

BSC

Calculation/Analysis Change Notice

1. QA: QA
2. Page 1 of 5

Complete only applicable items.

| | | | |
|---|---|--|---|
| 3. Document Identifier: 100-S0C-CY00-00100-000 | | 4. Rev.: 00D | 5. CACN: CACN002 |
| 6. Title: Supplemental Soils Report | | | |
| 7. Reason for Change: To supersede CACN001 of the Supplemental Soils Report to correct Block 1 from QA:N/A to QA:QA. 1) Data included in Table 1-1 have been refined to be consistent with sources of information for ready reference. None of the data shown in this table is used as input to the calculation. 2) Better formatted versions of Tables 2-1 and 2-2 are available to allow ease of use and better understanding of the information presented in these tables. | | | |
| 8. Supersedes Change Notice: | <input checked="" type="checkbox"/> Yes | If, Yes, CACN No.: <u>100-S0C-CY00-00100-000-00D</u> <u>CACN001</u> | <input type="checkbox"/> No |
| 9. Change Impact: | | | |
| Inputs Changed: | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Results Impacted: | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Assumptions Changed: | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Design Impacted: | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 10. Description of Change: 1) Replace the existing Table 1-1 with the revised Table 1-1 (see attached). In Section 2.2.1 <u>Input Documents</u> , remove: | | | |
| <ul style="list-style-type: none"> • BSC (Bechtel SAIC Company) 2007. Emergency Diesel Generator Facility – Diesel Generator Foundation Calculation. 26D-S0C-EG00-00500-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20070718.0006. • BSC (Bechtel SAIC Company) 2007. Initial Handling Facility – Initial Handling Facility Foundation Design. 51A-SSC-IH00-00400-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. • BSC (Bechtel SAIC Company) 2007. Receipt Facility (RF) Foundation Design. 200-DBC-RF00-00300-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20070328.0004. (DIRS 184037) • BSC (Bechtel SAIC Company) 2007. Wet Handling Facility Subgrade Structure and Foundation Design. 050-SYC-WH00-00500-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20070601.0017. (DIRS 184031) | | | |
| and add: | | | |
| <ul style="list-style-type: none"> • BSC (Bechtel SAIC Company) 2007. Emergency Diesel Generator Facility – Mass Analysis & Moments of Inertia. 26D-SYC-EG00-00300-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20070323.0003. • BSC (Bechtel SAIC Company) 2008. Initial Handling Facility (IHF) Foundation Design. 51A-DBC-IH00-00200-000-00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20080221.0005. • BSC (Bechtel SAIC Company) 2006. Receipt Facility (RF) Mass Properties. 200-SYC-RF00-00100-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20061206.0001. • BSC (Bechtel SAIC Company) 2007. Wet Handling Facility (WHF) Mass Properties. 050-SYC-WH00-00300-000-00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20070326.0001. | | | |

In Section 2.2.4 Drawings, remove:

- BSC (Bechtel SAIC Company) 2007. Initial Handling Facility General Arrangement Ground Floor Plan. 51A-P10-IH00-00102-000 REV 00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20071101.0003. (DIRS 183793)
- Nuclear Facilities Buildings, Cannister Receipt and Closure Facility #1, Forming Plan at TOC El. 0'-0", 060-DB0-CR00-00101-000, Rev. 00A, 7/30/07, Las Vegas, Nevada: Bechtel SAIC Company.
- Nuclear Facilities Buildings, Receipt Facility, Forming Plan at TOC El. 0'-0", 200-DB0-RF00-00101-000, Rev. 00A, 5/29/07, Las Vegas, Nevada: Bechtel SAIC Company.
- Nuclear Facilities Buildings, Wet Handling Facility, Forming Plan at TOC El. 0'-0", 050-DB0-WH00-00102-000, Rev 00A, 7/30/07, Las Vegas, Nevada: Bechtel SAIC Company.

and add:

- BSC (Bechtel SAIC Company) 2007. Emergency Diesel Generator Facility General Arrangement Ground Floor Plan. 26D-P10-EG00-00102-000, Rev. 00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20071026.0009.
- BSC (Bechtel SAIC Company) 2007. Initial Handling Facility General Arrangement Ground Floor Plan. 51A-P10-IH00-00102-000, Rev. 00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20071226.0017.
C Jct 3/24/08
- BSC (Bechtel SAIC Company) 2008. Nuclear Facilities Buildings Canister Receipt and Closure Facility #1 Forming Plan at TOC EL 0'-0", 060-DB0-CR00-00101-000, Rev. 00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20080117.0025.
- BSC (Bechtel SAIC Company) 2008. Nuclear Facilities Buildings Receipt Facility Forming Plan at TOC EL 0'-0", 200-DB0-RF00-00101-000, Rev. 00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20080205.0002.
- BSC (Bechtel SAIC Company) 2008. Nuclear Facilities Buildings Wet Handling Facility Forming Plan at TOC EL 0'-0", 050-DB0-WH00-00102-000, Rev. 00B. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20080107.0004.

2) See attached pages for the better-formatted Tables 2-1 and 2-2.


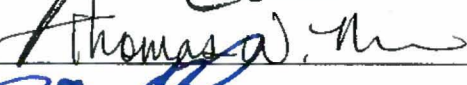
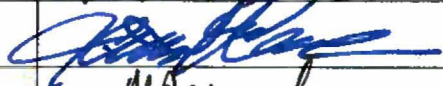
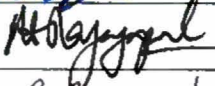
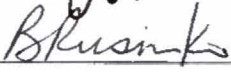
| 11. REVIEWS AND APPROVAL | | |
|---|--|-----------|
| Printed Name | Signature | Date |
| 11a. Originator: JAMES T. CAMERON |  | 3/21/08 |
| 11b. Checker: Thomas W. Ma |  | 3/21/08 |
| 11c. EGS: James A. Clark |  | 3.21.2008 |
| 11d. DEM: RAJ S. RATAGOPAL |  | 3/24/2008 |
| 11e. Design Authority: B. Rusinko |  | 3/24/08 |

Table 1-1. Summary of Planned Buildings

| | | | | | | References for Dimensions and Loads | |
|---|----------------------|---------------------|--------------------------|------------------|----------------|-------------------------------------|----------------------------|
| Building | Plan Dimensions (ft) | Slab Thickness (ft) | Bottom of Slab Elev (ft) | Load (1000 kips) | Pressure (ksf) | Drawing Reference | Calculation |
| Receipt Facility, RF | 284 x 242 | 7 | 3651 | 189.7 | 3.45 | 200-DB0-RF00-00101-000, Rev. 00B | 200-SYC-RF00-00100-000-00A |
| Emergency Diesel Generator Facility | 98 x 174 | 4 | 3663 | 28.7 | 1.68 | 26D-P10-EG00-00102-000, Rev. 00A | 26D-SYC-EG00-00300-000-00A |
| Canister Receipt and Closure Facility , CRCF #1 | 262 x 421 | 6 | 3656 | 314.2 | 3.33 | 060-DB0-CR00-00101-000, Rev. 00B | 060-DBC-CR00-00200-000-00A |
| Canister Receipt and Closure Facility , CRCF #2 | | | 3657 | | | | |
| Canister Receipt and Closure Facility , CRCF #3 | | | 3660 | | | | |
| Initial Handling Facility, IHF Large Structure (IHF Cask Process Area Main Structure) | 170 x 196.5 | 6 | 3665 | 56.7 | 1.70 | 51A-P10-IH00-00102-000, Rev. 00C | 51A-DBC-IH00-00200-000-00B |
| Initial Handling Facility, IHF Small Structure (IHF Loadout Area Concrete Structure) | 141.5 x 75 | | | 32.3 | 3.05 | | |
| Wet Handling Facility, WHF (pool) | 114 x 116 | 8 | 3607 | 42.6 | 3.22 | 050-DB0-WH00-00101-000, Rev. 00A | 050-SYC-WH00-00300-000-00B |
| Wet Handling Facility, WHF (building) | 270 x 214 | 6 | 3661 | 269.7 | 4.67 | 050-DB0-WH00-00102-000, Rev. 00B | |

Note: Building dimensions, weights, elevations, and associated drawings and references are all subject to change as design progresses.
 This table is provided as an approximation of the current building design information. The most up to date information should be used for final design.
 However, it is not expected that future changes in the building designs will have any significant impact on the conclusions of this report.

Table 2-1. Recommended Material Parameters

| Design Parameter ^a | Layer | | | |
|---|------------------------------|---|--|-----------------------------------|
| | Engineered Fill | Roller Compacted Cement ^b | Alluvium | Bedrock |
| Moist Density, γ (pcf) | 127 pcf | 130–140 pcf | 114–117 pcf | 100 pcf |
| Specific Gravity, G_s | 2.5 | | 2.5 | Not Applicable |
| Shear Strength Parameters | $\phi = 42^\circ$ $c = 0$ | $\phi = 0$ $c = 400$ psi (unconf. comp.) | $\phi = 39^\circ$ $c = 0$ | Not Applicable |
| At-Rest Earth Pressure Coefficient, K_o | 0.33 | Not Applicable | 0.37 | Not Applicable |
| Active Earth Pressure Coefficient, K_A | 0.20 | Not Applicable | 0.23 | Not Applicable |
| Passive Earth Pressure Coefficient, K_P | 5.0 | Not Applicable | 4.4 | Not Applicable |
| Static Elastic Modulus, E (ksi) | 14–28 | Not Available | 30–75 | Not Applicable |
| Poisson's Ratio, ν | 0.3–0.4 | 0.3 | 0.23–0.44 | 0.3 |
| Shear Wave Velocity, V_s (fps) | 630–1,500 | 2,000–3,000 | Figure 6-27, Figure 6-29, and Base Case - Figure 6-31 | Figure 6-32 and Figure 6-34 |
| Compression Wave Velocity, V_p (fps) | 1,500–3,700 | 3,700–5,600 | Figure 6-28 and Figure 6-30 | Figure 6-33 and Figure 6-35 |
| Low-Strain Shear Modulus, G (ksi) | 10–60 | 100–270 | 40–200 | 150–1,000 |
| Low-Strain Elastic Modulus, E (ksi) | 30–170 | 260–700 | 100–500 | 400–2,500 |
| Shear Modulus Reduction, G/G_{max} | Figure 6-38 | Figure 6-40 | Figure 6-36– upper figure | Figure 6-37– upper figure |
| Material Damping Ratio, $D\%$ | Figure 6-39 | Figure 6-41 | Figure 6-36– lower figure | Figure 6-37– lower figure |
| Resistivity (ohm-m) | To Be Determined | To Be Determined | To Be Determined | Not Applicable |
| CBR | 20-60 | Not Applicable | 20–60 | Not Applicable |
| Soil Profile Type (ICC 2000) | S_D (stiff soil) | S_C (very dense soil and soft rock) to S_B (rock) | S_C (very dense soil and soft rock) | S_B (rock) to S_A (hard rock) |

^a see applicable sections in calculation or appendices for basis of parameters^b additional testing required for verification

Table 2-2. Summary of Recommended Surface Facilities Foundation Design Parameters

| Design Parameter | Results / Recommendations | | | | | | | | | | | | | | | | |
|--|---|-------------------------|-------------------|------------------------|-------------------|-------------------------|-----------------------|------------|-----|---|-------------------|--------------------|-------------------|------------|--------------------------|-------------------------|-----|
| Soil Material Properties | Table 2-1 | | | | | | | | | | | | | | | | |
| Foundation Pressure | Settlement controls design Square and Continuous footings: Figure 7-2 and Figure 7-3 | | | | | | | | | | | | | | | | |
| Estimated Settlements | <u>Square and strip footings</u> Figure 7-4 through Figure 7-6 <u>Mat foundation (300' × 400')</u> <table border="1"> <thead> <tr> <th>Load (ksf)</th> <th>Center (in)</th> <th>Corner (in)</th> <th>Differential (in)</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>0.2-0.4</td> <td>negligible</td> <td>0.4</td> </tr> <tr> <td>5</td> <td>0.5-1.6</td> <td>< 0.1</td> <td>1.5</td> </tr> <tr> <td>7</td> <td>1.3-2.9</td> <td>< 0.1</td> <td>2.9</td> </tr> </tbody> </table> | Load (ksf) | Center (in) | Corner (in) | Differential (in) | 3 | 0.2-0.4 | negligible | 0.4 | 5 | 0.5-1.6 | < 0.1 | 1.5 | 7 | 1.3-2.9 | < 0.1 | 2.9 |
| Load (ksf) | Center (in) | Corner (in) | Differential (in) | | | | | | | | | | | | | | |
| 3 | 0.2-0.4 | negligible | 0.4 | | | | | | | | | | | | | | |
| 5 | 0.5-1.6 | < 0.1 | 1.5 | | | | | | | | | | | | | | |
| 7 | 1.3-2.9 | < 0.1 | 2.9 | | | | | | | | | | | | | | |
| Lateral Pressures | <u>Yielding walls</u> Static and seismic pressures: Figure 7-7 Surcharge loads: Figure 7-8 and Figure 7-9 <u>Non-yielding walls</u> Static and seismic pressures: Figure 7-10 Compactor-induced pressures: Figure 7-11 thru Figure 7-15 | | | | | | | | | | | | | | | | |
| Lateral Load Resistance | Friction Coefficient, $\tan \phi$ for alluvium: 0.81 for engineered fill: 0.90 Passive resistance: 515 pcf equivalent fluid | | | | | | | | | | | | | | | | |
| Temporary Shoring | For braced excavation Lateral pressure: 17H psf | | | | | | | | | | | | | | | | |
| Temporary Slopes | 1.5H:1V | | | | | | | | | | | | | | | | |
| Permanent Slopes | 2H:1V | | | | | | | | | | | | | | | | |
| Modulus of Subgrade Reaction (static loading; ranges may be doubled for short-term loading) | <table border="1"> <thead> <tr> <th></th> <th><u>Alluvium</u></th> <th><u>Engineered Fill</u></th> </tr> </thead> <tbody> <tr> <td>Horizontal:</td> <td>104-120 kcf (60-70 pci)</td> <td>60-96 kcf (35-55 pci)</td> </tr> <tr> <td>Vertical:</td> <td></td> <td></td> </tr> <tr> <td>1ft × 1ft footing</td> <td>1000 kcf (580 pci)</td> <td>600 kcf (350 pci)</td> </tr> <tr> <td>Large mats</td> <td>155-520 kcf (90-300 pci)</td> <td>75-250 kcf (45-145 pci)</td> </tr> </tbody> </table> | | <u>Alluvium</u> | <u>Engineered Fill</u> | Horizontal: | 104-120 kcf (60-70 pci) | 60-96 kcf (35-55 pci) | Vertical: | | | 1ft × 1ft footing | 1000 kcf (580 pci) | 600 kcf (350 pci) | Large mats | 155-520 kcf (90-300 pci) | 75-250 kcf (45-145 pci) | |
| | <u>Alluvium</u> | <u>Engineered Fill</u> | | | | | | | | | | | | | | | |
| Horizontal: | 104-120 kcf (60-70 pci) | 60-96 kcf (35-55 pci) | | | | | | | | | | | | | | | |
| Vertical: | | | | | | | | | | | | | | | | | |
| 1ft × 1ft footing | 1000 kcf (580 pci) | 600 kcf (350 pci) | | | | | | | | | | | | | | | |
| Large mats | 155-520 kcf (90-300 pci) | 75-250 kcf (45-145 pci) | | | | | | | | | | | | | | | |
| Saturated Permeability | 5×10^{-5} to 5×10^{-4} fpm | | | | | | | | | | | | | | | | |
| Percolation Rate | 1.8 in/hr | | | | | | | | | | | | | | | | |
| Depth of Frost Penetration | 10 inches: see Figure 7-16 | | | | | | | | | | | | | | | | |
| Minimum Footing Depth | 2 feet | | | | | | | | | | | | | | | | |