turbine Building, UMA | RIZZO | 60.5 | 22.5 | 101,305 | 9% | 446,600 | 0% | 4.4 | -10% |
| Emergency Power Generating Building, UBP | RIZZO | 76.0 | 7.0 | 12,611 | 0% | 40,200 | 0% | 3.2 | 0% |
| Emergency Service Water Building, URB | RIZZO | 61.0 | 22.0 | 16,284 | 0% | 88,700 | 0% | 5.4 | 0% |

(1) From Ref. 9.
(2) From Ref. 2.
(3) From Ref. 6 and 7.
(4) Difference from Table 3-1 values

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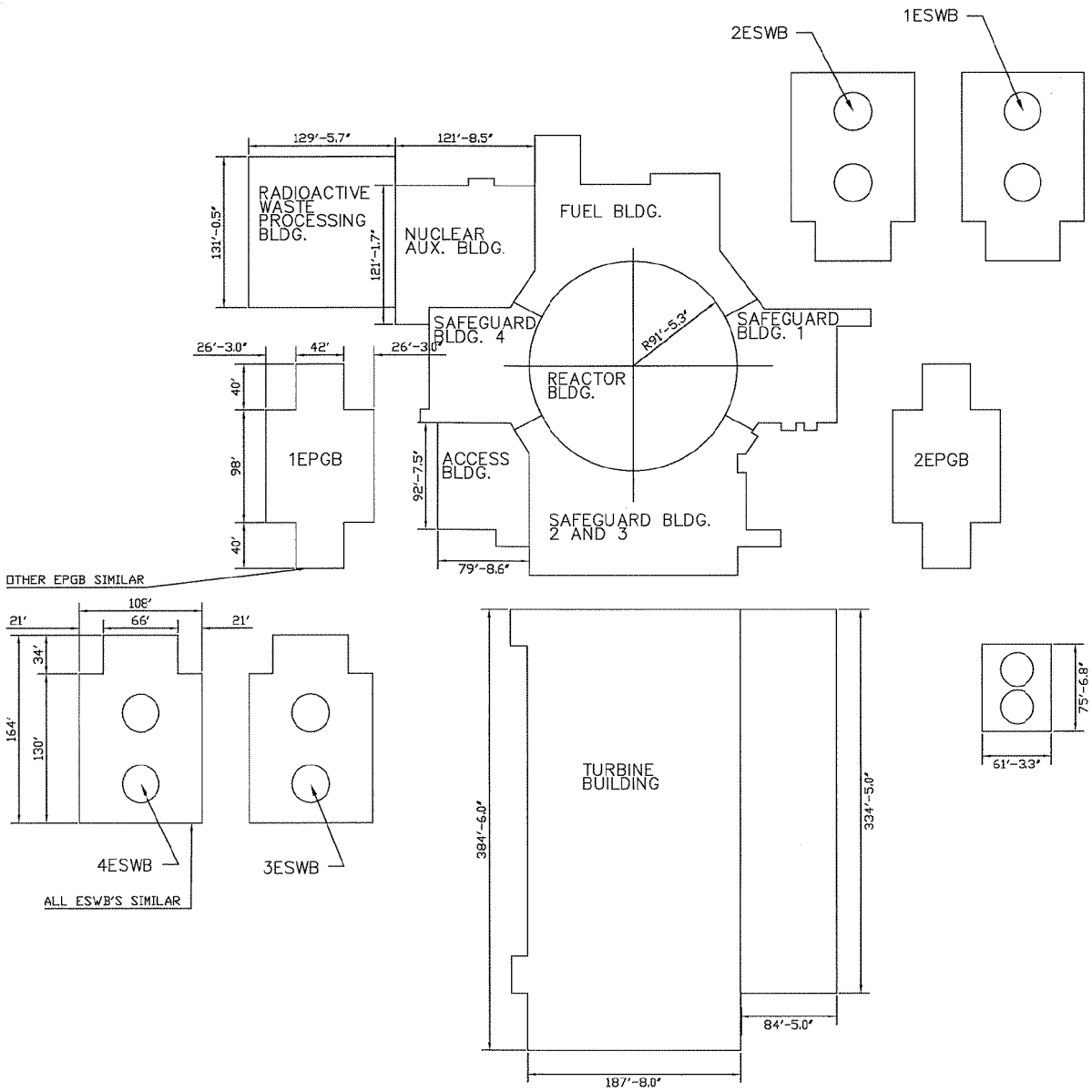


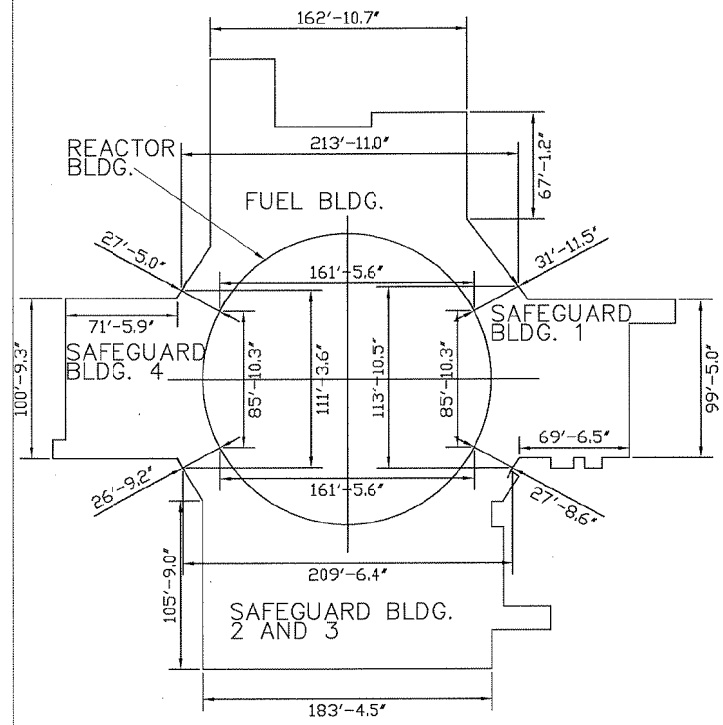


# NUCLEAR ISLAND COMMON MAT

FIGURE 1

CCNPP Unit 3 Building Footprint

Bechtel drawing 25237-3P1-0010-00002 Rev. 3

PREPARED FOR

Unistar

PCR A I

| CAD FILE NUMBER | CHECKED BY / APPROVED BY | DRAWN BY |
|---|---|---|
| | | |

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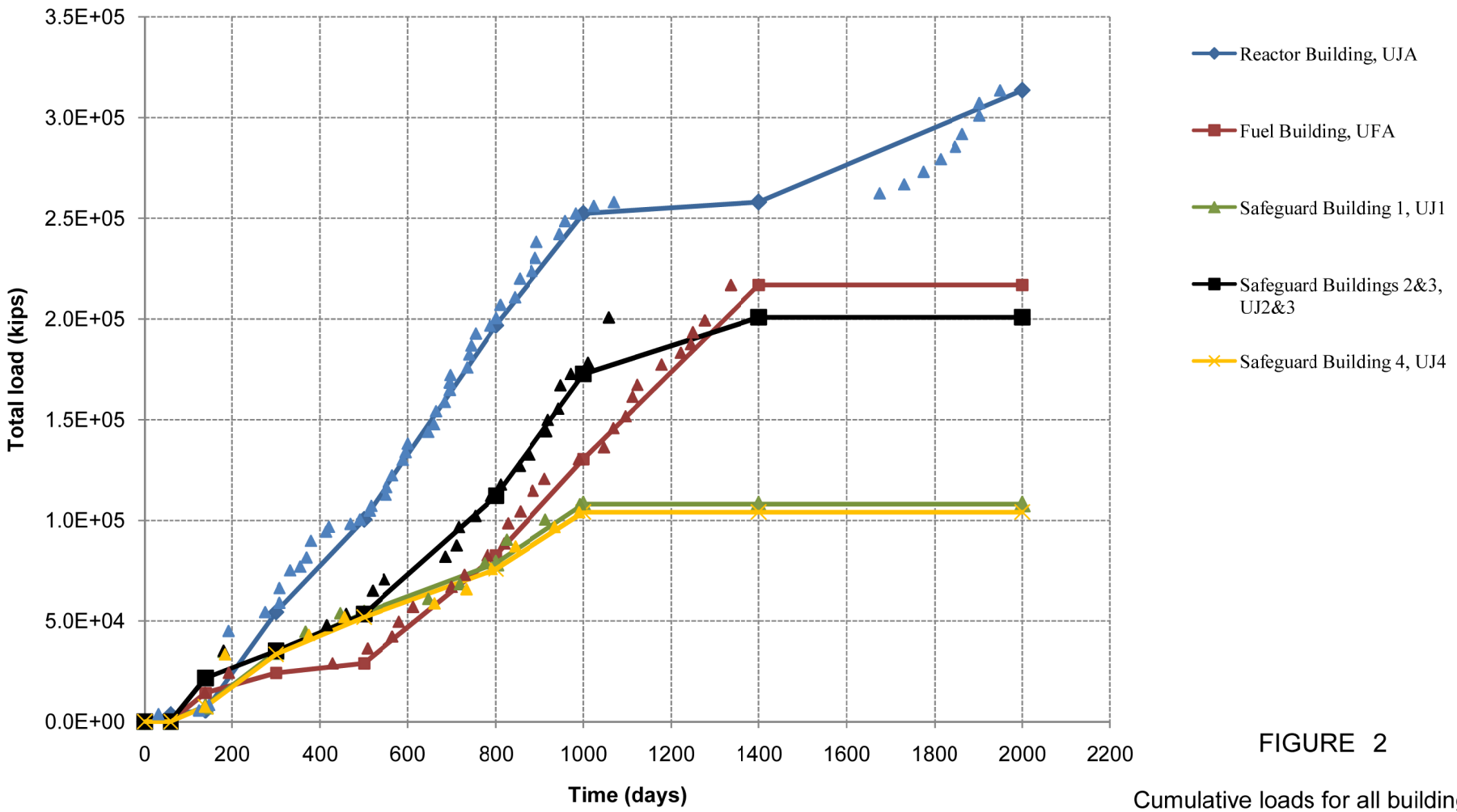
| PLOT | | DRAWN | DRB | CHECKED BY | | | Construction Loads for all buildings.xls |
|---|---|---|---|---|---|---|---|
| 1=1 | | BY | 8/24/2009 | APPROVED BY | | | |




Note: Cummulative loads grouped on each time-step are compared with a detailed load distribution based on the OL3 construction load schedule.

FIGURE 2

Cumulative loads for all buildings grouped in 8 time steps

CCNPP Unit 3

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ENGINEERS & CONSULTANTS

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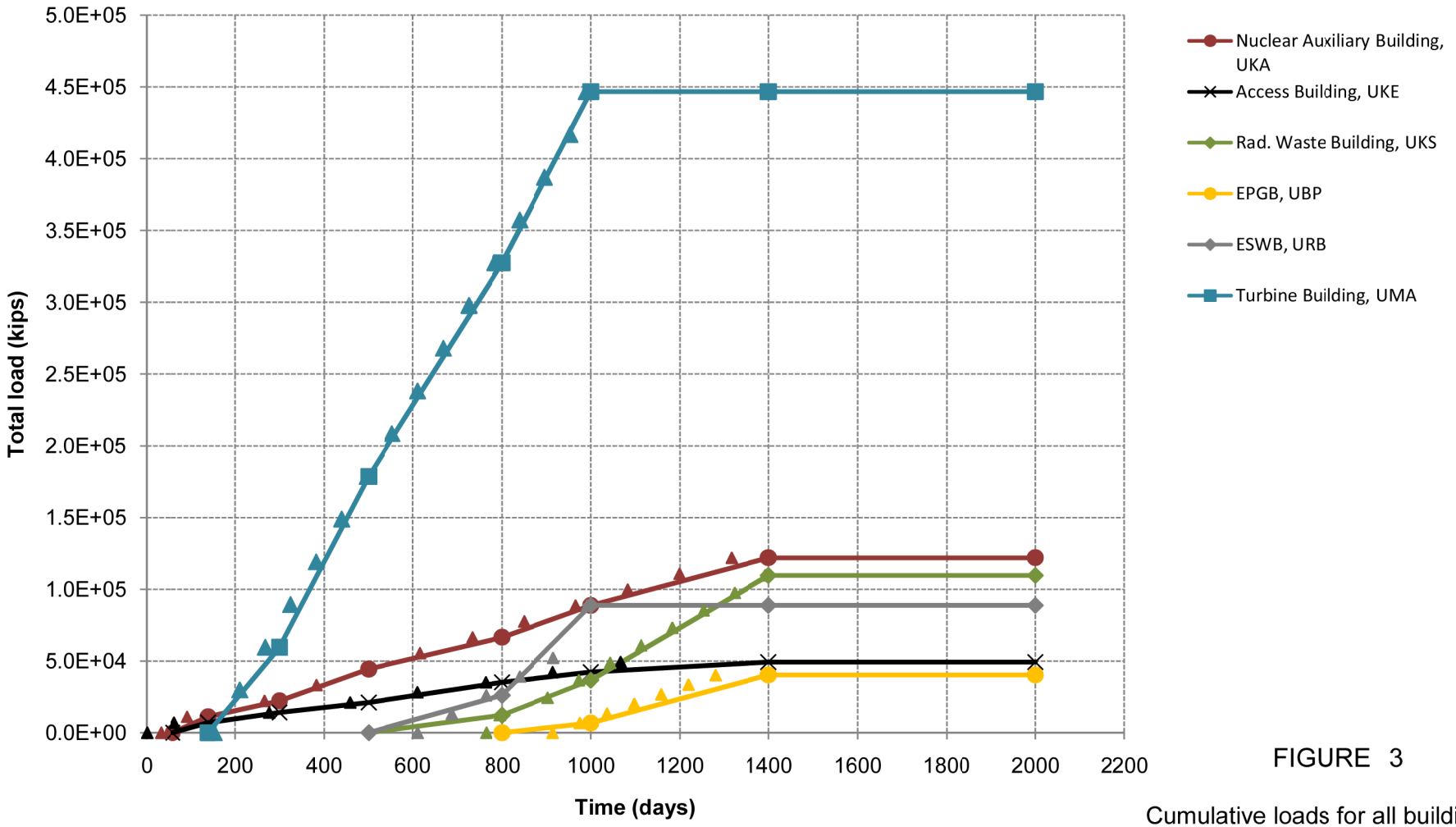
| PLOT | | DRAWN | DRB | CHECKED BY | | | Construction Loads for all buildings.xls |
|---|---|---|---|---|---|---|---|
| 1=1 | | BY | 8/24/2009 | APPROVED BY | | | |




Note: Cummulative loads grouped on each time-step are compared with a detailed load distribution based on the OL3 construction load schedule.

FIGURE 3

Cumulative loads for all buildings grouped in 8 time steps

CCNPP Unit 3

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ENGINEERS & CONSULTANTS

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| PLOT | | DRAWN | DRB | CHECKED BY | | | Construction Loads for all buildings.xls |
|---|---|---|---|---|---|---|---|
| 1=1 | | BY | 8/24/2009 | APPROVED BY | | | |

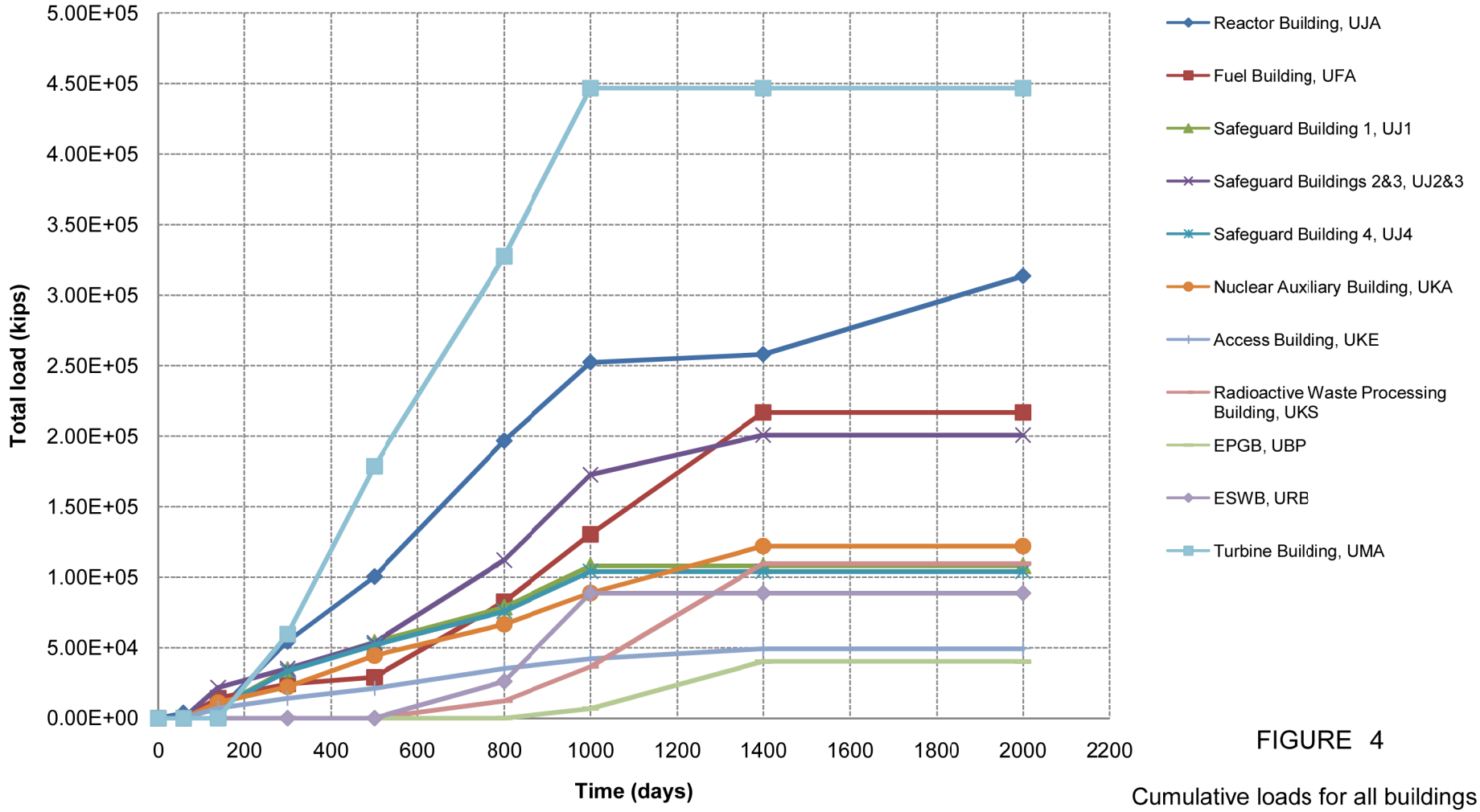


FIGURE 4

Cumulative loads for all buildings grouped in 8 time steps

CCNPP Unit 3

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| PLOT | | DRAWN | DRB | CHECKED BY | | | Construction Loads for all buildings.xls |
|---|---|---|---|---|---|---|---|
| 1=1 | | BY | 8/24/2009 | APPROVED BY | | | |

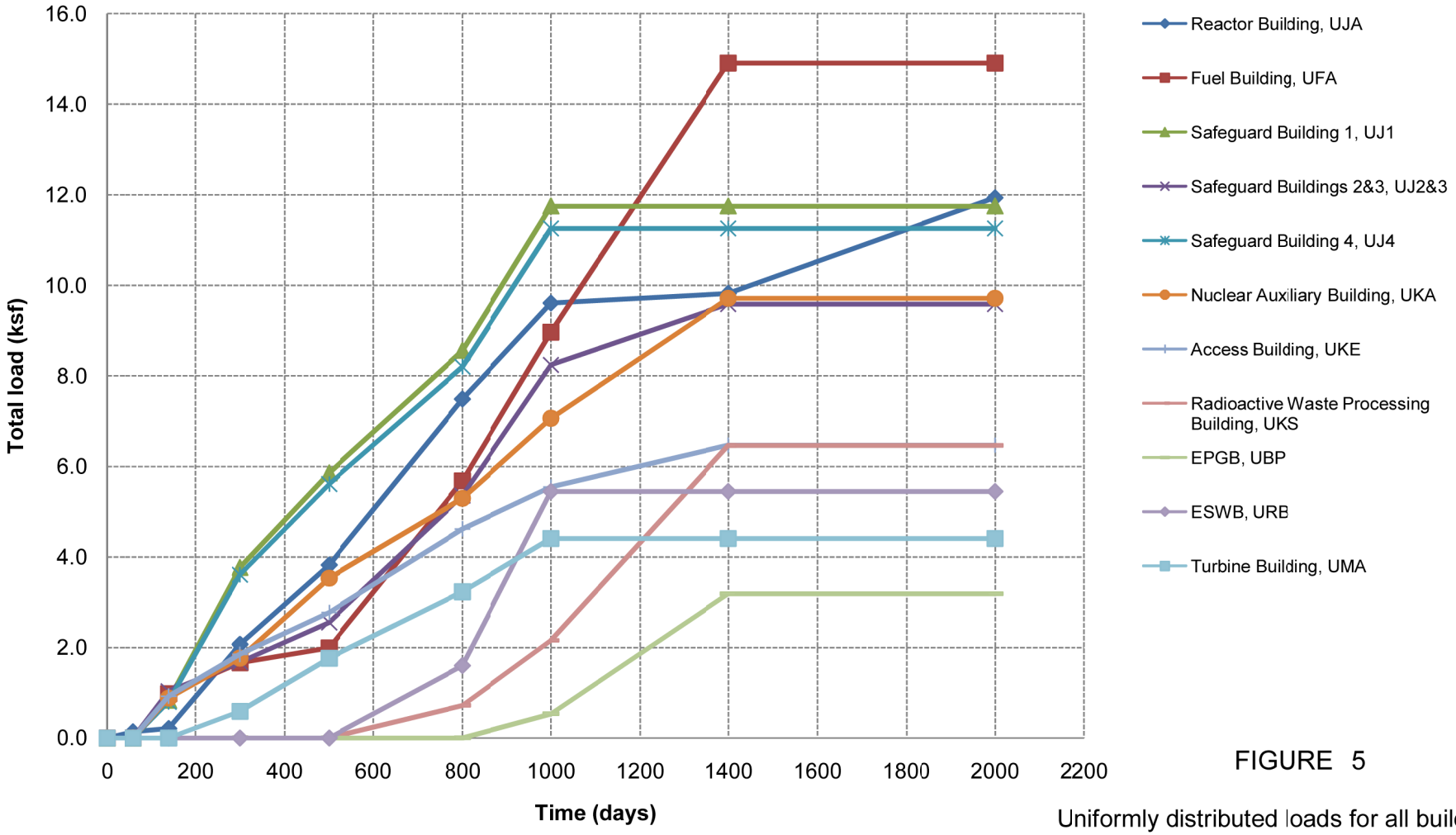


FIGURE 5

Uniformly distributed loads for all buildings grouped in 8 time steps

CCNPF Unit 3

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Reference 3

Give to Nish

AREVA

June 25, 2007

EPR #07-415

Dr. Paul C. Rizzo, President
Paul Rizzo Associates, Inc.
105 Mall Boulevard, Suite 270-E
Monroeville, PA 15146

Subject: Bounding Settlement Values for U.S. EPR Design Certification

Dear Dr. Rizzo:

This letter is to transmit the information needed to determine the bounding settlement values to be included in the U.S. EPR Design Certification Document identified during the May 17, 2007 meeting at AREVA's Charlotte office. These items were identified in the Preliminary Action Plan discussed at the meeting. Based on subsequent AREVA comments, the action plan is to only include work for the U.S. EPR Design Certification Document and not include any analysis using site specific information. In subsequent discussion with Nish Vaidya of Paul Rizzo Associates, it was determined that bounding settlements would be calculated using the soft soil case (Soil Case 1U).

A copy of the Preliminary Action Plan provided by Paul Rizzo and Nish Vaidya as modified to incorporate AREVA comments is included as Attachment I to this letter. Attachment II is a copy of AREVA drawing 02-DCD-CGE-UZT-3002-A0-000 which provides the site layout on the EPR including the building footprints. Attachment III includes 26 pages of schematic layout drawings that provide the concrete placement location as well as the relative schedule of placements. Attachment III is the current concrete placement plan for the OL3 Nuclear Island but this information may be used for the EPR due to the relative similarities between the structures.

The final required item was an approximate weight of the Nuclear Island, Turbine Building and Access Building. The weight of the Nuclear Island to be used in the analysis is 862,000 kips. This approximate weight includes the deadweight of the structure including base mat, deadweight of significant equipment, and 25% of the applied Live Load.

At this time in the design process this information is not available for the Turbine or Access Buildings. However, based upon past experience for similar structures at other nuclear plants please utilize the following bearing pressures.

AREVA NP INC.
An AREVA and Siemens company

7207 IBM Drive, Charlotte, NC 28262
Tel.: 704 805 2000 - Fax: 704 805 2800 - www.areva.com

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Reference 3



Access Building Footprint - use 4 kips per square foot (ksf)
Turbine Building Footprint - use 6 ksf under the approximate area of the turbine pedestal (the turbine pedestal is approximately 240' x 50' centered on the turbine building) and 4 ksf for the remainder of the building footprint

Please use the information provided to complete the analysis as outlined in Attachment I. If you have any questions or need additional information, please contact Jim Wheeler at (704) 805-2624 or Todd Oswald at (704) 805-2831.

Sincerely,

Thomas E. Sliva
AREVA EPR DC Project Manager

Attachments (as stated)

cc:
D.B. Fisher
J.T. Oswald
R.J. Parler
J.B. Wheeler
N. Vaidya (Paul Rizzo Associates)

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Reference 4

Response to RFI-07-501 Date: August 14, 2007

Subject: Building weights and plan area

The following information is provided as per your request.

Emergency Diesel Generator Building UBP 1-4

Total Dead Load (self wt. + equip.) = 37,643.2 kips
Total Live Load (excluding snow) = 2,456.8 kips } 40,100K We used: 40,092 K OK

Ref.: Bechtel Calc. No. 25140-102-S0C-SS90-00010 Rev. 0

Plan area = 12,621 sq, ft. (Bechtel Dwg. No. 0-P1-3710-00001 (Note 1 & 2)
We used 12,726 ft² OK

Nuclear Auxiliary Building

Total Dead Load (self wt. + equip.) = 99,952 kips
Total Live Load (excluding snow) = 22,030 kips } 121,982 K We used: 121,958 K OK

Ref.: Bechtel Calc. No. 25140-102-S0C-SS90-00022 (Note 1 & 3)

Plan area See Areva Drawing No.02-DCD-CGE-UKA-3100-A0-000 , EPR Design Certification Project - Dimensional Arrangement Drawing – Nuclear Auxiliary Building, Plan at Elevation 9.60 m

Notes:

1. Bechtel Calc. No. 25140-102-S0C-SS90-00010 and Bechtel Calc. No. 25140-102-S0C-SS90-00022 are in process, unchecked and not approved. Therefore information provided in this RFI should be considered preliminary and is subject to change.

2. Bechtel Calc. No. 25140-102-S0C-SS90-00010 is scheduled to be issued to Areva on 10-8-07. Information provided in this RFI can be confirmed by Areva at that time.

3. Bechtel Calc. No. 25140-102-S0C-SS90-00022 is scheduled to be issued to Areva on 8-24-07. Information provided in this RFI can be confirmed by Areva at that time.

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Reference 4

Response to RFI-07-500 August 14, 2007

Subject: Building weights and plan area

The following information is provided as per your request.

Essential Service Water Cooling Tower Structures (Ultimate Heat Sink Structures) URB (1-4)

Total Dead Load (self wt. + equip.) Excluding Pool water= 62,717 kips

Total Dead Load (self wt + equip.) Including Pool water= 86,109 kips
Total Live Load (with out snow) =2,046 kips
} 88,155 K
We used: 88,155 k OK

Ref.: Bechtel Calc. No. 25237-103-S0C-SS90-00003, (Note 1, 2)

Plan area: 16,284 sq. ft (Bechtel Dwg. No. 1-P1-1610-00001, Rev.000)

We used: 16,334 ft² OK

Notes:

1. Bechtel Calc. No. 25237-103-S0C-SS90-00003 is in process, unchecked and not approved. Therefore information provided in this RFI should be considered preliminary and is subject to change.

2. The referenced calculation is scheduled to be issued to Areva on 10-12-07. Information provided in this RFI can be confirmed by Areva at that time.

| Building | Start Civil | Finish Civil |
|---|---|---|
| UBA SWITCHGEAR BUILDING | 1-Feb-13 | 1-Dec-14 |
| UB1 MAIN TRANSFORMERS | 1-Aug-14 | 1-Nov-14 |
| UBP10/20 EMERGENCY POWER GENERATING BUILDINGS 1/2 | 1-Jun-14 | 1-Jul-15 |
| UBP30/40 EMERGENCY POWER GENERATING BUILDINGS 3/4 | 1-Jun-14 | 1-Aug-15 |
| UFA FUEL BUILDING | 1-Dec-11 | 1-Oct-15 |
| UGV WASTE WATER (SEWAGE) TREATMENT BUILDING | 5-Sep-14 | 1-Nov-14 |
| UJ1 SAFEGUARD BUILDING 1 | 1-Dec-11 | 1-Nov-14 |
| UJ2 SAFEGUARD BUILDING 2/3 | 1-Dec-11 | 1-Nov-14 |
| UJ4 SAFEGUARD BUILDING 4 | 1-Dec-11 | 1-Nov-14 |
| UJA REACTOR BUILDING | 29-Nov-11 | 1-Apr-17 |
| UKA NUCLEAR AUXILIARY BLDG | 1-Jan-12 | 1-Nov-15 |
| UKE ACCESS BLDG | 1-Dec-11 | 1-Apr-15 |
| UKS RADIOACTIVE WASTE PROCESSING BLDG | 1-Jan-14 | 1-Dec-15 |
| UMA TURBINE BLDG | 1-May-12 | 1-Nov-14 |
| UPE CIRCULATING WATER MAKEUP INTAKE STRUCTURE | 13-Mar-12 | 27-Aug-12 |
| UPF ULTIMATE HEAT SINK MAKEUP WATER INTAKE STRUCTURE | 3-Mar-12 | 11-Mar-13 |
| UPQ WATER TREATMENT BUILDING | 18-Feb-14 | 25-Dec-14 |
| UQA CIRCULATING WATER PUMP BLDG | 8-May-12 | 25-Dec-12 |
| UQB10 ESSENTIAL SERVICE WATER PUMP BUILDING 1/2 | 1-Aug-13 | 1-Nov-14 |
| UQB30 ESSENTIAL SERVICE WATER PUMP BUILDING 3/4 | 1-Aug-13 | 1-Nov-14 |
| URA COOLING TOWER STRUCTURE | 29-May-12 | 14-Sep-15 |
| USG FIRE PROTECTION STORAGE TANKS AND BUILDING | 12-Sep-14 | 12-Jan-15 |
| UTG CENTRAL GAS SUPPLY BLDG | 8-Sep-14 | 3-Oct-14 |

Reference 6



**CCNPP Unit 3 Foundations - Information and Source Summary Table**

Attachment to Rizzo RFI 008 Rev 1 July 21 2009

| Building Name | Responsible | Seismic Category | Foundation Size (ft x ft) | Area ($ft^2$) | Bottom El. (ft) | Depth (ft) | Est. Static Bearing Pressure (ksf)* | Total Dead Load (kips)* | Total Live Load (kips) | Source |
|---|---|---|---|---|---|---|---|---|---|---|
| CW Intake | Bechtel | CS | 66 ft x 33 ft | 2,178 | -26.5 feet | 36.5 feet | | 11,000 | 450 | See Response |
| UHS Makeup Water Intake | Bechtel | I | 68 ft x 63 ft | 4,284 | -26.5 feet | 36.5 feet | | 24,500 | 400 | See Response |
| Forebay | Bechtel | II | 114 ft x 94 ft | 10,716 | -26.5 feet | 36.5 feet | | 26,500 | 0 | See Response |
| UHS Intake Elec Bldg | Bechtel | I | 76 ft x 35 ft | 2,660 | -20.5 feet | 10.5 feet | | 4,800 | 250 | See Response |
| ESWB | Bechtel | I | (130 ft x 108 ft) + (34 ft x 66 ft) | 16,284 | 64 feet | 22 feet | | 86,000 | 2,700 | See Response |
| EPGB | Bechtel | I | 2 (40 ft x 42 ft) + (98 ft x 94.5 ft) | 12,621 | 78.5 feet | 6 feet | | 37,700 | 2,500 | See Response |
| **NI Common Mat** ***Components Noted Below*** | **AREVA** | | | | | | | | | |
| Reactor Building | AREVA | | | | | | | | | |
| Fuel Building | AREVA | | | | | | | | | |
| Safeguard 1 | AREVA | | | | | | | | | |
| Safeguard 2 | AREVA | | | | | | | | | |
| Safeguard 3 | AREVA | | | | | | | | | |
| Safeguard 4 | AREVA | | | | | | | | | |
| NAB | Bechtel | RW IIa/ CS | 121 ft x 106 ft | 12,506 | 46.5 feet | 39.5 feet | | 100,000 | 22,000 | See Response |
| Rad. Waste | Bechtel | RW IIa/ CS | 131.75 ft x 128 ft | 16,864 | 48.5 feet | 37.5 feet | | 95,200 | 14,500 | See Response |
| Access | Bechtel | CS | 122 ft x 79.5 ft | 9,699 | 48.5 feet | 37.5 feet | | 43,500 | 5,800 | See Response |
| Turbine | Bechtel | CS | 290 ft x 385 ft | 111,650 | 58.9 feet | 27.1 feet | 4.0 | | | See Response |

Information provided by Bechtel

* Total load is preferred, if unavailable, provided estimated static bearing pressure

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| **Building Name** | **Responsible** | **Seismic Category** | Foundation Size (ft x ft)** | Area (ft^2) | Bottom El. (ft) | Depth (ft) | Est. Static Bearing Pressure (ksf)* | Total Load* (kips) (DL + 25% LL) | 25% LL (psf) | Source |
|---|---|---|---|---|---|---|---|---|---|---|
| CW Intake | Bechtel | | | | | | | | | |
| UHS Makeup Water Intake | Bechtel | | | | | | | | | |
| Forebay | Bechtel | | | | | | | | | |
| UHS Intake Elec Bld | Bechtel | | | | | | | | | |
| ESWB | Bechtel | | | | | | | | | |
| EPGB | Bechtel | | | | | | | | | |
| **NI Common Mat** ***Components Noted Below*** | **AREVA** | | | | | | | | | |
| Reactor Building | AREVA | I | 200 x 200 | 26,134 | -36.4 | -35.4 | - | 313,477 | 125 | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| Fuel Building | AREVA | I | 162 x 63 | 13,057 | -41.3 | -40.3 | - | 216,806 | 125 | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| Safeguard 1 | AREVA | I | 104 x 81 | 8,866 | -41.3 | -40.3 | - | 108,064 | 75 | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| Safeguard 2 & 3 | AREVA | I | 183 x 82 | 23,457 | -41.3 | -40.3 | - | 200,814 | 75 | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| Safeguard 4 | AREVA | I | 104 x 81 | 9,661 | -41.3 | -40.3 | - | 104,079 | 75 | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| Total of Nuclear Island Common Basemat | AREVA | I | - | 81,175 | - | - | - | 943,240 | - | AREVA Stick Model Calculation<br>AREVA Reconciliation for area of NI Common Basemat |
| NAB | Bechtel | | | | | | | | | |
| Rad. Waste | Bechtel | | | | | | | | | |
| Access | Bechtel | | | | | | | | | |
| Turbine | Bechtel | | | | | | | | | |

* Total load is preferred, if unavailable, provided estimated static bearing pressure
** Foundation size of each building is approximate, as they are all part of the NI Common Basemat Cruciform structure. The foundation size reflected considers the RSB + 9' to account for principle stress transferred to the bottom of the RB basemat. All other dimensions reference to the 9' boundary of the RB. Note that the foundation size is a "square" number and does not match the area determined in the following column.

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Reference 9

## CCNPP Unit 3 Foundations

(4/25/08)

| Building Name | Seismic Category | Foundation Size (ftxft) | Area (ft^2) | Bottom El. | Depth (ft) | Est. Static Bearing Pressure (ksf) |
|---|---|---|---|---|---|---|
| CW Intake | Conventional Seismic | 68.5x36.5 | 2,500 | -24.5 | 34.5 | 4 |
| UHS Makeup Water Intake | Cat I | 63x68 | 4,284 | -24.5 | 34.5 | 5.1 |
| UHS Intake Elec Bld | Cat I | 76x35 | 2,660 | -10.5 | 20.5 | 2 |
| Intake Channel Wall | Cat II | TBD | | | | |
| Fish Return | Conventional Seismic | TBD | | | | |
| ESWB | Cat I | (150)(128)+(34)(86) | 22,124 | 61 | 22 | 4.3 |
| EPGB | Cat I | 98x94.5 + (2)40*42 | 12,621 | 76 | 6 | 3.3 |
| NI Common Mat | Cat I | 63 ft)(345 ft) (Cruciform Shap | 79,911 | 42.5 | 41.5 | 15 |
| NAB | Rad Waste Seismic | 120.73x106.14 | 12,814 | 48 | 35.5 | 10 |
| Rad. Waste | Rad Waste Seismic | 127.95x131.73 | 16,855 | 47 | 35.5 | 6 |
| Access | Conventional Seismic*** | 79.40x121.23 | 9,626 | 48 | 35.5 | 5 |
| Turbine | Conventional Seismic*** | 366x186 | 68,076 | 60.5 | 23.5 | 5 |
| Switchgear | Conventional Seismic*** | 275x100 | 27,500 | 66.5 | 17 | 4 |
| Generator X-mers | Conventional Seismic | 188.7x44 | 8,303 | 75 | 7.5 | 4 |
| Auxiliary X-mers | Conventional Seismic | 61x44 (5 separate) | 2,684 | 75 | 7.5 | 4 |
| Fire Protection | Cat II-SSE | 90x25 | 2,250 | 79 | 1 | 4 |
| Central Gas | Conventional Seismic | 75x60 | 4,500 | 81 | 1 | 4 |
| Desal | Conventional Seismic | 200x100 | 20,000 | 99* | 1 | 4 |
| Demin Tanks | Conventional Seismic | 56d, 2t ringwall | 176 | 78.5 | 4 | 4 |
| Security Access | Conventional Seismic | 90x60 | 5,400 | 82 | 1 | 4 |
| Security Warehouse | Conventional Seismic | 127.5x100 (2' wide footers) | 910 | 78.75 | 4.66 | 3 |
| Const. Warehouse | Conventional Seismic | 125x400 (3 separate) | 50,000 | TBD** | 1 | 4 |
| Cooling Tower | Conventional Seismic | 309.5 side hexagon | 248,811 | 90* | 5 | TBD |
| CT Pump House | Conventional Seismic | 115.5x95 | 10,973 | 76* | 20 | 4 |
| Sewage Treatment | Conventional Seismic | 50x50 | 2,500 | TBD** | 1 | 4 |

*Elevation likely to be raised, depth should remain constant
**Exact building location(s) undetermined at this time
***Extra seismic requirements to prevent collapse on Cat I Structures
Highlighted cells are documented in COLA Calculation.
Access Building based on OL3 drawings and preliminary hand calculations.
Radwaste Building based on OL3 drawings and preliminary hand calculations.
NAB based on OL3 drawings and documented in DCD calculations.
Cooling Tower vendor data not available at this time.

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