TRUE COPY - NOT ORIGINAL

DRB = Diego Rivera –

EO = Emrah Onder

TABLE OF CONTENTS

Construction loads, areas and elevations of CCNPP Unit 3 Buildings

	FIRST PAGE	TOTAL PAGES IN SECTION
INTRODUCTION AND CALCULATION SUMMARY	2	2
CALCULATION AND TABLES	4	18
FIGURES	22	5
REFERENCES	27	8

TRUE COPY - NOT ORIGINAL

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

TRUE COPY - NOT ORIGINAL

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%**

TRUE COPY - NOT ORIGINAL

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

TRUE COPY - NOT ORIGINAL

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%

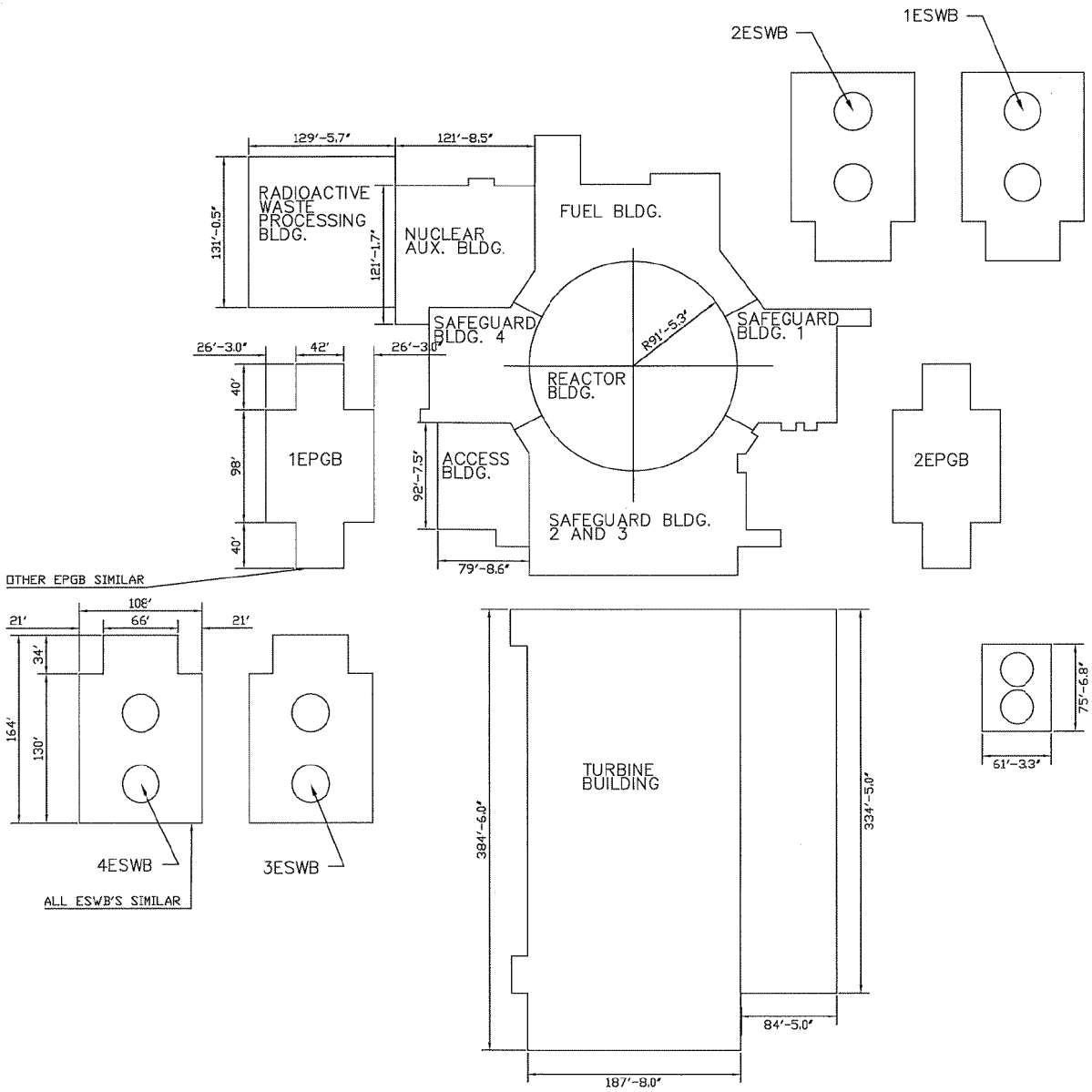
(1) From Ref. 9.
(2) From Ref. 8
(3)See Section 1: Construction Loads
(4) Difference from Table 3-1 values

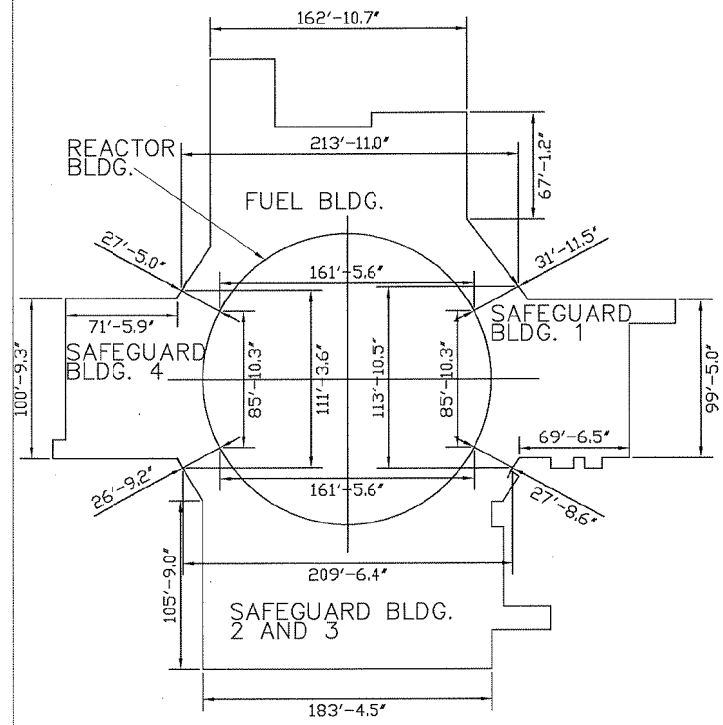
3) Information used in the RIZZO settlement and bearing capacity final calculations

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

TRUE COPY - NOT ORIGINAL





NUCLEAR ISLAND COMMON MAT

FIGURE 1

CCNPP Unit 3 Building Footprint

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

PREPARED FOR

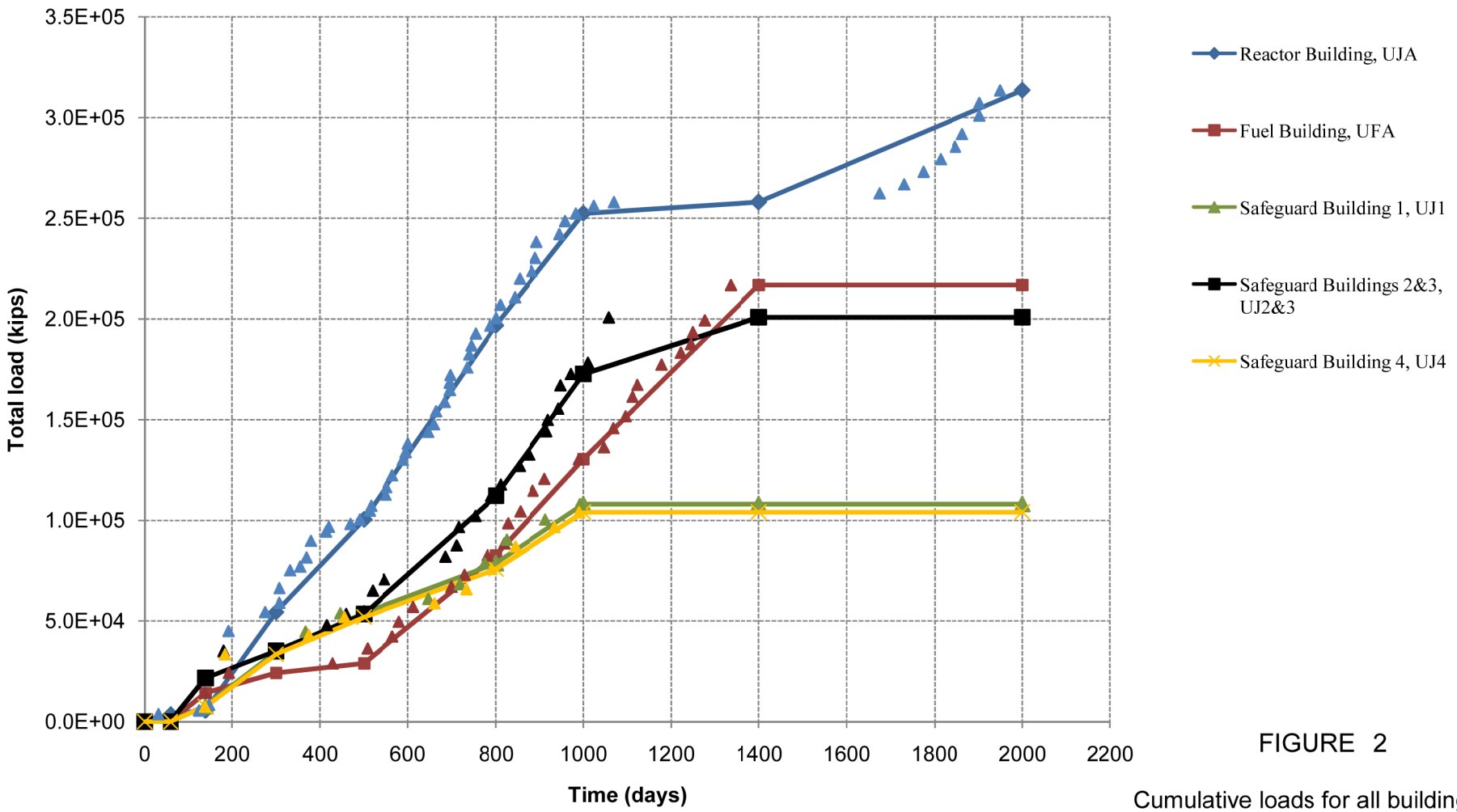
Unistar

PCR A I

CAD FILE NUMBER	CHECKED BY / APPROVED BY	DRAWN BY

TRUE COPY - NOT ORIGINAL

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

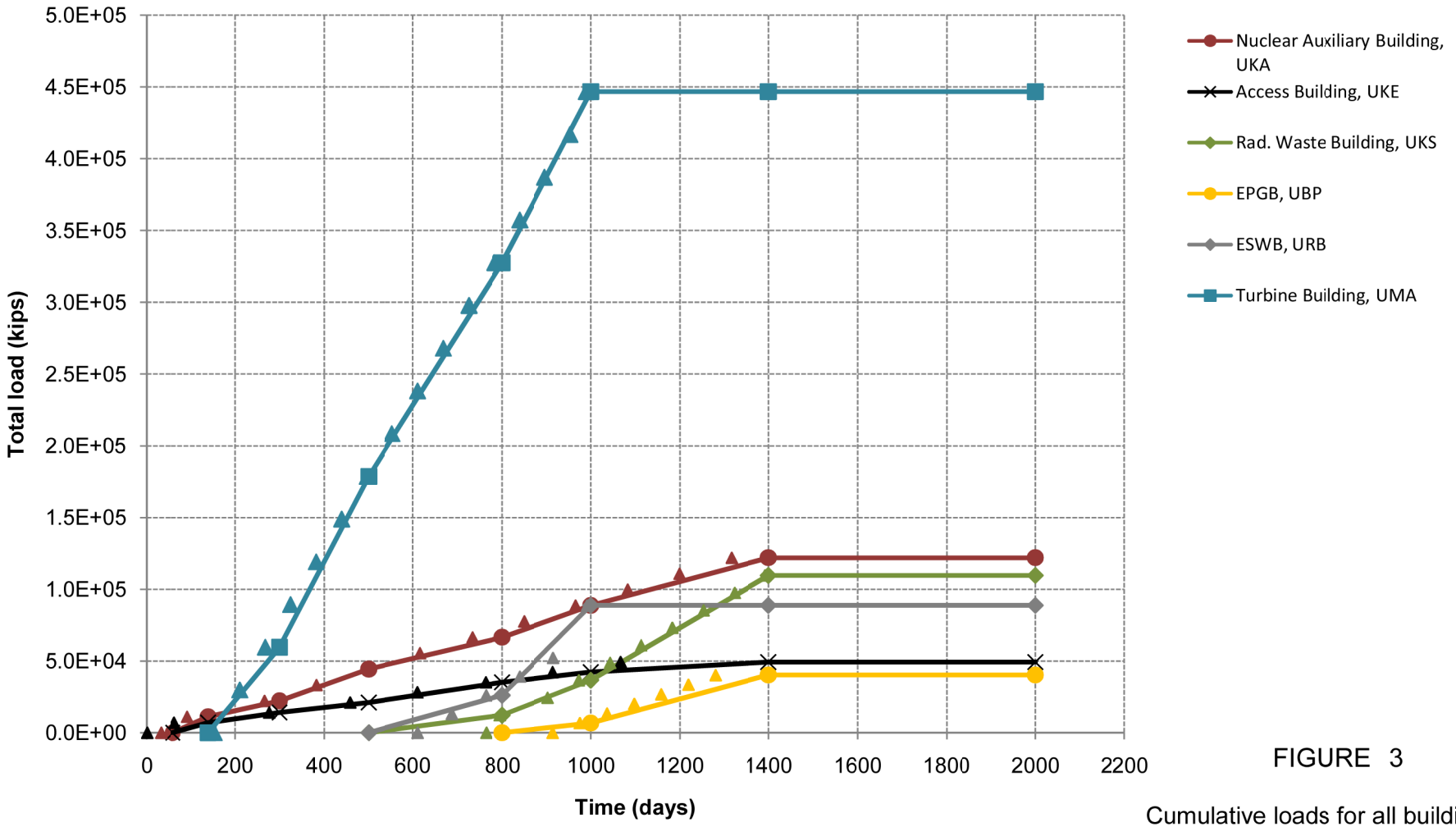
PREPARED FOR

UNISTAR

Paul C. Rizzo Associates, Inc.
ENGINEERS & CONSULTANTS

TRUE COPY - NOT ORIGINAL

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

PREPARED FOR

UNISTAR

Paul C. Rizzo Associates, Inc.
ENGINEERS & CONSULTANTS

TRUE COPY - NOT ORIGINAL

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

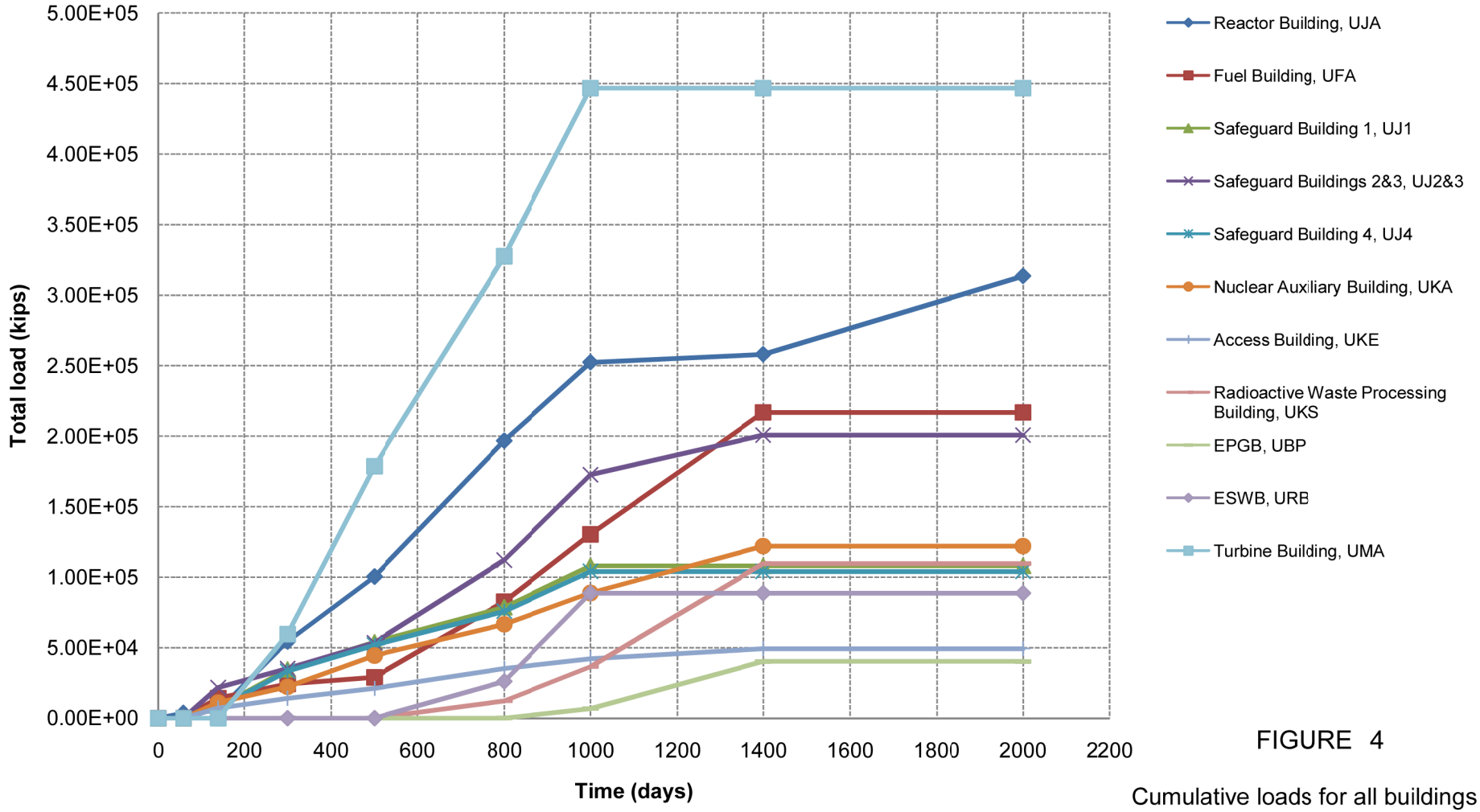


FIGURE 4

Cumulative loads for all buildings grouped in 8 time steps

CCNPP Unit 3

PREPARED FOR

UNISTAR

Paul C. Rizzo Associates, Inc.
ENGINEERS & CONSULTANTS

TRUE COPY - NOT ORIGINAL

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

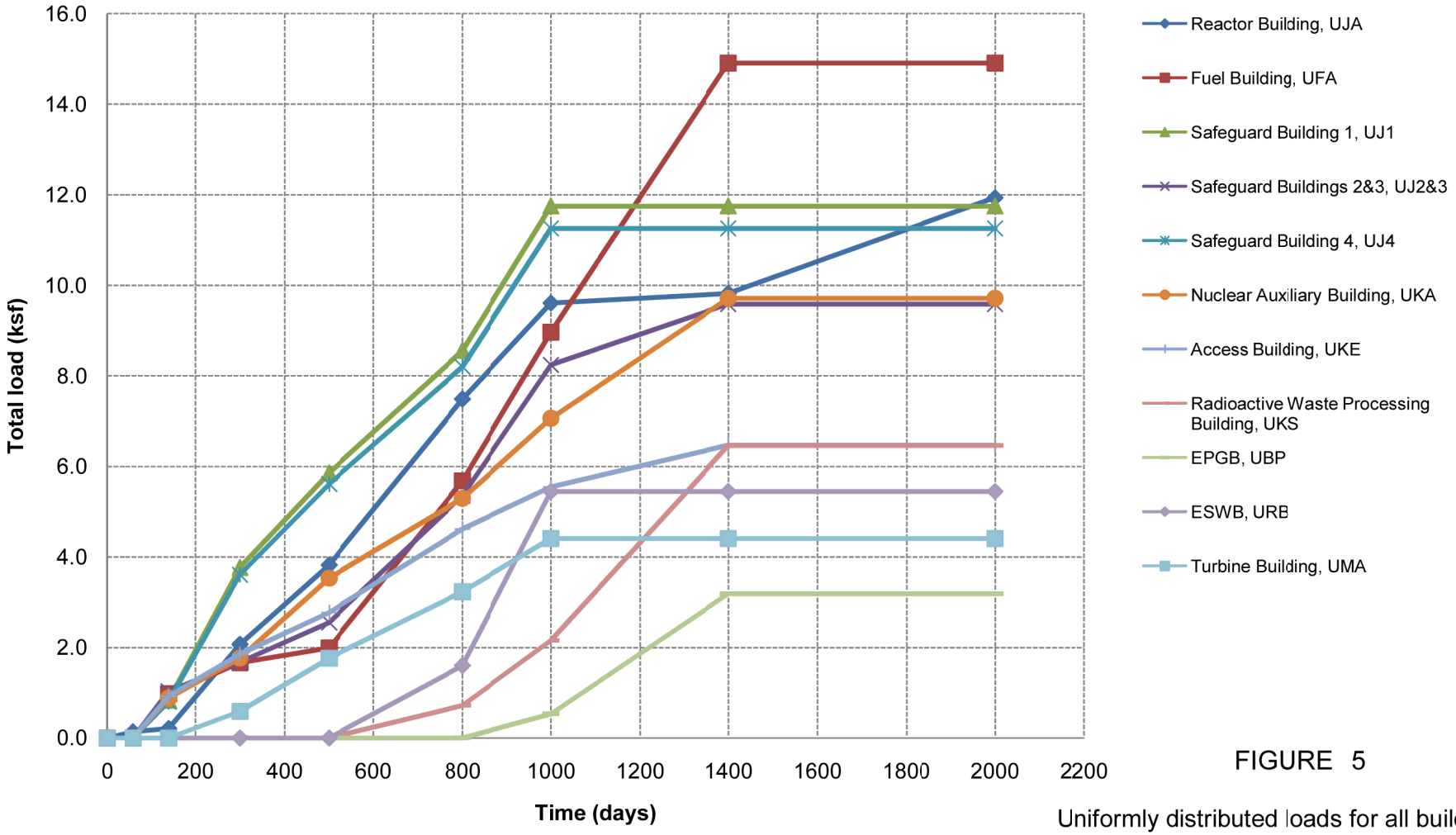


FIGURE 5

Uniformly distributed loads for all buildings grouped in 8 time steps

CCNPF Unit 3

PREPARED FOR

UNISTAR

Paul C. Rizzo Associates, Inc.
ENGINEERS & CONSULTANTS

TRUE COPY - NOT ORIGINAL

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

TRUE COPY - NOT ORIGINAL

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)

TRUE COPY - NOT ORIGINAL

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.

TRUE COPY - NOT ORIGINAL

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

TRUE COPY - NOT ORIGINAL

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 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 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 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 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 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 AREVA Reconciliation for area of NI Common Basemat
Total of Nuclear Island Common Basemat	AREVA	I	-	81,175	-	-	-	943,240	-	AREVA Stick Model Calculation 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.

TRUE COPY - NOT ORIGINAL

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.

TRUE COPY - NOT ORIGINAL