Table 12.2-1
REACTOR BUILDING CONCRETE STRUCTURE
BASE SLAB DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| DL + External Water Load El.556.0 + Differential Settlement + Operating Basis Earthquake | Normal concrete stresses<br>fs = 0.5fy |
| DL + External Water Load El. 556.0 + Differential Settlement + Design Basis Earthquake | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal concrete stresses are as given for working stress design in ACI Code 318.63

Material Properties

Concrete - fc' = 3000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi (ASTM A432)

Rock (elastic modulus) - 8,200,000 psi (Subsection 2.5)

Table 12.2-2
REACTOR BUILDING CONCRETE STRUCTURE
STAGE I WALL DESIGN DATA
(Construction Condition)

| Principal Design Case | Allowable Stresses |
|---|---|
| DL + External Water Load El. 547.0 + Earth Load El. 547.0 | Normal concrete stresses<br>fs = 0.5 fy |

Normal concrete stresses are as given for working stress design in ACI Code 318.63.

Material Properties

Concrete - fc = 3,000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi(ASTM A432)

Earth - w = 120 pcf

Table 12.2-3
REACTOR BUILDING CONCRETE STRUCTURE
STAGE II SLAB OVER TORUS DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| I DL + External Water Load El.547.0 + Earth Load El.547.0 | Normal concrete stresses fs = 0.5 fy |
| II Case I + LL | fs = 0.5 fy |
| III DL + LL | fs = 0.5fy |

LL as given above is wet weight of concrete from El. 559.83 to El. 565.0

Normal concrete stresses are as given for working stress design in ACI Code 318-63.

Material Properties

Concrete - fc' = 3,000 psi (4,000 psi inside wall El.536.92-557.5)
w = 145 pcf

Reinforcing steel - fy = 60,000 psi (ASTM A432)

Earth - w = 120 pcf

Table 12.2-4
REACTOR BUILDING CONCRETE STRUCTURE
EL. 565.0 SLAB OVER TORUS DESIGN DATA

| Principal Design Cases | | Allowable Stresses |
|---|---|---|
| I | DL + LL + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| II | DL + LL + Column Load + Operating Basis Earthquake (0.1g) | Noral concrete stresses<br>fs = 0.5 fy |
| III | DL + Earth Load + Water Load + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5fy |
| IV | DL + LL + Column Load + Earth Load + Waterload + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| V | DL + LL + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |
| VI | DL + LL + Column Load + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |
| VII | DL + Earth Load + Water Load + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |
| VIII | DL + LL + Column Load + Earth Load + Water Load + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |

LL as listed above includes uniform live load of 400 psf and machine loads where they exceed the uniform live load.

Normal concrete stresses are as given for working stress design in ACI Code 318-63.

Material Properties

Concrete - fc' = 3,000 psi(4,000 psi inside wall El. 536.92 - 557.5)
w = 145 pcf

Reinforcing steel - fy = 60,000 psi (ASTM A432)

Earth - w = 120 pcf

Table 12.2-5
REACTOR BUILDING CONCRETE STRUCTURE
CORNER WALL DESIGN DATA

| Principal Design Cases | | Allowable Stresses |
|---|---|---|
| I | Earth Load + Water Load + Operating Basis<br>Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| II | Earth Load + Water Load + Design Basis<br>Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal concrete stresses are as given for working stress design in ACI Code 318.63.

Material Properties

Concrete - fc' = 3,000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi (ASTM A432)

Earth - w = 120 pcf

Table 12.2-6
REACTOR BUILDING CONCRETE STRUCTURE
HPCI SYSTEM ROOMS DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| DL + Earth Load + Water Load + Operating Basis<br>Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| DL + Earth Load + Water Load + Design Basis<br>Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal concrete stresses are as given for working stress design in ACI Code 318-63.

Material Properties

Concrete - fc' = 3,000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi (ASTM A432)

Earth - w = 120 pcf

Table 12.2-7

REACTOR BUILDING CONCRETE STRUCTURE
EXTERIOR WALLS

| | Principal Design Cases | Allowable Stresses |
|---|---|---|
| I | Earth Pressure* | Normal stresses |
| II | Earth Pressure* + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>$f_s$= 0.5 fy |
| III | Earth Pressure* + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |
| IV | Earth Pressure* + Internal Pressure of Ruptured Pipe (36 lbs per sq ft) | fc = 0.85 fc'<br>fs = 0.90 fy |
| V | Earth Pressure* + 100-mph Wind | Normal Stresses increased 33-1/3% |
| VI | Earth Pressure* + 300-mph Wind | fc = 0.85 fc'<br>fs = 0.90 fy |
| VII | Earth Pressure* + Rapid Tornado Depressurization | fc = 0.85 fc'<br>fs = 0.90 fy |
| VIII | Probable Maximum Flood**<br>(Water Level El.572.5) | fc = 0.85 fc'<br>fs = 0.90 fy |

*or pressure from diesel-generator building or radwaste building
**applicable only to wall adjacent to Turbine Building

Normal stresses are as given for working stress design in ACI Code 318-63. Concrete shear stress is as described in this subsection.

Material Properties

Concrete-fc' = 3000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi(ASTM A-432)

Earth-w=120 pcf

Table 12.2-8

REACTOR BUILDING CONCRETE STRUCTURE
EXTERIOR WALLS AT ADJACENT UNITS

| Principal Design Cases | | Allowable Stresses |
|---|---|---|
| I | Expansion Joint Loads | Normal stresses |
| II | Expansion Joint Loads + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| III | Expansion Joint Loads + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90fy |
| IV | Expansion Joint Loads + Rapid Tornado Depressurization | fc = 0.85fc'<br>fy = 0.90 fy |

Normal stresses are as given for working stress design in ACI Code 318-63. Concrete shear stress is as described in this subsection.

Material Properties - As given in Table 12.2-7

Table 12.2-9

REACTOR BUILDING CONCRETE STRUCTURE
FLOOR SLABS, BEAMS, AND COLUMNS

| Principal Design Cases | | Allowable Stresses |
|---|---|---|
| I | DL + LL | Normal stresses |
| II | DL + LL + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| III | DL + LL + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |
| IV | DL + LL + 300-mph Wind | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal stresses are as given for working stress design in ACI Code 318-63.

Uniform Floor Live Loads

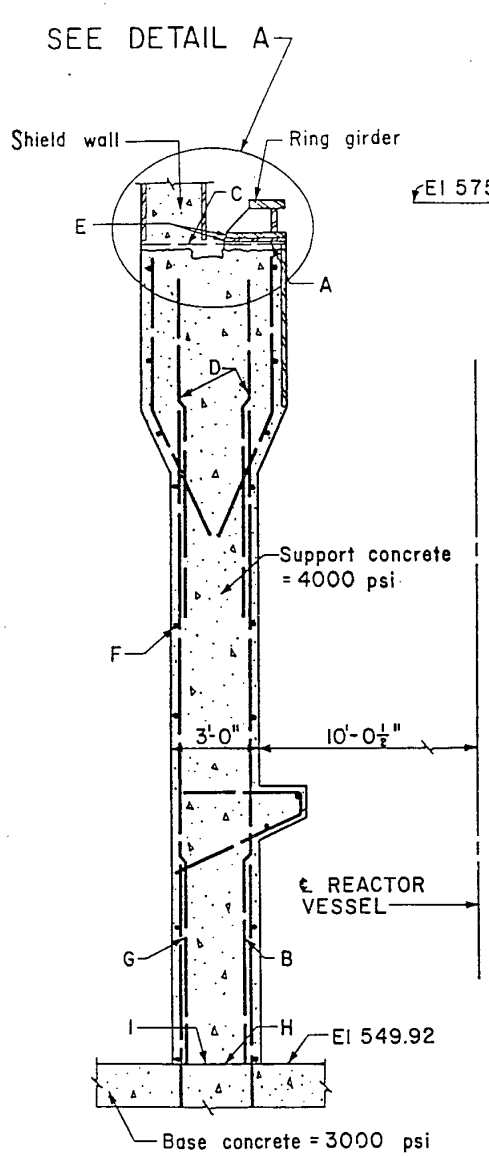
| | |
|---|---|
| Slab El. 593, 606, 617, 621.25 | 400 lbs per sq ft |
| Slab El. 639 (exception noted below) | 400 lbs per sq ft |
| Slab El. 639 between columns R2, R5 and t, u; R10, R13, and t, u; and R17, R20, and t, u | 250 lbs per sq ft |
| Slab El. 664 | 1000 lbs per sq ft |
| Roof El. 635 | 50 lbs per sq ft |

Main Properties

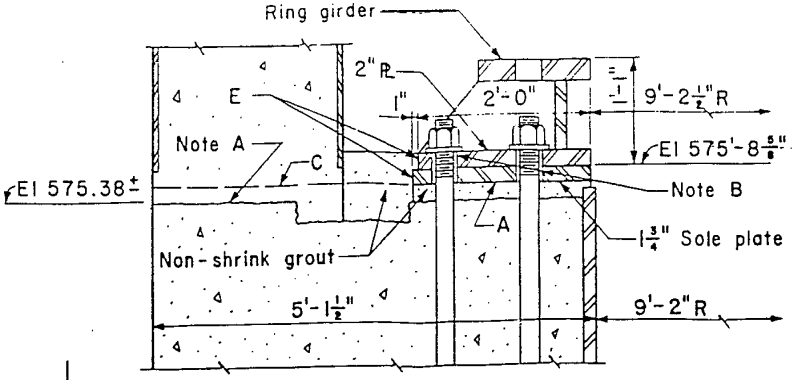
Concrete

| | |
|---|---|
| Beams and slabs El. 593, 621.25 | fc' = 3000 psi |
| Beams and slabs El. 639, 664 | fc' = 4000 psi |
| Slabs El. 606, 617 | fc' = 3000 psi |
| Roof El. 635 | fc' = 3000 psi |
| Columns | fc' = 4000 psi |
| w - 145 pcf | |

Reinforcing steel - fy = 60,000 psi(ASTM A432)




SECTION THRU PEDESTAL




DETAIL A
Scale ¾" = 1'-0"

Table 12.2-10
REACTOR SUPPORT PEDESTAL–ALLOWABLE AND ACTUAL STRESSES FOR PRINCIPAL DESIGN CASES

Note A:
Concrete poured to El 575.47 and chipped back to El 575.33 or lower to insure sound concrete.

Note B:
Fill gap with Sika Colma Dur.

PRINCIPAL DESIGN CASES

Case I Normal Operating Loads + Operating Basis Earthquake (0.1g) + Temperature Effects

Case II Normal Operating Loads + Design Basis Earthquake (0.2g) + Temperature Effects + Jet Load (Accident)

Material Properties
Concrete f'c = 4000 psi (pedestal & shieldwall)
4000 psi (non-shrink grout)
3000 psi (pedestal base)
w = 145 pcf
Reinforcing steel fy = 60,000 psi (ASTM A432)

| POINT OF STRESS | DESCRIPTION | CASE I | | CASE II | |
|---|---|---|---|---|---|
| | | ALLOWABLE STRESS (psi) | ACTUAL STRESS (psi) | ALLOWABLE STRESS (psi) | ACTUAL STRESS (psi) |
| A | Conc Bearing-Base PL | 1500(1) | 166 | 3000(2) | 398 |
| B | Reinforcing Tension | 30000(5) | Negligible | 54000(6) | 9410 |
| C | Conc Shear | 126(4) | 35 | 215(3) | 109 |
| D | Reinforcing Tension | 30000(5) | Negligible | 54000(6) | 645 |
| E | Conc Bearing | 1500(1) | 495 | 3000(2) | 1225 |
| F | Reinforcing Tension | 30000(5) | 27200 | 54000(6) | 47500 |
| G | Reinforcing Tension | 30000(5) | Negligible | 54000(6) | 5790 |
| H | Conc Bearing | 750(1) | 224 | 2250(2) | 476 |
| Ia | Conc Shear | 70(1) | 36 | 109(7) | 68 |
| Ib | Conc Shear | 145(8) | 65 | 290(9) | 158 |
| | | | | | |
| | | | | | |

(1) Normal concrete stress as given for working stress design in ACI Code 318-63.
(2) $0.75\ f'c$
(3) $4\phi\sqrt{f'c}$
(4) $2\sqrt{f'c}$
(5) 0.5 fy
(6) 0.9 fy
(7) $2\phi\sqrt{f'c}$
(8) $\frac{1}{2}(5.4\phi\sqrt{f'c})$
(9) $5.4\phi\sqrt{f'c}$ (SEAOC Code)

Note C:
Ia – shear is radial and considered as diagonal tension shear
Ib – shear is longitudinal and distributed over annular cross section

Table 12.2-11

REACTOR BUILDING CONCRETE STRUCTURE
P-LINE WALL DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| DL + LL | Normal Stresses |
| DL + LL + Operating Basis Earthquake (0.1g) | Normal concrete stresses<br>fs = 0.5fy |
| DL + LL + Design Basis Earthquake (0.2g) | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal stresses are as given for working stress design in ACI Code 318-63.

Material Properties

Concrete - fc' = 3000 psi (4000 psi at steam line compartment)
w = 145 pcf

Reinforcing steel - fy = 60,000 psi(ASTM A432)

Table 12.2-12

REACTOR BUILDING CONCRETE STRUCTURE
FUEL STORAGE POOL AND DRYER AND SEPARATOR STORAGE POOL

| | Principal Design Case | Allowable Stresses |
|---|---|---|
| I | DL + LL + Water Load | Normal stresses |
| II | DL + LL + Water Load + Operating Basis Earthquake(0.1g) | Normal concrete stresses<br>fs = 0.5 fy |
| III | DL + LL + Water Load + Operating Basis Earthquake (0.1g) + Drywell thermal rise | Normal concrete stresses<br>fs = 0.75fy |
| IV | DL + LL + Water Load + Design Basis Earthquake (0.2g) + Drywell thermal rise | fc = 0.85 fc'<br>fs = 0.90 fy |

LL as listed above includes uniform live load, equipment load, and fuel load. Drywell thermal rise includes the effect of the upward movement of the pools due to thermal growth of the drywell shield wall at operating temperature.

Normal stresses are given for working stress design in ACI Code 318-63.

Material Properties

Concrete - fc' = 3000 psi
w = 145 pcf

Reinforcing steel - fy = 60,000 psi(ASTM A432)

Table 12.2-13
(Deleted by Amendment 22)

Table 12.2-14

(Deleted by Amendment 21)

Table 12.2-15
(Deleted by Amendment 21)

Table 12.2-16

ALLOWABLE STRESSES FOR DRYWELL ACCESS PLATFORMS

| Loading Condition | Tension on the Net Section | Shear on Gross Section | Compression on Gross Section | Bending |
|---|---|---|---|---|
| D.L. + L.L. + Seismic Loads (0.1g) | (1) S | (1) S | (1) S-Varies with Slenderness ratio | (1) S |
| D.L. + L.L. + Seismic Loads(0.2g) + Jet | (2) 0.90 Fy or 1.5 x S | (2) 0.52 Fy or 1.5 x S | (2) 0.9 x Critical Buckling Stress<br>Varies with slenderness ratio or 1.5 x S | (2) 0.9 FY or 1.5 x S |

1. S = Allowable Stress Based on the AISC 8th Edition

2. Upper Limit on Allowable Stresses is the lesser of the two values computed

Table 12.2-16.1

(Deleted by Amendment 10)

Table 12.2-16.2

(Deleted by Amendment 10)

Table 12.2-16.3

(Deleted by Amendment 10)

Table 12.2-16.4

REACTOR BUILDING OUTSIDE DRYWELL CONTAINMENT MODAL MASS PROPERTIES

| MODE NO. | FREQUENCY CPS | N-S MODAL MASS K-SEC$^2$/FT | E-W MODAL MASS K-SEC$^2$/FT | VERTICAL MODAL MASS K-SEC$^2$/FT |
|---|---|---|---|---|
| 1 | 1.46 | 77.4 | | |
| 2 | 3.50 | | 235.5 | |
| 3 | 5.83 | 2198.4 | | |
| 4 | 6.01 | | 2937.7 | |
| 5 | 6.28 | 890.1 | | |
| 6 | 6.91 | | | 136.7 |
| 7 | 10.94 | | 214.0 | |
| 8 | 14.04 | | | 3221.6 |
| 9 | 16.90 | 1350.6 | | |
| 10 | 16.98 | | 1349.0 | |
| 11 | 20.08 | | | 7.2 |
| 12 | 36.24 | | | 1200.4 |
| | SUMMATION | 4516.5 | 4526.3 | 4585.9 |
| | TOTAL MASS | 5020.5 | 5020.5 | 5020.5 |

Table 12.2-17

DAMPING VALUES FOR THE RPV, RPV INTERNALS,
INTERNAL STRUCTURES, AND REACTOR BUILDING

| Component/Structure | Damping Ratio (%) of Critical | |
|---|---|---|
| | Horizontal | Vertical |
| R/B Enclosure Structure | 5 | 5 |
| Drywell Steel | 1 | 1 |
| Shield Wall | 5 | 5 |
| Pedestal | 5 | 5 |
| Star Truss | 2 | - |
| Stabilizer | 2 | - |
| Refueling Bellows | 2 | - |
| Reactor Vessel | 1 | 1 |
| Vessel Support Skirt | 1 | 1 |
| Shroud and Supports | 1 | 1 |
| Fuel | 7 | 7 |
| CRD Guide Tubes | 1 | 1 |
| CRD Housings | 3.5 | 1 |
| Spring $K_1$ | 2 | - |
| Spring $K_2$ | 2 | - |
| Spring $K_3$ | 1 | - |
| Spring $K_4$ | 1 | - |

Table 12.2-17.1A

REACTOR BUILDING INSIDE DRYWELL CONTAINMENT MODAL PROPERTIES
NS DIRECTION

| MODE NO. | FREQUENCY (CDS) | MODAL MASS ($K\text{-}SEC^2/FT$) | COMPOSITE MODAL DAMPING RATIO (% OF CRITICAL) |
|---|---|---|---|
| 1 | 1.45 | 77.2 | 5.00 |
| 2 | 4.27 | 72.7 | 6.34 |
| 3 | 5.80 | 2002.0 | 4.95 |
| 4 | 6.22 | 968.5 | 4.95 |
| 5 | 7.37 | 36.7 | 1.83 |
| 6 | 9.85 | 0.3 | 2.13 |
| 7 | 11.68 | 0.6 | 2.83 |
| 8 | 14.35 | 115.9 | 2.76 |
| 9 | 17.16 | 1240.9 | 4.95 |
| 10 | 17.59 | 3.75 | 6.84 |
| 11 | 18.69 | 0.50 | 2.23 |
| | SUMMATION: | 4519.1 | |
| | TOTAL MASS: | 5020.5 | |

Table 12.2-17.1B

REACTOR BUILDING INSIDE DRYWELL CONTAINMENT MODAL PROPERTIES
EW DIRECTION

| MODE NO. | FREQUENCY (CDS) | MODAL MASS ($K\text{-}SEC^2/FT$) | COMPOSITE MODAL DAMPING RATIO (% OF CRITICAL) |
|---|---|---|---|
| 1 | 3.43 | 224.1 | 5.00 |
| 2 | 4.27 | 64.0 | 6.34 |
| 3 | 5.99 | 2841.0 | 4.90 |
| 4 | 7.37 | 35.9 | 1.82 |
| 5 | 9.86 | 0.3 | 2.14 |
| 6 | 10.70 | 2.1 | 4.99 |
| 7 | 11.68 | 0.6 | 2.83 |
| 8 | 14.35 | 114.1 | 2.76 |
| 9 | 17.24 | 1238.8 | 4.96 |
| 10 | 17.59 | 5.9 | 6.84 |
| 11 | 18.69 | 0.6 | 2.23 |
| | SUMMATION: | 4527.4 | |
| | TOTAL MASS: | 5020.5 | |

Table 12.2-17.1C

REACTOR BUILDING INSIDE DRYWELL CONTAINMENT MODAL PROPERTIES
V DIRECTION

| MODE NO. | FREQUENCY (CDS) | MODAL MASS ($K\text{-}SEC^2/FT$) | COMPOSITE MODAL DAMPING RATIO (% OF CRITICAL) |
|---|---|---|---|
| 1 | 7.73 | 156.3 | 5.00 |
| 2 | 14.56 | 3249.0 | 4.87 |
| 3 | 16.84 | 7.3 | 3.64 |
| | SUMMATION: | 3412.6 | |
| 4 | 22.31 | 5.7 | 5.00 |
| 5 | 27.21 | 0.3 | 3.65 |
| 6 | 36.73 | 39.0 | 1.41 |
| 7 | 37.42 | 1130.3 | 4.86 |
| 8 | 44.26 | 0.8 | 2.32 |
| | SUMMATION: | 4588.7 | |
| | TOTAL MASS: | 5020.5 | |

Table 12.2-18

(Deleted by Amendment 8)

Table 12.2-19

(Deleted by Amendment 8)

Table 12.2-20

(Deleted by Amendment 8)

Table 12.2-21

(Deleted by Amendment 8)

Table 12.2-22

(Deleted by Amendment 8)

Table 12.2-23
TURBINE BUILDING
CONCRETE FRAME DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| DL + LL + Earth Pressure | Normal stresses |
| DL + LL + Earth Pressure + Wind (100 mph) | Normal stresses + 33-1/3% |
| DL + LL + Earth Pressure + Earthquake (Area cols. m-j only) | Normal stresses + 33-1/3% |

LL as listed above includes uniform live load as shown in Figures 12.2-47, 12.2-48, and 12.2-49 and machine loads where they exceed the uniform live load.

Normal stresses are as given for working stress design in ACI Code 318.63.

Material Properties

| | |
|---|---|
| Concrete | fc' = 4000 psi for columns |
| | fc' = 3000 psi for all other members including columns placed with walls (pilasters) |
| | w (conventional conc.) = 145 pcf<br>w (heavy conc.) = 280 pcf |
| Reinforcing Steel | fy = 80,000 psi (ASTM A432) |

Table 12.2-24

TURBINE FOUNDATION DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| DL + LL | $f'_c$ = 400 psi |
| | fs = 10,000 psi |
| DL + LL + Thermal | $f'_c$ = 1,350 psi |
| | fs = 24,000 psi |
| Material Properties | |
| Concrete | $f'_c$ = 3,000 psi |
| | w = 145 pcf |
| Reinforcing Steel | fy = 60,000 psi (ASTM A432) |

Table 12.2-25

REINFORCED CONCRETE CHIMNEY
DESIGN DATA

| | Allowable Stresses, psi | | Load Factor |
|---|---|---|---|
| Design Case | Concrete | Steel | Ultimate Strength |
| 1. DL + 100-Mph Wind | 1075 | 15,000* | |
| 2. DL + Tornado-Lower 280 feet | | | 1.10 |
| -Upper 320 feet | | | 0.55 |
| 3. DL + Operating Basis Earthquake - 0.1g | 1605 | 30,000 | |
| DL + Design Basis Earthquake - 0.2g | 3655 | 54,000 | |
| DL + Design Basis Earthquake - 0.2g | | | 1.25 |
| 4. Resonant Wind | 1605 | 30,000 | |
| 5. DL + 100-Mph Wind + Thermal (due to Unit 3 HWWV) | 3655 | 54,000 | |

*ACI 307-69

Material Properties

| | |
|---|---|
| Concrete | |
| Shell | f 'c = 4,300 psi |
| Foundation and Internal Structures | f 'c = 3,000 psi |
| Reinforcing Steel | fy = 60,000 psi(ASTM A432) |

Table 12.2-26

RADWASTE BUILDING
DESIGN DATA

| Principal Design Cases | Allowable Stresses |
|---|---|
| 1. DL + Dry Earth Loads + Floor Live Loads or Equipment Loads | Normal stresses |
| II. DL + Earth Saturated to E1.556 + Floor Live Loads or Equipment Loads | Normal stresses |
| III. DL + Earth Saturated to E1.556 + Floor Live Loads or Equipment Loads + 100 MPH Wind ($30\#/ft^2$) | Normal stresses increased 33-1/3% |
| IV. DL + Floor Live Loads or Equipment Loads + Probable Maximum Flood (Water Level E1.572.5) + Wave Forces | fc = 0.85 fc'<br>fs = 0.90 fy |

Normal stresses are as given for working stress design in ACI Code 318-63.

Material Properties

| | |
|---|---|
| Concrete | f 'c = 3000 psi<br>w = 145 pcf |
| Reinforcing Steel | fy = 60,000 psi (ASTM A432) |
| Bearing Piles | fy = 36,000 psi (ASTM A36) |

Table 12.2-27

INTAKE BUILDING - DESIGN DATA

| | Principal Design Cases | Allowable Stresses | Calculated Safety Factors Overturning | Floating | Sliding |
|---|---|---|---|---|---|
| Ia | Reservoir level at elevation 556, two pump bays unwatered. Operating loads including fill and surcharge. | Normal | 3.7 | 3.4 | 1.3 |
| Ib | Same as Ia without surcharge with 0.1g earthquake loads. | Normal concrete fs = 0.5 fy | 2.2 | 2.9 | 2.7 |
| II | Reservoir level at elevation 562, one pump bay unwatered. Operating loads including fill and surcharde. | Normal increased by 33% | 2.1 | 2.3 | 6.7 |
| III | Reservoir level at elevation 529, (breech at Wheeler Dam) two pump bays unwatered. Operating dead loads including fill and 0.2g earthquake. | fc = 0.85 fc' fs = 0.90 fy | 4.7 | 13.2 | 3.8 |
| IV. | Construction condition (stability only). No machinery. Backfill in place - dry condition. | | 15.3 | - | 4.1 |
| V. | The high walls forming the four compartments around the RHRSW pumps shall be designed to provide protection against natural phenomena such as DBE, tornadoes, and wind waves from 45 mph winds associated with PMF. | fc = 0.85fc' fs = 0.90fy | | | |

Normal stresses are as given for working stress design in ACI Code 318-63.

Material Properties

| | |
|---|---|
| Concrete | f 'c = 3000 psi<br>w = 145 pcf |
| Reinforcing Steel | fy = 60,000 psi(ASTM A432) |

Table 12.2-28

INTAKE AND DISCHARGE CONDUITS - DESIGN DATA

| | Principal Design Cases | Allowable Stresses |
|---|---|---|
| I. | Normal Operation - Conduit Full<br>DL + Hydraulic Gradient El.597.0 + Earth Pressure<br>(w = 105 pcf) | Normal stresses |
| II. | Exposed Condition - Conduit Full<br>DL + Hydraulic Gradient El.597.0 | Normal stresses + 35% |
| III. | Shutoff Condition - Conduit Full Intake Conduit only<br>DL + Hydraulic Gradient El.622.0 + Earth Pressure<br>(w = 105 pcf) | Normal stresses + 65% |
| IV. | External Pressure - Conduit Empty<br>DL + External Water Pressure El.556.0 + Earth Pressure<br>(w = 120 pcf) + Surcharge (300 psf) | Normal stresses |
| V. | Construction Condition - Conduit Empty<br>DL + External Water Pressure El.556.0 + Earth Pressure<br>(w = 120 pcf) + Surcharge (100-Ton Crane) | Normal stresses + 50% |

Normal stresses are 20,000 psi for reinforcing steel and for concrete are as given for working stress design in ACI Code 318-63.

Material Properties

| | |
|---|---|
| Concrete | - fc = 3000 psi<br>w = 145 pcf |
| Reinforcing steel | - fy = 60,000 psi (ASTM A432) |

Table 12.2-29

DIESEL GENERATOR BUILDING

| | Principal Design Cases | Allowable Stresses |
|---|---|---|
| I. | DL + Earth Loads + Expansion Joint Loads | Normal stresses |
| II. | Case I + Floor Live Loads | Normal stresses |
| III. | (1±0.067) DL + Expansion Joint Loads + Operating Basis Earthquake Loads(0.1g) | Normal concrete<br>fs = 0.5 fy |
| IV. | (1±0.133) DL + Expansion Joint Loads + Design Basis Earthquake (0.2g) | fc = 0.85 f 'c<br>fs = 0.90 fy |
| V. | Case I + Tornado Depressurization | fc = 0.85 f 'c<br>fs = 0.90 fy |
| VI. | Case I + 300 MPH Tornado Wind (230#/Sq. Ft.) | fc = 0.85 f 'c<br>fs = 0.90 fy |
| VII. | Case I + Probable Maximum Flood (Water Level El.572.5) + Wave Forces | fc = 0.85 f 'c<br>fs = 0.90 fy |

DL includes weight of diesel generators

Normal stresses are as given for working stress design in ACI Code 318-63.

Material Properties

| | |
|---|---|
| Concrete | f 'c = 3000 psi<br>w = 145 pcf |
| Reinforcing Steel | fy = 60,000 psi (ASTM A432) |
| Earth | w = 120 pcf |

Table 12.2-30
(Sheet 1)

DIESEL GENERATOR BUILDING
ACCESS DOORS
DESIGN DATA

Door and Frame Assemblies of A36 Steel

| No. | Load Combination | Allowable Stresses (psi) Tension & Compression | Shear |
|---|---|---|---|
| I | Dead<br>Wind at 10 psf | 18,000<br>(0.50 Fy) | 12,000<br>(0.33 Fy) |
| II | Dead<br>Wind at 300 mph | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| III | Dead<br>Tornado differential pressure at 40 psf acting outward | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| IV | Dead<br>Earthquake at 0.1g<br>OBE (0.1g) | 18,000<br>(0.5 Fy) | 12,000<br>(0.33 Fy) |
| V | Dead<br>Earthquake at 0.2g<br>OBE (0.2g) | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| VI | Dead<br>300 mph wind with 100 mph impact from one of the following missiles<br>a. 100 pounds with circular impact area of 4-inch-diameter<br>b. 10-foot length of 2-inch std pipe impacting endwise<br>c. 10-foot length of 1/2-inch std pipe impacting endwise | Plastic design - Doors deform but stop missle | |
| VII | Dead<br>Static water head to elevation 578 | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| VIII | Dead<br>Wind<br>Static water head<br>Broken waves to elevation 578.0<br>Wave height varies with flood level and wind from 10 feet maximum to 5 feet at probable maximum flood but does not exceed El. 578.0 | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |

Table 12.2-30
(Sheet 2)

DIESEL GENERATOR BUILDING
ACCESS DOORS
DESIGN DATA

Other Parts

| No. | Load Combination | Allowable Stresses (psi) Tension & Compression | Shear |
|---|---|---|---|
| I | Dead<br>Wind at 10 psf | ULT/5 | 2xULT/15 |
| II | Dead<br>Wind at 300 mph | 0.9 Fy | 0.6 Fy |
| III | Dead<br>Tornado differential pressure at 40 psf acting outward | 0.9 Fy | 0.6 Fy |
| IV | Dead<br>OBE (0.1g) | ULT/5 | 2xULT/15 |
| V | Dead<br>DBE (0.2g) | 0.9 Fy | 0.6 Fy |
| VI | Dead<br>300 mph wind with 100 mph impact from one of the following missiles<br>a. 100 pounds with circular impact area of 4-inch-diameter<br>b. 10-foot length of 2-inch std pipe impacting endwise<br>c. 10-foot length of 1/2-inch std pipe impacting endwise | Plastic design - Doors deform but stop missile | |
| VII. | Dead<br>Static water head to elevation 578 | 0.9 Fy | 0.6 Fy |
| VIII. | Dead<br>Wind<br>Static water head<br>Broken waves to elevation 578.0<br>Wave height varies with flood level and wind from 10 feet maximum to 5 feet at probable maximum flood but does not exceed El.578.0 | 0.9 Fy | 0.6 Fy |

Doors open or closed for combinations 1, IV, and V and closed for all other combinations.

Table 12.2-31

(Deleted by Amendment 8)

Table 12.2-32
(Deleted by Amendment 22)

Table 12.2-33

EQUIPMENT ACCESS LOCK DOORS
DESIGN DATA

| No. | Load Combinations | Allowable Stresses (psi) Tension & Compression | Shear |
|---|---|---|---|
| I | Dead | 14,000 | 9,300 |
| II | Dead<br>Wind (10 psf) | 22,000 | 14,500 |
| III | Dead<br>Wind (30 psf) | 32,400 | 21,600 |
| IV | Dead<br>OBE (0.1g) | 14,000 | 9,300 |
| V | Dead<br>DBE (0.2g) | 32,400 | 21,600 |

Table 12.2-34

STANDBY GAS TREATMENT BUILDING
DESIGN DATA

| | Principal Design Cases | Allowable Stresses |
|---|---|---|
| I | DL + Earth Loads | Normal stresses |
| II | DL + Earth Loads + Floor Live Loads | Normal stresses |
| III | (1 $\pm$ 0.067) DL + Earth Loads (w = 120 pcf) + Operating Basis Earthquake Loads (NC) | Normal concrete<br>fs = 0.5 fy |
| IV | (1 + 0.133) DL + Earth Loads (w = 120 pcf) + Design Basis Earthquake Loads (NC) | fc = 0.85 f 'c<br>fs = 0.90 fy |

Normal stresses are as given for working stress design in ACI Code 318-63.

Material Properties

| | |
|---|---|
| Concrete | f 'c = 3000 psi<br>w = 145 pcf |
| Reinforcing steel | fy = 60,000 psi (ASTM A432) |
| Earth | w = 120 pcf |

TABLE 12.2-35

VALUES USED IN DYNAMIC EARTHQUAKE ANALYSIS
OF STANDBY GAS TREATMENT BUILDINGS

| ITEM | N-S DIRECTION | E-W DIRECTION | VERTICAL DIRECTION |
|---|---|---|---|
| Mass of Roof | 150 K $sec^2$/Ft | 150 K $sec^2$/Ft | 150 k $sec^2$/Ft |
| Mass of Base | 58.4 K $sec^2$/Ft | 58.4 K $sec^2$/Ft | 58.4 K $sec^2$/Ft |
| | BUILDING NO. 1 | | |
| $K_T$ | 1.20 X $10^6$ K/Ft | 1.06 X $10^6$ K/Ft | - - - - - - - - |
| $K_R$ | 5.49 X $10^8$Ft-K/RAD | 1.97 X $10^9$Ft-K/RAD | - - - - - - - - |
| $K_V$ | - - - - - - - - | - - - - - - - - | 3.47 X $10^6$ K/Ft |
| | BUILDING NO. 2 | | |
| $K_T$ | 1.25 X $10^6$ K/Ft | 1.10 X $10^6$ K/Ft | - - - - - - - - |
| $K_R$ | 5.81 X $10^8$ Ft-K/RAD | 2.15 X $10^9$Ft-K/RAD | - - - - - - - - |
| $K_V$ | - - - - - - - - | - - - - - - - - | 3.60 X $10^6$ K/Ft |

Table 12.2-36

RESULTS OF DYNAMIC EARTHQUAKE ANALYSIS OF STANDBY GAS
TREATMENT BUILDING FOR OPERATING BASIS EARTHQUAKE (0.10g)

N-S Direction

Period = 0.0845 seconds

| Item | Value |
|---|---|
| Roof Acceleration | 0.268g |
| Base Acceleration | 0.179g |
| Roof Displacement | 0.0163 in. |
| Base Displacement | 0.0112 in. |

E-W Direction

Period = 0.071 seconds

| Item | Value |
|---|---|
| Roof Acceleration | 0.216g |
| Base Acceleration | 0.176g |
| Roof Displacement | 0.0099 in. |
| Base Displacement | 0.00844 in. |

Table 12.2-37

INTAKE CHANNEL GATE STRUCTURE DESIGN LOADS

Items and Design Cases

34/Gate Guide Cells

Case 1. $W_c + F_H + P_{H20}\ P_{SOIL} + P_{SOILA} + P_{SOILP} + F_{fA} + F_{fp}$ (Initial Condition)

Case 2. Same as Case 1 + $W_g + G + G_{H20}$ (Final Condition)

34/Closure Cells

Case 1. $W_c + F_H + P_{H20} + P_{SOIL} + P_{SOILA} + P_{SOILP} + F_{fA} + F_{fp}$

$W_c$ = Weight of cell minus vertical DBE seismic load

$W_g$ = Weight of gate minus vertical DBE seismic load

G = Total weight of gate time horizontal DBE acceleration

$F_H$ = Total weight of cell times horizontal DBE acceleration

$G_{H20}$ = Increased water pressure on gate due to DBE seismic loading*

$P_{H20}$ = Increased water pressure on cell due to DBE seismic loading*

$P_{SOIL}$ = Increased earth pressure on cell due to DBE seismic loading

$P_{SOILA}$ = Static active earth pressure on cell

$P_{SOILP}$ = Static passive earth pressure on cell

$F_{fA}$ = Active friction force between cell and earth

$F_{fp}$ = Passive friction force between cell and earth

*(Design Maximum Water Level at Elevation 556.0)

Table 12.2-38

REACTOR BUILDING - PERSONNEL AND EQUIPMENT ACCESS LOCKS - WATERTIGHT DOORS
DESIGN DATA

Door and Frame Assemblies

| No. | Load Combination | Allowable Stresses (psi) Tension | Compression | Shear |
|---|---|---|---|---|
| I | Door Open or closed and dogged Dead + 0.1g earthquake (OBE) | 0.5 Fy | 0.48 Fy | 0.33 Fy |
| II | Door Open or closed and dogged Dead + 0.2g earthquake (DBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| III | Door closed and dogged Dead + 7.5 feet static head | 0.9 Fy | 0.9 Fy | 0.6 Fy |

Other Parts

| | | | | |
|---|---|---|---|---|
| I | Door open or closed and dogged Dead + 0.1g earthquake (OBE) | ULT/5 | ULT/5 | 2xULT/l5 |
| II | Door open or closed and dogged Dead + 0.2g earthquake (DBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| III | Door closed and dogged Dead + 7.5 feet static head | 0.9 Fy | 0.9 Fy | 0.6 Fy |

A276-304 Stainless Steal Fy = 30 ksi

A-36 Steel Fy = 36ksi

Table 12.2-39
(Sheet 1)

RADWASTE BUILDING - DOUBLE DOORS FOR EXTERIOR OPENINGS
DESIGN DATA

Door and Frame Assemblies of A36 Steel

| No. | Load Combination | Allowable Stresses (psi) Tension | Compression | Shear |
|---|---|---|---|---|
| I | Door open or closed and not dogged<br>Dead load + 0.1g earthquake (OBE) | 18,000<br>(0.5 Fy) | 17,000<br>(0.48 Fy) | 12,000<br>(0.33 Fy) |
| II | Door closed and dogged<br>Dead + 100 mph wind | 32,400<br>(0.9 Fy) | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| III | Door open<br>Dead + 30 mph wind | 18,000<br>(0.5 Fy) | 17,000<br>(0.48 Fy) | 12,000<br>(0.33 Fy) |
| IV | Door closed and dogged<br>Dead + 10-foot wave with water level at elevation 561.0 + 60 mph wind +0.1g earthquake (OBE) | 32,400<br>(0.9 Fy) | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| V | Door open (door 183 only)<br>Dead load + 30 mph wind + earthquake at 0.2g | 32,400<br>(0.9 Fy) | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| VI | Door open<br>Dead + 30 mph wind + 0.1g earthquake | 32,400<br>(0.9 Fy | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| VII | Door closed and dogged<br>Dead + 13 feet static head | 32,400<br>(0.9 Fy) | 32,400<br>(0.9 Fy) | 21,600<br>(0.9 Fy) |
| Other Parts | | | | |
| I | Door open or closed and not dogged<br>Dead + 0.1g earthquake (OBE) | ULT/5 | ULT/5 | 2xULT/15 |

Table 12.2-39 (Continued)
Sheet 2
RADWASTE BUILDING - DOUBLE DOORS FOR EXTERIOR OPENINGS
DESIGN DATA

Other Parts (Continued)

| No. | Load Combination | Allowable Stresses (psi) Tension | Compression | Shear |
|---|---|---|---|---|
| II | Door closed and dogged<br>Dead + 100 mph wind | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| III | Door open<br>Dead + 30 mph wind | ULT/5 | ULT/5 | 2xULT/15 |
| IV | Door closed and dogged<br>Dead + 10-foot wave with water at elevation 561.0 + 60 mph wind + 0.1g earthquake (OBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| V | Door open (door 183 only)<br>Dead + 30 mph wind + 0.2g earthquake (DBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| VI | Door open<br>Dead + 30 mph wind + 0.1g earthquake (OBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy |
| VII | Door closed and dogged<br>Dead + 13 feet static head | 0.9 Fy | 0.9 Fy | 0.6 Fy |

Table 12.2-40

RADWASTE BUILDING - PERSONNEL ACCESS DOORS
DESIGN DATA

Door and Frame Assemblies of A36 Steel

| No. | Load Combination | Allowable Stresses (psi) Tension | Compression | Shear |
|---|---|---|---|---|
| I | Door open or closed and dogged Dead | 18,000 (0.5 Fy) | 17,000 (0.48 Fy) | 12,000 (0.33 Fy) |
| II | Door closed and dogged Dead + 7.5 feet static head (18.3 feet static head for pipe and cable tunnel door) | 32,400 (0.9 Fy) | 32,400 (0.9 Fy) | 21,600 (0.6 Fy) |

Other Parts

| | | | | |
|---|---|---|---|---|
| I | Door open or closed and dogged Dead | ULT/5 | ULT/5 | 2xULT/15 |
| II | Door closed and dogged Dead + 7.5 static head (18.3 feet static head for pipe and cable tunnel door) | 0.9 Fy | 0.9 Fy | 0.6 Fy |

Table 12.2-41

INTAKE STRUCTURE AND EQUIPMENT ACCESS LOCK
PERSONNEL ACCESS DOORS
DESIGN DATA

Door and Frame Assemblies

| No. | Load Combination | Allowable Stresses (psi) Tension | Compression | Shear | |
|---|---|---|---|---|---|
| I | Doors closed and dogged<br>Dead + 300 mph wind | (0.9 Fy) | (0.9 Fy) | (0.6 Fy) | * |
| II | Door open or closed and dogged<br>Dead + 0.1g earthquake (OBE) | (0.5 Fy) | (0.48 Fy) | (0.33 Fy) | * |
| III | Door open or closed and dogged<br>Dead + 0.2g earthquake (DBE) | (0.9 Fy) | (0.9 Fy) | (0.6 Fy) | * |
| IV | Door closed and dogged<br>Dead + 13 feet static head | (0.9 Fy) | (0.9 Fy) | (0.6 Fy) | * |

Other Parts

| | | | | | |
|---|---|---|---|---|---|
| I | Doors open or closed and dogged<br>Dead + 0.1g earthquake (OBE) | ULT/5 | ULT/5 | 2xULT/15 | |
| II | Door open or closed and dogged<br>Dead + 0.2g earthquake (DBE) | 0.9 Fy | 0.9 Fy | 0.6 Fy | |
| III | Door closed and dogged<br>Dead + 300 mph wind | 0.9 Fy | 0.9 Fy | 0.6 Fy | |
| IV | Door closed and dogged<br>Dead + 13 feet static head | 0.9 Fy | 0.9 Fy | 0.6 Fy | |

ASTM A276-304 Stainless Steel
ASTM A240-304 Stainless Steel
Fy = 30 ksi

ASTM A-36 Steel
Fy = 36 ksi

* For new design, the Allowable Shear stress = 0.52 Fy

Table 12.2-42

DIESEL GENERATOR BUILDING
PORTABLE BULKHEAD
DESIGN DATA

Bulkhead Bolted in Place

| No. | Load Combination | Allowable Stresses (psi) Tension & Compression | Shear |
|---|---|---|---|
| I | Dead<br>OBE (0.1g) | 18,000<br>(0.5 Fy) | 12,000<br>(0.33 Fy) |
| II | Dead<br>Static water head to elevation 578 | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |

Table 12.2-43

EQUIPMENT ACCESS LOCK
FLOOD GATE
DESIGN DATA

Gate Structural Members of A36 Steel

| No. | Load Combination | Allowable Stresses (psi) Tension & Compression | Shear |
|---|---|---|---|
| I | Dead<br>Wind at 10 psf | 18,000<br>(0.5 Fy) | 12,000<br>(0.33 Fy) |
| II | Dead<br>Wind at 30 psf | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| III | Dead<br>OBE (0.1g) | 18,000<br>(0.5 Fy) | 12,000<br>(0.33 Fy) |
| IV | Dead<br>DBE (0.2g) | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| V | Dead<br>Static water head to elevation 578 | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |
| VI | Dead<br>Wind<br>Static water head<br>Broken waves to elevation 578.0<br>Wave height varies with flood level and wind from 10 feet maximum to 5 feet at probable maximum flood but does not exceed El.578.0 | 32,400<br>(0.9 Fy) | 21,600<br>(0.6 Fy) |

Gate in lowered or raised position for above combination numbers I through IV and in lowered position only for V and VI.

Other Parts

| | | | |
|---|---|---|---|
| I | Dead<br>Wind at 10 psf | ULT/5 | 2xULT/15 |
| II | Dead<br>Wind at 30 psf | 0.9 Fy | 0.6 Fy |
| III | Dead<br>OBE (0.1g) | ULT/5 | 2xULT/15 |
| IV | Dead<br>DBE (0.2g) | 0.9 Fy | 0.6 FY |

Gate in raised position only for above combination numbers I through IV. No load on other parts in lowered position.

Table 12.2-44

OFFGAS TREATMENT BUILDING - DESIGN DATA

Loads

D = Dead load of structure.

$H_V$ = Vertical earth pressure, including 200-pound-per-squre-foot surcharge.

$H_L$ = Lateral earth pressure, including 200-pound-per-square-foot surcharge.

$H'_L$ = Lateral earth pressure, including worst effects of water at elevation 556, 561, or 568.75; 200-pound-per-square-foot surcharge.

E = Design basis earthquake, earth dry.

S = Earth pressures including 4,700-pound-per-square-foot surcharge along any one wall at a time. This surcharge is caused by chimney dropping outside of building boundary.

B = Effect on walls only of 13,000-pound-per-square-foot load on the roof. This load represents approximately 3 times the load that would be required to collapse the roof.

V = Negative pressure of 240 pounds per square foot inside building due to tornado.

C = Earth pressure against the exterior walls acting as cantilever wall with an applied moment at the top equal to the moment capacity of the connection between the walls and roof. Structure is designed according to the ACI Building Code 318.71.

| No. | Load Combinations and Load Factor |
|---|---|
| 1 | $U = 1.7H_L + 1.4$ or $0.9 (D + H_V)$ |
| 2 | $U = 1.7H_L + 1.4$ or $0.9 (D + H_V)$ |
| 3 | $U = 1.7E + 1.4$ or $0.9 (D + H_V)$ |
| 4 | $U = 1.1S + 1.4$ or $0.9 (D + H_V)$ |
| 5 | $U = 1.7H_L + 1.1V + 1.4(D + H_V)$ |
| 6 | $U = 1.1 C$ |
| 7 | $U + B + H_L + D$ |

Material Properties - As given in Table 12.2-7

Table 12.2-45

RADWASTE EVAPORATOR BUILDING-DESIGN DATA

Loads

D = Dead load of structure

L = Floor live loads (100 pounds per square foot or equipment loads, whichever was greater)

H = Maximum possible flood (water to elevation 572.5) plus wave forces

W = Wind load (100 MPH)

| | |
|---|---|
| 1. D + L | Normal stresses |
| 2. D + L + W | Normal stresses, increased by 1.33 |
| 3. D + H | fc=0.85 fc<br>fs=0.90 fy |

Normal stresses are given for working stress design in the ACI Code 318-71, alternate design method Section 8.10.

Material Properties - As given in Table 12.2-7.

Table 12.2-46
GATE STRUCTURE NO. 2 DESIGN DATA
Sheet 1

Loads

| | | |
|---|---|---|
| D | = | Dead load of the structure and equipment, plus a portion of the live load is added when it includes items such as piping, cable trays, etc. |
| S | = | Active soil pressure. |
| H | = | Hydrostatic pressure from the water surface elevations as shown below. |
| $U_H$ | = | Hydrostatic uplift from the water surface elevations as shown below. |
| L | = | Live load - 200 psf on the machinery deck and/or mobile crane loading on the cellular cofferdam. |
| C | = | Construction condition - cellular cofferdam in place with excavation for concrete gravity section completed. |
| E | = | Earthquake (DBE) - 0.20g horizontal and 0.13g vertical accelerations (at bedrock). |

| Load Case | Load Combination | Overturning | Factor of Safety Sliding | Pullout** |
|---|---|---|---|---|
| I | $D + S + H_1 + U_{H1}$ | 1.5* | 1.5 | 1.5 |
| II | $D + S + H_3 + U_{H3}$ | 1.05 | 1.05 | 1.05 |
| III | Construction Condition | 1.25 | 1.25 | 1.25 |
| IV | $D + S + H + U_H + E$ | 1.0 | 1.0 | 1.0 |

* or 100% of base in compression for the concrete gravity section
** applies only to steel sheet pile structures

Table 12.2-46
GATE STRUCTURE NO. 2 DESIGN DATA
Sheet 2

Water Surface Elevations for Loads H and $U_H$

| | Upstream | Downstream | Corresponding Rainfall |
|---|---|---|---|
| H & $U_H$ | El. 562.67 | El. 556.0 | None |
| $H_1$ & $U_{H1}$ | El. 563.44 | El. 556.01 | 4" / hour |
| $H_3$ & $U_{H3}$ | El. 564.93 | El. 556.03 | Max. Possible |

Required Ultimate Concrete Strength (U) for the Reinforced Concrete Components

$U = 1.4D + 1.7(S + H_1 + U_{H1} + L)$

$U = 1.05(D + S + H_3 + U_{H3})$

$U = 0.75[1.4D + 1.7(S + H + U_H + L) + 1.87E]$