Permit No.	Date	Document ID No.
36-13	**February 23, 2009**	**6861**

CORPORATE EHS SERVICES

Duke Energy Corporation
526 South Church St.
Charlotte, NC 28202

Mailing Address:
EC13K / PO Box 1006
Charlotte, NC 28201-1006

February 19, 2009

North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section
401 Oberlin Road
Raleigh, N.C. 27605

APPROVED DOCUMENT
Division of Waste Management
Solid Waste Section
Date **December 9, 2009** By **LY Frost**

Attention: Mr. Edward F. Mussler, III, P.E.

Subject: Duke Energy – Allen Steam Station
Retired Ash Basin (RAB) - CCP Landfill
Permit No. 36-12
Engineering Stability Analyses Summary

Dear Mr. Mussler:

As requested by and discussed with Mr. Larry Frost, attached is the Engineering Stability Analyses Summary for the CCP landfill currently under construction at Duke Energy's Allen Steam Station in Gaston County. The summary was prepared by Duke Energy's consultant for this project, S&ME, Inc. and was taken from previously performed engineering submitted with the Site Suitability and Engineering Plan Reports for the project. Included with S&ME's summary are figures showing general and specific site location information. Also, included with this submittal is a CD containing specifics of the various stability analyses being summarized. Analyses provided include global slope stability, settlement and liquefaction.

We hope the information provided meets the needs of your request. If further information is required or questions arise, please contact me at 980-373-7892.

Sincerely,

Christopher D. Hallman

Christopher D. Hallman, P.E.
Duke Energy Corporate EHS

RECEIVED
FEB 23 2009
SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

Attachments

cc (w/att/CD): Larry Frost – NCDENR, Asheville Office Ted Manes

cc (w/att): Bill McCabe Ken Daly, S&ME, Inc. Andy Tinsley

S&ME

Celebrating 35 Years
1973 • 2008

February 18, 2009

Duke Energy
526 South Church St.
EC13K
Charlotte, North Carolina 28202

Attention: Mr. Chris Hallman, P.E.

Reference: **Engineering Stability Analyses Summary**
Retired Ash Basin (RAB) – Ash Landfill
Duke Energy - Allen Steam Station, Belmont, NC
S&ME Project No. 1356-06-825

Dear Mr. Hallman:

S&ME Inc., (S&ME) prepared this letter to summarize the engineering stability analyses conducted supporting the proposed Retired Ash Basin (RAB) Ash Landfill at Duke Energy's Allen Steam Station. We prepared this letter in response to your request for information on the stability analyses to be provided to the North Carolina Department of Environment and Natural Resources (NCDENR). We understand that there has been a recent interest in the stability of the proposed landfill development in light of a recent wet ash impoundment failure in Tennessee.

We are providing a concise project overview, site characterization description, and summary of stability analyses and results previously submitted to NCDENR. This information was originally provided in the following reports:

> "Site Suitability Study, Retired Ash Basin (RAB) - Landfill, Duke Energy – Allen Steam Station, Belmont, North Carolina, S&ME Project No. 1356-06-825." dated August 31, 2007, revised October 31, 2007; and
>
> "Engineering Plan, Retired Ash Basin (RAB) – Ash Landfill, Allen Steam Station, Belmont, North Carolinas, S&ME project No. 1356-06-825." Dated March 21, 2008.

Background

The proposed landfill is located on the eastern portion of the Allen Steam Station property to the south of the steam station itself, and within the footprint of the RAB. The general site location is illustrated on a topographic map in Figure 1 and an aerial

photograph in Figure 2. The ash basin was retired in the 1970's when the active ash basin to the south of the proposed landfill area was developed and put into service.

The RAB is bound to the north, east, south, and west by earthen dikes. Adjacent to the RAB to the north is the Station's coal pile. The Catawba River is located to the east. Adjacent to the RAB to the south is the existing active ash basin, and to the west is a structural fill (permitted with the NCDENR Division of Water Quality). Ground surface elevations around the RAB range from approximately 640 feet at the northern perimeter to about 620 feet within and to the south of the RAB. The RAB contains fly and bottom ash ranging in thickness from approximately 15 to 55 feet.

With a top elevation of about 625 feet and a toe elevation of about 580 feet, the east RAB dike is approximately 45 feet in height. The east RAB dike has estimated 2 horizontal to 1 vertical side slopes. The east RAB dike is buttressed by a fill area where rail lines are located. The rail lines separate the east RAB dike from the Catawba River. The south RAB dike is shared with the active ash basin to the south. From the general RAB surface (at an approximate 620 foot elevation) the south RAB dike extends approximately 25 feet in height with a top elevation of approximately 645 feet.

Geotechnical Exploration

S&ME conducted a geotechnical exploration to characterize and evaluate geotechnical conditions at the site. The exploration included numerous soil test borings and Cone Penetration Test (CPT) soundings to measure in-situ conditions, interpret subsurface stratigraphy, characterize hydrogeologic conditions, and collect samples for characterization and laboratory testing. A detailed summary of this characterization is provided in the Site Suitability Study (S&ME, 2007). Results of this evaluation were used to develop material parameters and stratigraphy for the engineering analyses presented in the Engineering Plan (S&ME, 2008).

Engineering Stability Analyses

Engineering stability analyses including slope stability, settlement analyses, and liquefaction potential were conducted to evaluate and design the proposed facility. Slope stability analyses included global slope stability analyses, liner system stability analyses, and cover system stability analyses. Of the slope stability analyses, global slope stability analyses are further summarized, as we believe they are more relevant to NCDENR's request. In addition, settlement analyses and liquefaction potential evaluations are also summarized.

Global Slope Stability

Global slope stability analyses were performed, and considered potential deep seated circular failure surfaces passing through the waste fill and the underlying foundation materials. Global slope stability of two cross sections, one in the north-south direction and the other in the east-west direction, was analyzed. The north-south cross section passes through the south RAB dike and represents slope stability from the proposed landfill through the south RAB dike toward the active ash basin. The east-west cross section passes through the east RAB dike and characterizes slope stability from the

proposed landfill, through the east dike, and through underlying foundation materials to the Catawba River.

For each cross section, three conditions were analyzed: construction (active operations) static, post-construction (final configuration) static, and post-construction (final configuration) pseudo-static conditions. Results indicate that the proposed landfill satisfies minimum design criteria. Static slope stability analyses results for construction (active operations) conditions indicate factors of safety greater than 1.3. Static slope stability analyses results for post-construction (final configuration) conditions indicate factors of safety greater than 1.5. Pseudo-static analyses for post-construction (final configuration) conditions indicate the landfill can tolerate ground accelerations greater than those imposed by the design seismic event. Global slope stability analyses are provided in detail in the Engineering Plan (S&ME, 2008), Appendix II, and attached to this letter in electronic format.

Settlement Analyses

Settlement was analyzed for the post-construction (final configuration) condition to evaluate post settlement liner system conditions and performance. Analyses were conducted using three-dimensional surfaces of the layers of interest (i.e. final cover grades, liner system grades, and subsurface stratigraphy). Material properties were based on results of the geotechnical evaluation.

Results of the analyses indicate settlement up to 6 to 7 feet. Based on our analyses, the 4 foot minimum vertical separation between the liner system base and the seasonal high groundwater table is maintained. Also, the results indicate that liner system post settlement slopes greater than 2 percent are maintained. In addition, results of analyses indicate that liner system strain is within acceptable limits. The settlement analyses are provided in the Engineering Plan (S&ME, 2008), Appendix II, and attached to this letter in electronic format.

To further evaluate settlement, a full scale instrumented test fill was designed, constructed, and monitored. Results of the test fill monitoring indicate that actual settlement is less than (by about half) the settlement calculated using the material properties assumed for the design. Therefore we expect actual settlement will be less than the design estimates.

Liquefaction Potential

Data from the geotechnical exploration was used to evaluate the liquefaction potential of the existing RAB ash underlying the landfill subgrade. A liquefaction factor of safety was estimated by comparing the cyclic stress ratio induced by a seismic event to the cyclic resistance ratio of subgrade soils estimated from CPT data. Analysis was conducted for post-construction (final configuration) conditions. Results indicate factors of safety against liquefaction greater than the design criteria of 1.0 for the post-construction (final configuration) condition. The liquefaction potential analyses are provided in the Engineering Plan (S&ME, 2008), Appendix II, and attached to this letter in electronic format.

Closing

It is our opinion that the geotechnical exploration work adequately characterizes the RAB conditions and materials used in support of our engineering analyses. The various engineering analyses conducted, and in particular the global slope stability analyses summarized herein, address stability of the proposed landfill and surrounding dikes. Results of these analyses indicate the proposed landfill and surrounding dikes are stable for the various design conditions analyzed. Furthermore, analyses summarized herein indicate that the proposed landfill development can tolerate estimated settlement and has acceptable factors of safety against liquefaction for the design seismic event.

S&ME hopes this information is responsive to your request. Please contact us if you have questions or require additional information.

Sincerely,

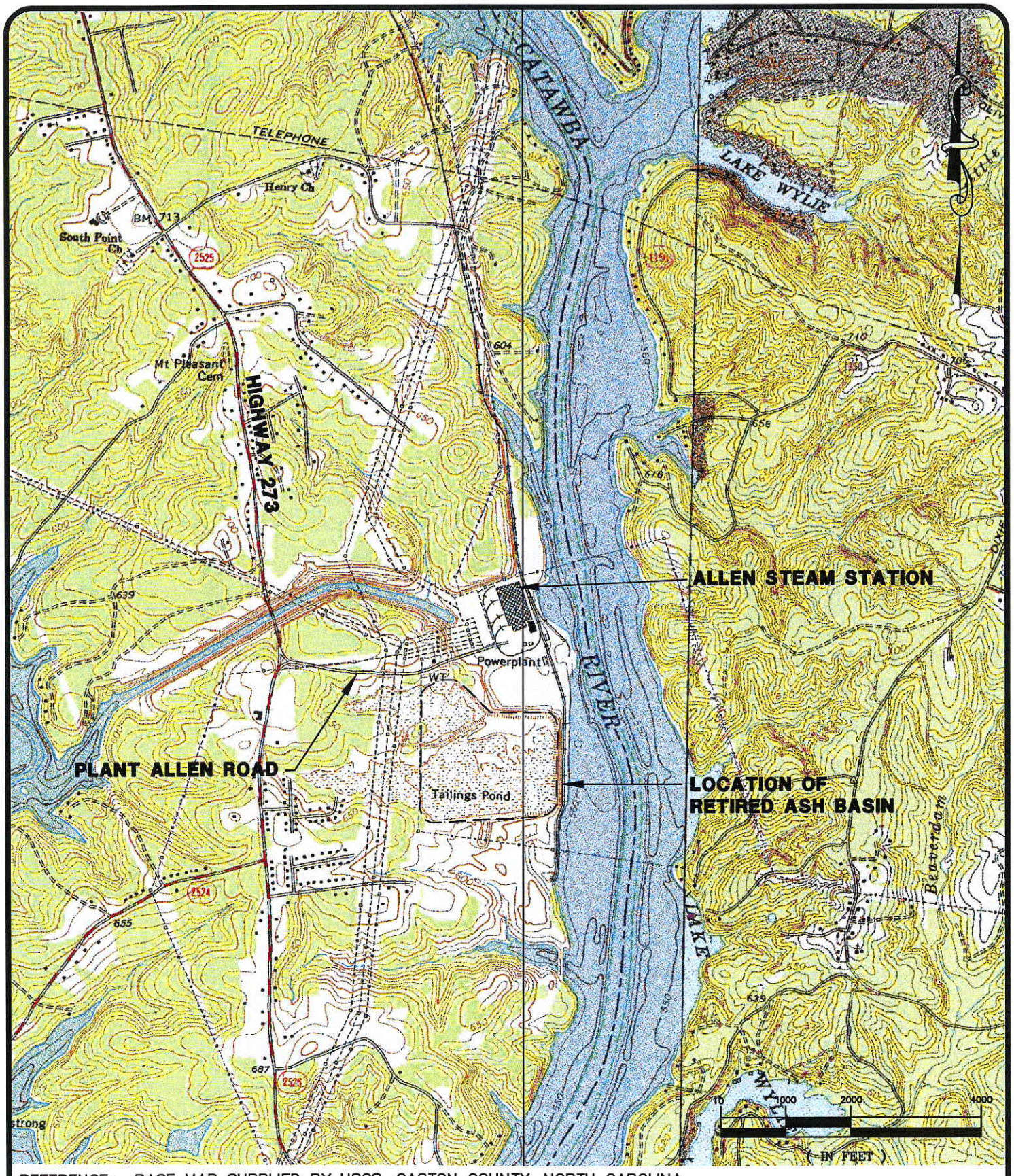
S&ME, Inc.

Ken Daly, P.E.
Senior Project Engineer

Jason S. Reeves, P.E.
Senior Reviewer

Attachments: Figures 1 and 2
CD with: Global Slope Stability Calculation; Settlement Calculation; Liquefaction Potential Analyses

Cc: Ted Manes, Duke Energy



REFERENCE: BASE MAP SUPPLIED BY USGS, GASTON COUNTY, NORTH CAROLINA

SCALE:	AS SHOWN
DATE:	03-12-07
DRAWN BY:	JID
PROJECT NO:	1356-06-825

S&ME
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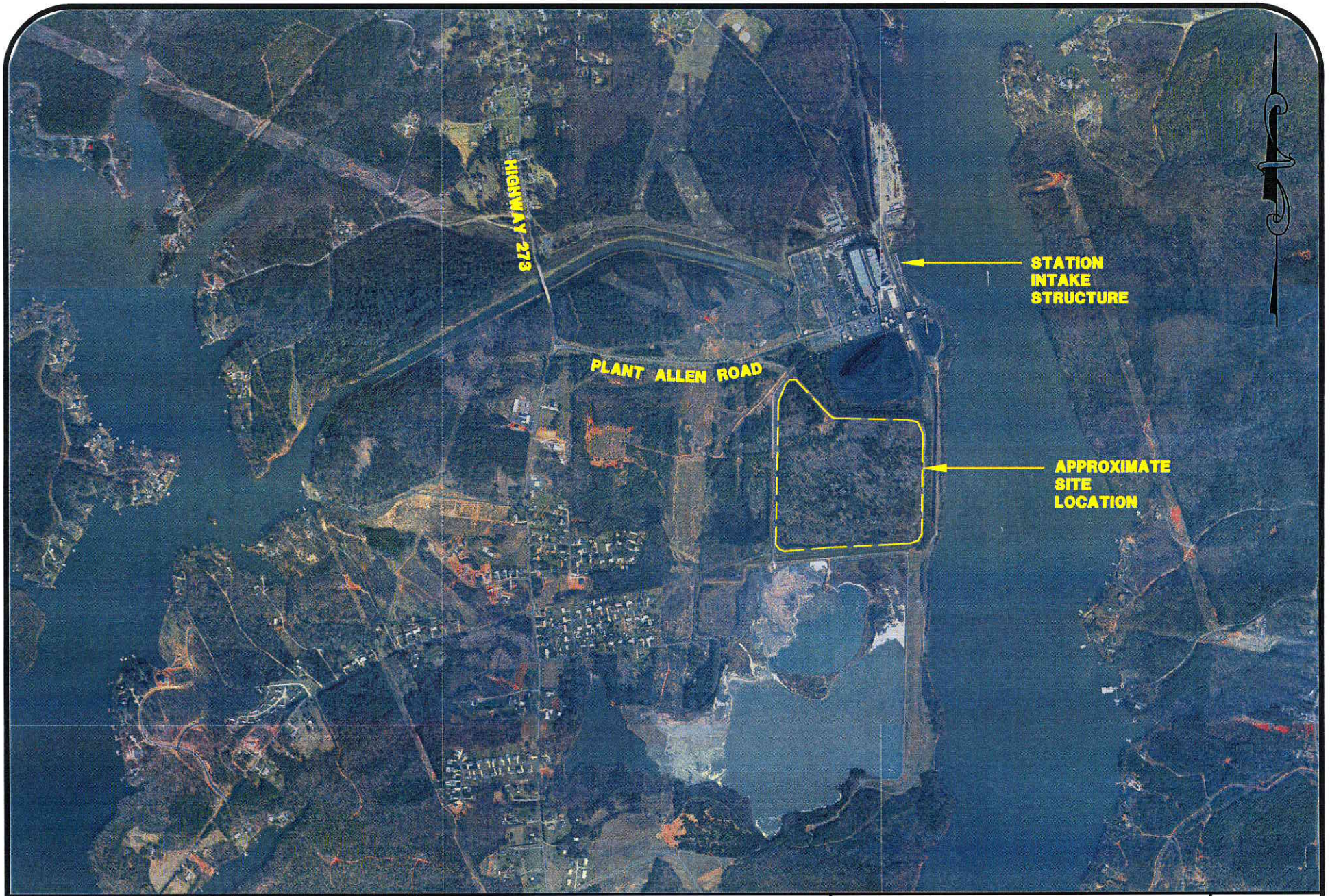
SITE LOCATION MAP
USGS TOPO
ALLEN STEAM STATION–RETIRED ASH BASIN
BELMONT, NORTH CAROLINA

FIGURE NO.
1



SCALE: 1"=1500'	DATE: 03-12-07	S&ME WWW.SMEINC.COM	**SITE LOCATION AERIAL**	FIGURE NO.
PROJECT NO. 1356-06-825	DRAWN BY: JID		ALLEN STEAM STATION-RETIRED ASH BASIN BELMONT, NORTH CAROLINA	2
	CHECKED BY:			

S&ME

PROJECT NO. 1356-06-825

SHEET NO. 1 / 12

DATE March 5, 2008

JOB NAME Duke Energy – Allen Steam Station Ash Landfill

COMPUTED BY CHR

SUBJECT Settlement Calculation

CHECKED BY KB

COMPUTATIONS BY:

Signature Cedric Ruhl

Date 3·5·08

Name Cedric Ruhl, E.I.

Title Staff Professional

ASSUMPTIONS AND PROCEDURES CHECKED BY:

Signature Kenneth R. Daly

Date 3·5·08

Name Kenneth Daly, P.E.

Title Sr. Project Engineer

COMPUTATIONS CHECKED BY:

Signature Kyle Baucom

Date 3/5/08

Name Kyle Baucom, E.I.

Title Staff Professional

REVIEWED BY:

Signature Kenneth R. Daly

Date 3·5·08

Name Kenneth Daly, P.E.

Title Sr. Project Engineer

REVIEW NOTES / COMMENTS:

OBJECTIVE:

The objective of this calculation package is to evaluate the settlement of the proposed ash landfill over the retired ash basin (RAB) at Duke Energy's Allen Steam Station. This calculation will discuss primary settlement, time of average consolidation, secondary settlement, and liner strain due to settlement.

BACKGROUND:

Duke Energy is proposing to develop a new ash landfill over the RAB which consists of 15 to 55 feet of sluiced fly and bottom ash. The RAB ash is generally underlain by saprolite, partially weathered rock, and bedrock. Site characterization activities indicate that the RAB ash consists of interbedded layers of fine and coarse grain ash. Laboratory test results of ash samples (S&ME, 2007) indicate that the majority of the ash samples classify as a non-plastic silt (ML) according to the unified soil classification system (USCS) while some samples classify as a silty sand (SM). Laboratory test results of saprolite samples indicate a material that classifies as a non-plastic silt (ML) according to USCS.

METHOD:

Soil settlement characteristics are dependent on the soil type and previous soil loading conditions. Understanding that the RAB ash was placed by human activities and no loading and/or unloading of the ash is known to have occurred, the RAB ash was assumed to be normally consolidated. The underlying saprolite was also assumed to be normally consolidated. The materials below the saprolite (partially weathered rock and bedrock) were considered relatively incompressible in comparison to the RAB ash and saprolite. As the RAB ash and underlying saprolite classify predominantly as fine-grained silty soils, one-dimensional consolidation theory was used to evaluate primary and secondary settlement.

Primary Settlement

Primary settlement occurs due to increases in effective overburden stress, such as during fill placement, and may be estimated based on the following equation:

$$s_c = C_{c\varepsilon} H_o \log \frac{\sigma'_{v0} + \Delta\sigma}{\sigma'_{v0}}$$ [Ref. 1, Eq. 8-11]

Where: s_c = primary settlement due to consolidation

$C_{c\varepsilon}$ = modified compression index $= \dfrac{C_c}{1+e_0}$ [Ref. 1, Eq. 8-9]

C_c = compression index
e_0 = initial void ratio
H_0 = initial height
σ'_{v0} = initial effective overburden pressure
$\Delta\sigma$ = change in effective overburden pressure

and

$$C_c = \frac{e_1 - e_2}{\log(\sigma_2') - \log(\sigma_1')}$$ [Ref. 1, Eq. 8-7]

Where: e_1 = void ratio at load 1
e_2 = void ratio at load 2
σ'_1 = effective stress at load 1
σ'_2 = effective stress at load 2

Time of Average Consolidation

Consolidation is a time-dependent process. The time for an average percentage of consolidation to occur may be estimated by the following equation:

$$t = \frac{TH_{dr}^2}{c_v}$$ [Ref. 1 Eq. 9-5]

Where: t = time to a percentage of consolidation
T = time factor
H_{dr} = length of the longest drainage path
c_v = coefficient of consolidation

Secondary Settlement

Unlike primary settlement, secondary settlement occurs at a constant effective overburden stress and is time-dependent. Secondary settlement, also called creep strain, may be estimated based on the following equation:

$$s_s = C_{\alpha\varepsilon} H_0 \log\left(\frac{t_2}{t_1}\right)$$ [Ref. 1 Eq. 9-19]

Where: s_s = time-dependent secondary settlement
$C_{\alpha\varepsilon}$ = modified secondary compression index $= \frac{C_\alpha}{1+e_p}$ [Ref. 1, Eq. 9-16]
C_α = secondary compression index
e_p = void ratio at the end of primary consolidation
H_0 = initial height
t_1 = time to primary consolidation
t_2 = time of interest (design life)

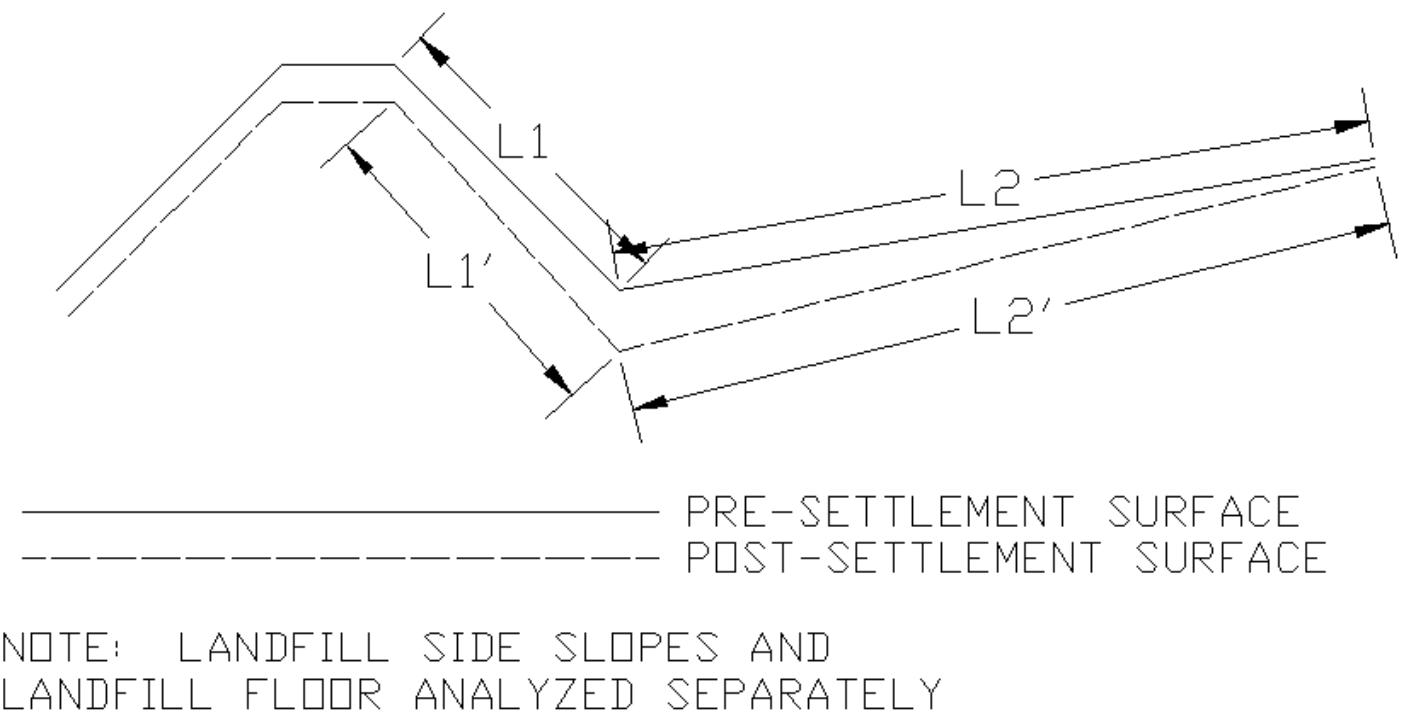
and

$$C_\alpha = \frac{e_1 - e_2}{\log(t_2) - \log(t_1)}$$ [Ref. 1, Eq. 9-15]

Where: e_1 = void ratio at dial reading 1
e_2 = void ratio at dial reading 2
t_1 = time at dial reading 1
t_2 = time at dial reading 2

Liner Strain

As the material underlying the liner system settles, the liner system will need to stretch to conform to the bottom of the landfill. A simplified sketch of pre- and post-settlement is shown below:



Strain is defined by the following equation:

$$\varepsilon = \frac{\Delta l}{l_0}$$

Where: ε = strain
Δl = L1 – L1' OR L2 - L2'
l_0 = initial length = L1 OR L2

DESIGN CRITERIA:

Consistent with North Carolina solid waste rules the following design criteria were used for evaluating post settlement liner system conditions of the proposed RAB ash landfill:

- maintain slopes greater than or equal to 2 percent before and after settlement; and
- maintain a four (4) foot vertical separation between the liner system base and the seasonal high groundwater table.

Consistent with standard industry practice, the amount of liner system strain caused by settlement was considered acceptable to a maximum of 5% [Ref. 3].

MATERIAL PARAMETERS:

Eight consolidation tests were conducted on relatively undisturbed RAB ash samples. Four samples were recovered using the Shelby tube method, the remaining four samples were recovered using the fixed-piston sampling method. The fixed-piston sampling method is generally considered to yield higher quality samples than the Shelby tube method. Compression index values for the 8-16 ksf loading range were chosen for analysis because post-construction loading conditions are anticipated to fall within this range. Unit weight results are summarized in Tables 1 and 2, consolidation test results are summarized in Tables 3 and 4.

Table 1: Ash Unit Weights

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	Unit Weight (pcf)
B-33 ST-5	26	dark gray clayey silt	piston	Raleigh	98.8
B-33 ST-5	26.2	dark gray silty f. to m. sand	piston	Raleigh	104.0
B-32 ST-6	31.2	gray silt with trace of sand	piston	Raleigh	103.5
B-32 ST-2	9.5-11.5	fly ash	piston	Charlotte	114.0
B-6	20-22	gray fine sandy silt	shelby tube	Charlotte	89.8
OW-12	15-17	gray silty f. to c. sand	shelby tube	Charlotte	94.1
OW-18	8.5-10.5	gray clayey silt	shelby tube	Charlotte	91.7
OW-19	40-42	gray sandy silty clay	shelby tube	Charlotte	120.0

mean	102.0
median	101.2
standard deviation	10.7

Table 2: Saprolite Unit Weights

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	Unit Weight (pcf)
B-6	76-77	tan and white m. to f. sandy silt w/ mica	shelby tube	Charlotte	114.6
OW-8	20-22	reddish tan and white micaceous sandy silt	shelby tube	Charlotte	82.5
B-24	40-42	brown white tan silty m. to f. sand w/ mica	shelby tube	Charlotte	114.6

mean	103.9
median	114.6
standard deviation	18.5

For the purposes of analysis, a unit weight of 90 pcf was used for ash and a unit weight of 110 was used for saprolite.

Table 3: Ash $C_{c\varepsilon}$ Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_c (8-16 ksf)	e_o	$C_{c\varepsilon}$ (8-16 ksf)
B-33 ST-5	26	dark gray clayey silt	piston	Raleigh	0.240	1.070	0.116
B-33 ST-5	26.2	dark gray silty f. to m. sand	piston	Raleigh	0.111	0.658	0.067
B-32 ST-6	31.2	gray silt with trace of sand	piston	Raleigh	0.081	0.906	0.042
B-32 ST-2	9.5-11.5	fly ash	piston	Charlotte	0.183	1.300	0.080
B-6	20-22	gray fine sandy silt	shelby tube	Charlotte	0.123	1.466	0.050
OW-12	15-17	gray silty f. to c. sand	shelby tube	Charlotte	0.089	1.057	0.043
OW-18	8.5-10.5	gray clayey silt	shelby tube	Charlotte	0.213	1.170	0.098
OW-19	40-42	gray sandy silty clay	shelby tube	Charlotte	0.166	0.718	0.097

All Samples	mean	0.151	1.043	0.074
	median	0.145	1.063	0.073
	standard deviation	0.059	0.276	0.028
Piston Samples	mean	0.154	0.984	0.076
	median	0.147	0.988	0.073
	standard deviation	0.072	0.270	0.031
Shelby Tube Samples	mean	0.148	1.103	0.072
	median	0.145	1.114	0.073
	standard deviation	0.054	0.309	0.029

The mean, median, and standard deviation among the sample varieties were consistent. A $C_{c\varepsilon}$ value of 0.1 was used during settlement analysis, generally corresponding with the median plus one standard deviation.

Four consolidation tests were conducted on relatively undisturbed saprolite. The saprolite samples were recovered using the Shelby tube method. Consolidation test results are summarized in Table 4.

Table 4: Saprolite $C_{c\varepsilon}$ Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_c (8-16 ksf)	e_o	$C_{c\varepsilon}$ (8-16 ksf)
B-6	**76-77**	tan and white m. to f. sandy silt w/ mica	shelby tube	Charlotte	0.110	0.578	0.070
OW-8	**20-22**	reddish tan and white micaceous sandy silt	shelby tube	Charlotte	0.308	1.110	0.146
B-24	**40-42**	brown white tan silty m. to f. sand w/ mica	shelby tube	Charlotte	0.131	0.787	0.073
				mean	0.183	0.825	0.096
				median	0.131	0.787	0.073
				standard deviation	0.109	0.268	0.043

The $C_{c\varepsilon}$ value for the OW-series boring was twice as high as the $C_{c\varepsilon}$ value for the B-series borings, skewing the statistical data and greatly increasing the standard deviation. A $C_{c\varepsilon}$ value of 0.12 was used during settlement analysis, generally corresponding with the median plus one standard deviation.

Secondary compression indices were also estimated from the consolidation tests; results are presented in Tables 5 and 6.

Table 5: Ash $C_{\alpha\varepsilon}$ Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_α (16 ksf)	e_o	$C_{\alpha\varepsilon}$ (16 ksf)
B-33 ST-5	26	dark gray clayey silt	piston	Raleigh	0.0043	1.0699	0.0021
B-33 ST-5	26.2	dark gray silty f. to m. sand	piston	Raleigh	0.0018	1.0699	0.0009
B-32 ST-6	31.2	gray silt with trace of sand	piston	Raleigh	0.0018	1.0699	0.0008
B-32 ST-2	9.5-11.5	fly ash	piston	Charlotte	0.0037	0.6584	0.0022
B-6	20-22	gray fine sandy silt	shelby tube	Charlotte	0.0025	0.6584	0.0015
OW-12	15-17	gray silty f. to c. sand	shelby tube	Charlotte	0.0019	0.6584	0.0011
OW-18	8.5-10.5	gray clayey silt	shelby tube	Charlotte	0.0068	0.9059	0.0036
OW-19	40-42	gray sandy silty clay	shelby tube	Charlotte	0.0045	0.9059	0.0024
				mean	0.0034	0.8746	0.0018
				median	0.0031	0.9059	0.0018
				standard deviation	0.0018	0.1915	0.0009

Table 6: Saprolite $C_{\alpha\varepsilon}$ Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_α	e_o	$C_{\alpha\varepsilon}$
B-6	**76-77**	tan and white m. to f. sandy silt w/ mica	shelby tube	Charlotte	0.0026	0.578	0.0017
OW-8	**20-22**	reddish tan and white micaceous sandy silt	shelby tube	Charlotte	0.0083	1.110	0.0039
B-24	**40-42**	brown white tan silty m. to f. sand w/ mica	shelby tube	Charlotte	0.0022	0.787	0.0013

mean	0.0044	0.825	0.0024
median	0.0026	0.787	0.0015
standard deviation	0.0034	0.268	0.0027

Modified secondary compression indices of 0.0018 for ash and 0.0024 for saprolite, generally corresponding with the mean value for each material, were used during settlement analysis.

Coefficient of consolidation parameters for each material are summarized in Tables 7 and 8.

Table 7: Ash C_v Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_v (16 ksf) (ft^2/day)
B-33 ST-5	26	dark gray clayey silt	piston	Raleigh	2.9310
B-33 ST-5	26.2	dark gray silty f. to m. sand	piston	Raleigh	3.4180
B-32 ST-6	31.2	gray silt with trace of sand	piston	Raleigh	3.4420
B-32 ST-2	9.5-11.5	fly ash	piston	Charlotte	4.5600
B-6	20-22	gray fine sandy silt	shelby tube	Charlotte	2.3900
OW-12	15-17	gray silty f. to c. sand	shelby tube	Charlotte	2.0600
OW-18	8.5-10.5	gray clayey silt	shelby tube	Charlotte	1.8800
OW-19	40-42	gray sandy silty clay	shelby tube	Charlotte	1.2000

mean	2.7351
median	2.6605
standard deviation	1.0689

Table 8: Saprolite C_v Values

Sample	Depth (feet)	Material Description	Sampling Method	Laboratory Location	C_v (16 ksf) (ft^2/day)
B-6	76-77	tan and white m. to f. sandy silt w/ mica	shelby tube	Charlotte	1.3200
OW-8	20-22	reddish tan and white micaceous sandy silt	shelby tube	Charlotte	Not Taken
B-24	40-42	brown white tan silty m. to f. sand w/ mica	shelby tube	Charlotte	1.8000

mean	1.5600
median	1.5600
standard deviation	0.3394

Coefficient of consolidation parameters of 2.7 ft^2/day for ash and 1.6 ft^2/day for saprolite, generally corresponding with the mean and median, were used during analysis.

The material parameters used during settlement analysis are summarized in Table 9.

Table 9: Material Parameters Summary

Material	Unit Weight (pcf)	$C_{c\varepsilon}$ (8-16 ksf)	$C_{\alpha\varepsilon}$ (16 ksf)	C_v (16 ksf) (ft^2/day)
Ash	90	0.10	0.0018	2.7
Saprolite	110	0.12	0.0024	1.6

CALCULATIONS:

Primary settlement:

Primary settlement was evaluated using the primary consolidation formula [Ref. 1, Eq. 8-11] coded into geographic information system (GIS) software. Using GIS software allowed the settlement evaluation to be conducted using three-dimensional surfaces. Specifically, the proposed cover system grading plan, liner system grading plan, bottom of ash, top of partially weathered rock, top of bedrock, and long term seasonal high groundwater contours were imported into GIS software. These grading plans and contour maps are illustrated in Figures 1 through 6. Once these grading plans or contour maps were imported into GIS, a raster (or grid) with cell sizes of one foot by one foot was generated. Next the depth to groundwater and thicknesses of the waste fill, retired ash basin (RAB) ash, and saprolite was calculated at each grid point. The calculated layer thicknesses were used to compute the initial effective overburden pressure. The stress increase caused by the placement of the new ash was computed using a one-dimensional analysis. The layer thicknesses, the initial and final stresses, and the properties listed in Table 9 were used to calculate the settlement at each grid point.

The time to 90% consolidation was also calculated for generalized strata thicknesses and parameters. Assuming fifty feet of doubly-drained RAB ash, the time to 90% consolidation is calculated in Table 10.

Table 10: 90% Consolidation

Material	Percent Consolidated	T [Ref. 1, Table 9-1]	H_{dr} (feet)	C_v (ft^2/day)	t (years)
Ash	90	0.848	25	2.7	0.54

The time to 90% consolidation is estimated to be on the order of six months. We believe this is conservative because the RAB ash is interbedded with fine and coarse layers, therefore the actual drainage distance may be smaller than 25 feet.

Secondary settlement:

Secondary (creep) settlement was calculated for generalized strata thicknesses and parameters in Table 11.

Table 11: Typical Secondary Settlement

Secondary Consolidation - Ash					Secondary Consolidation - Saprolite					Total Secondary Consolidation $\{S_s\}$ (in)
$C_{\alpha\varepsilon}$	H (feet)	t (years)	t_{90} (years)	$S_{s,ash}$ (in)	$C_{\alpha\varepsilon}$	H (feet)	t (years)	t_{90} (years)	$S_{s,saprolite}$ (in)	
0.0018	50	30	0.54	1.88	0.0024	60	30	0.54	3.01	**4.90**

Secondary settlement was found to be small in comparison to the primary settlement; therefore secondary settlement was not included during the total settlement calculation.

Liner System Strain:

Pre-settlement liner lengths were compared to post-settlement lengths for eight sections, as shown in Figure 10. Settlements and resultant liner strain are calculated in the table below.

Table 12: Liner Strain

Section	Pre-Settlement				Post-Settlement				Strain (%)
	Elevation 1 (feet)	Elevation 2 (feet)	Horizontal Length (feet)	Slope Length (feet)	Elevation 1 (feet)	Elevation 2 (feet)	Horizontal Length (feet)	Slope Length (feet)	
L3B	644.00	620.00	73.59	77.40	643.52	615.04	73.59	78.91	1.94
L3A	638.10	618.00	555.66	556.02	633.61	611.27	555.66	556.11	0.02
L1A	642.00	630.03	493.49	493.64	637.78	624.48	493.49	493.67	0.01
L1B	631.96	625.50	26.93	27.70	631.56	622.92	26.93	28.29	2.12
L2A	630.12	618.00	474.44	474.60	623.58	612.84	474.44	474.57	-0.01
L2B	622.08	616.01	28.03	28.68	621.44	613.53	28.03	29.12	1.55
L4A	630.00	622.00	311.96	312.06	623.46	616.92	311.96	312.03	-0.01
L4B	633.95	619.11	46.18	48.50	633.31	615.84	46.18	49.37	1.79

For each cross-section, the calculated strain was below 5%, meeting design specifications.

RESULTS and CONCLUSIONS:

Using GIS software, the results of the settlement evaluation are reported on a settlement contour map provided as Figure 7. Results indicate maximum estimated settlements on the order of 7 to 8 feet. A spreadsheet validation of the GIS software analysis is provided in Attachment 1.

The estimated settlement was subtracted from the proposed liner system grading plan to generate a post settlement liner system contour map as illustrated in Figure 8. The post settlement liner system contour map was evaluated using GIS software to identify post settlement slopes. The post-settlement liner system slopes are illustrated in Figure 9. Review of the post-settlement liner system slopes indicate that the slopes meet or exceed the 2 percent post settlement design criteria.

Estimated long-term seasonal high groundwater elevations (S&ME, 1997) are illustrated on the post settlement liner system contour map provided in Figure 8. Review of Figure 8 indicates a minimum vertical separation of approximately 4 feet between the liner system base and the long-term seasonal high groundwater table.

The strain on the geomembrane due to settlement was calculated to be between 0.00% and 2.68%, less than the 5% allowable strain.

Based on the analyses and results reported in this calculation package the proposed RAB ash landfill can tolerate settlements on the order of 7 to 8 feet while maintaining required post settlement liner system slopes, vertical separation from estimated long-term seasonal high groundwater, and acceptable liner system strains.

REFERENCES:

1. "An Introduction to Geotechnical Engineering", Robert D. Holtz, 1981.

2. "Site Suitability Study – Retired Ash Basin (RAB) Landfill – Belmont, North Carolina", S&ME, 2007.

3. "Geomembrane Liner Durability: Contributing Factors and the Status Quo", Ian D. Peggs, http://www.geosynthetica.net/tech_docs/IDPigsUKpaper.pdf

ATTACHMENT 1 – GIS MODEL & SPREADSHEET VALIDATION

Point No.	RAB Ash thickness, H (ft)	Ash Fill Thickness (ft)	Subrade to GW (ft)	Existing Grade to GW	Saprolite Thickness	Landfill Overburden (psf)	Initial Vertical Effective Stress (Ash) (psf)	Ash Settlement (ft)	Initial Vertical Effective Stress (Saprolite) (psf)	Saprolite Settlement (ft)	Spreadsheet Total Settlement (ft)		GIS Model Total Settlement
1	30.90	123.01	28.58	15.92	43.08	11,070.90	2559.23	2.24	4010.95	2.97	5.22		5.22
2	63.38	108.77	28.02	20.79	20.00	9,789.30	2822.64	4.12	4173.28	1.26	5.38		5.37
3	50.00	136.15	23.28	14.58	23.78	12,253.50	2382.79	3.94	3638.76	1.83	5.77		5.77
4	42.13	102.13	18.67	12.48	33.28	9,191.70	1917.25	3.21	3290.70	2.31	5.53		5.53
5	42.04	164.00	44.87	16.85	37.12	14,760.00	4153.39	2.77	5617.00	2.49	5.26		5.26
6	52.78	36.32	12.65	7.42	31.75	3,268.80	1662.07	2.49	3146.09	1.18	3.67		3.67
7	52.11	74.67	15.90	8.01	30.91	6,720.30	1929.04	3.40	3383.82	1.76	5.16		5.16
8	17.02	83.87	12.39	30.39	58.98	7,548.30	511.21	2.04	2149.81	4.63	6.67		6.67

To verify the spreadsheet calculation with the GIS software analysis, point No. 1 will be chosen for all calculation purposes. The total settlement from the spreadsheet was simply the summation of the total ash settlement and the total saprolite settlement. Therefore, the primary settlement equation below had to be applied to each material.

$$s_c = C_{c\varepsilon} H_o \log\left(\frac{\sigma'_{v0} + \Delta\sigma}{\sigma'_{v0}}\right)$$

s_c = primary settlement due to consolidation
$C_{c\varepsilon}$ = modified compression index
H_0 = initial height
σ'_{v0} = initial effective overburden pressure
$\Delta\sigma$ = change in effective overburden pressure

Before the settlement could be determined, the initial effective overburden pressure for each material and the change in effective overburden pressure due to fill had to be calculated. The change in effective overburden pressure was a result of the ash fill placed on top of the retired ash basin. This effective overburden pressure may be calculated by the following equation:

$$\Delta\sigma = \gamma_{ash}(Ash\ Fill\ Thickness)$$

The dry unit weight of ash was assumed to be 90 pcf while the ash fill thickness at point No. 1 was 123.01 feet. With these values known, they can be plugged into the equation to solve for the change in effective overburden pressure.

$$\Delta\sigma = \left(90\frac{lb}{ft^3}\right)(123.01\,ft) = 11070.90\frac{lb}{ft^2}$$

This change in effective overburden pressure can be applied to the primary settlement equation for both ash and saprolite.

The initial effective overburden pressure for both ash and saprolite then needs to calculated. These pressures can be calculated using the equations below:

$$\sigma'_{v0(ash)} = (\gamma_{ash} * Subgrade\ to\ GW) + \left[\left(\frac{RAB\ Ash\ Thickness}{2} - Existing\ Grade\ to\ GW\right)(\gamma_{ashbuoyant})\right]$$

$$\sigma'_{v0(saprolite)} = (\gamma_{ash} * Subgrade\ to\ GW) + \left[(RAB\ Ash\ Thickness - Existing\ Grade\ to\ GW)(\gamma_{ash\ buoyant})\right] + \left[\left(\frac{Saprolite\ Thickness}{2}\right)(\gamma_{saprolite\ buoyant})\right]$$

The unit weights can be found in the following table. With these unit weights and the thicknesses from subgrade to groundwater, existing grade to groundwater, RAB ash thickness, and saprolite thickness from the previous table, the initial effective overburden pressure can be found for both ash and saprolite.

Ash Unit Weight	90 pcf
Saprolite Unit Weight	110 pcf
Water Unit Weight	62.4 pcf
Ash Bouyant Unit Weight	27.6 pcf
Saprolite Bouyant Unit Weight	47.6 pcf

$$\sigma'_{v0(ash)} = \left[\left(90\frac{lb}{ft^3} * 28.58\,ft\right)\right] + \left[\left(\frac{30.90\,ft}{2} - 15.92\,ft\right)\left(27.6\frac{lb}{ft^3}\right)\right] = 2{,}559.23\frac{lb}{ft^2}$$

$$\sigma'_{v0(saprolite)} = \left[\left(90\frac{lb}{ft^3} * 28.58\,ft\right)\right] + \left[(30.90\,ft - 15.92\,ft)\left(27.6\frac{lb}{ft^3}\right)\right] + \left[\left(\frac{43.08\,ft}{2}\right)\left(47.6\frac{lb}{ft^3}\right)\right] = 4{,}010.95\frac{lb}{ft^2}$$

With the change in effective overburden pressure due to the placement of fill and the initial effective overburden pressures known for both ash and saprolite, the settlement for each material can be determined. The modified compression indices are 0.1 for ash and 0.12 for saprolite. With these known values, they can be plugged into the primary settlement equation as follows:

$$s_{c\ ash} = C_{c\varepsilon\ ash}(RAB\ Ash\ Thickness)\log\left(\frac{\sigma'_{v0\,ash} + \Delta\sigma}{\sigma'_{v0\,ash}}\right)$$

$$s_{c\ ash} = (0.1)(30.90\ ft)\log\left(\frac{2{,}559.23\frac{lb}{ft^2} + 11{,}070.90\frac{lb}{ft^2}}{2{,}559.23\frac{lb}{ft^2}}\right) = 2.24\ ft$$

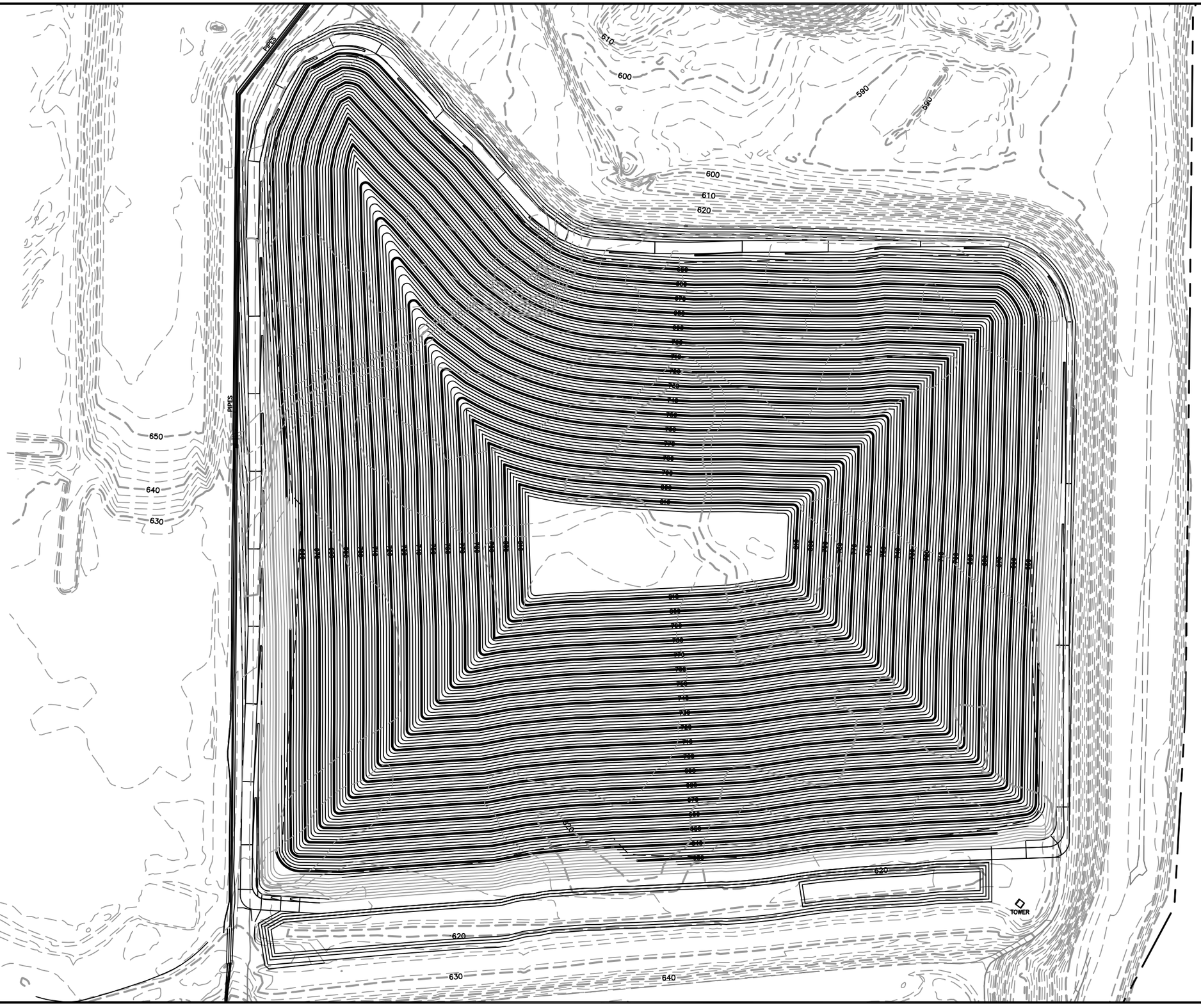
$$s_{c\ saprolite} = C_{c\varepsilon\ saprolite}(Saprolite\ Thickness)\log\left(\frac{\sigma'_{v0\,saprolite} + \Delta\sigma}{\sigma'_{v0\,saprolite}}\right)$$

$$s_{c\ saprolite} = (0.12)(43.08\ ft)\log\left(\frac{4{,}010.95\frac{lb}{ft^2} + 11{,}070.90\frac{lb}{ft^2}}{4{,}010.95\frac{lb}{ft^2}}\right) = 2.97\ ft$$

With the settlement for each material known, the total settlement is a simple summation of the two settlements.

$$s_{c\ total} = s_{c\ ash} + s_{c\ saprolite} = 2.24\ ft + 2.97\ ft = 5.21\ ft$$

This calculated value is equal to the settlement predicted by the GIS software.



CATAWBA RIVER

FLOW DIRECTION

LEGEND

- EXISTING GRADE CONTOUR
- PROPOSED GRADE CONTOUR (SEE NOTE 1)
- PERIMETER BERM CONTOUS

NOTE:

1. FINAL CLOSURE GRADES SHOWN REPRESENT TOP OF FINAL COVER CONTOUR.

REFERENCE:
TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON APRIL 2, 2006. PROVIDED BY NOVA SURVEYING AND MAPPING, INC..

100 0 50 100 200

(IN FEET)

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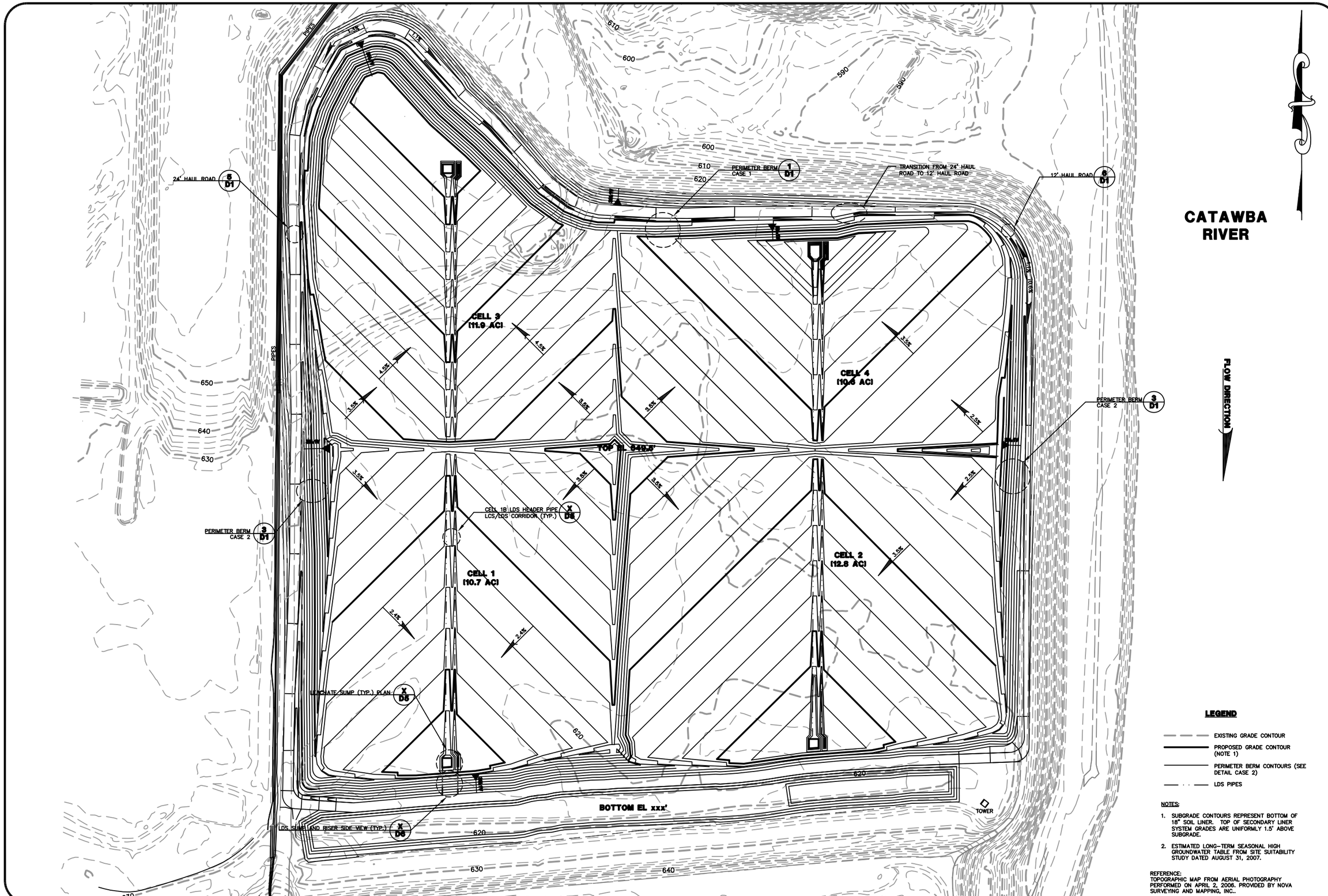
NO.	DATE	DESCRIPTION	BY

PROPOSED COVER SYSTEM GRADING PLAN
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY - ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: ELH	CHECKED BY:
DESIGNED BY: CFS	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE: 3/05/08
DRAWING: 1	OF: -

DRAWING PATH: Q:\1356\DUKE ENERGY\DR-825 PLANT ALLEN\DWG\EXT LANDFILL\DWG PIECES\CLOSURE GRADE.DWG



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NO.	DESCRIPTION	DATE	BY

PROPOSED LINER SYSTEM GRADING PLAN
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY - ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY:
DESIGNED BY: CFS	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE:
DRAWING: 2	OF: -

DRAWING PATH:G:\1356\DUKE ENERGY\06-825 PLANT ALLEN\DWG\CKT LANDFILL\DWG PIECES\SUBGRADE.DWG

REFERENCE:
TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON APRIL 2, 2006. PROVIDED BY NOVA SURVEYING AND MAPPING, INC..

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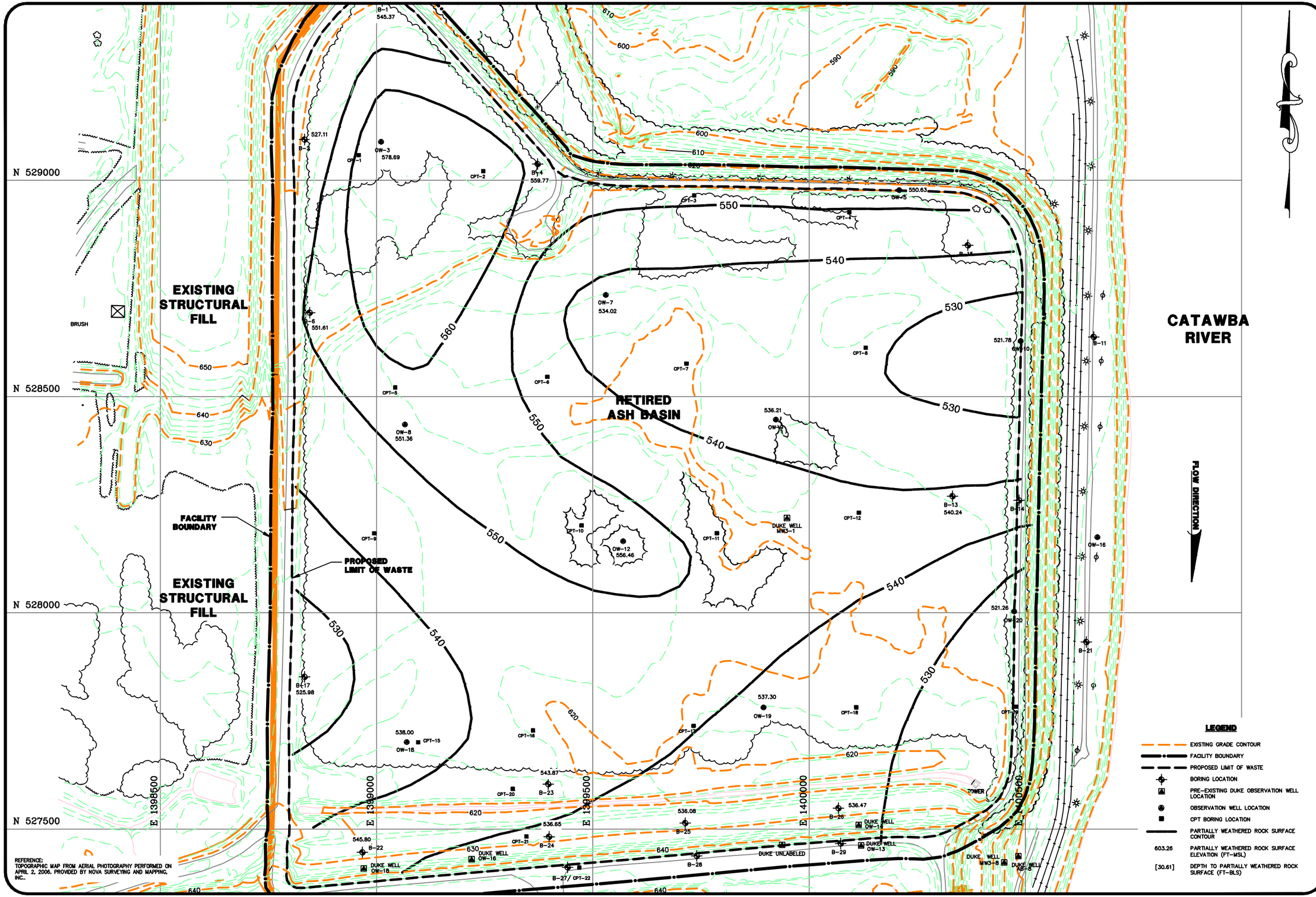
NO.	DATE	DESCRIPTION	BY

BOTTOM OF ASH
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY-ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE: 1/11/08
DRAWING: 3	OF: -

DRAWING PATH: S:\356\ASHE ENERGY\06-825 PLANT ALLEN\ENGINEERING\SETTLEMENT CALC FIG 3.4.4.SVG



REFERENCE:
TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON APRIL 2, 2006. PROVIDED BY NOVA SURVEYING AND MAPPING, INC..

LEGEND

- EXISTING GRADE CONTOUR
- FACILITY BOUNDARY
- PROPOSED LIMIT OF WASTE
- BORING LOCATION
- PRE-EXISTING DUKE OBSERVATION WELL LOCATION
- OBSERVATION WELL LOCATION
- CPT BORING LOCATION
- PARTIALLY WEATHERED ROCK SURFACE CONTOUR
- 603.26 PARTIALLY WEATHERED ROCK SURFACE ELEVATION (FT-MSL)
- [30.61] DEPTH TO PARTIALLY WEATHERED ROCK SURFACE (FT-BLS)

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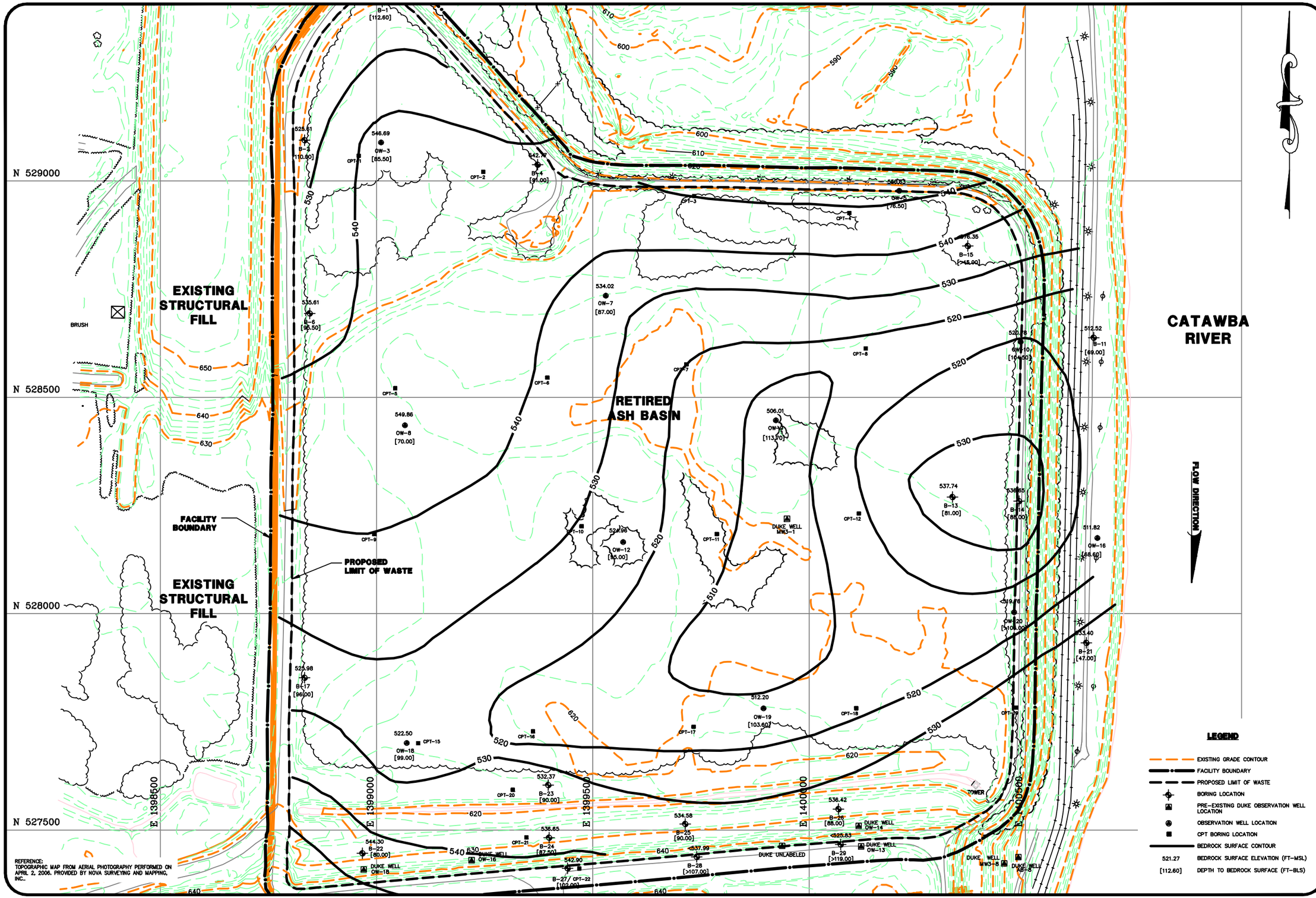
NO.	DATE	DESCRIPTION	BY

PARTIALLY WEATHERED ROCK
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY-ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE: 1/11/08
DRAWING: 4	OF: -

DRAWING PATH: S:\356\ASHE ENERGY\06-825 PLANT ALLEN\ENGINEERING\SETTLEMENT CALC FIG 3.4.4.5.DWG



REFERENCE:
TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON APRIL 2, 2006. PROVIDED BY NOVA SURVEYING AND MAPPING, INC..

LEGEND

- EXISTING GRADE CONTOUR
- FACILITY BOUNDARY
- PROPOSED LIMIT OF WASTE
- BORING LOCATION
- PRE-EXISTING DUKE OBSERVATION WELL LOCATION
- OBSERVATION WELL LOCATION
- CPT BORING LOCATION
- BEDROCK SURFACE CONTOUR
- 521.27 BEDROCK SURFACE ELEVATION (FT-MSL)
- [112.60] DEPTH TO BEDROCK SURFACE (FT-BLS)

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NO.	DATE	DESCRIPTION	BY

TOP OF BEDROCK
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY-ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE: 1/11/08
DRAWING: 5	OF: -

DRAWING PATH: S:\356\356_ENERGY\06-825 PLANT ALLEN\ENGINEERING\SETTLEMENT CALC FIG 5.4.ASSVG

REFERENCE:
TOPOGRAPHIC MAP FROM AERIAL PHOTOGRAPHY PERFORMED ON APRIL 2, 2006. PROVIDED BY NOVA SURVEYING AND MAPPING, INC..

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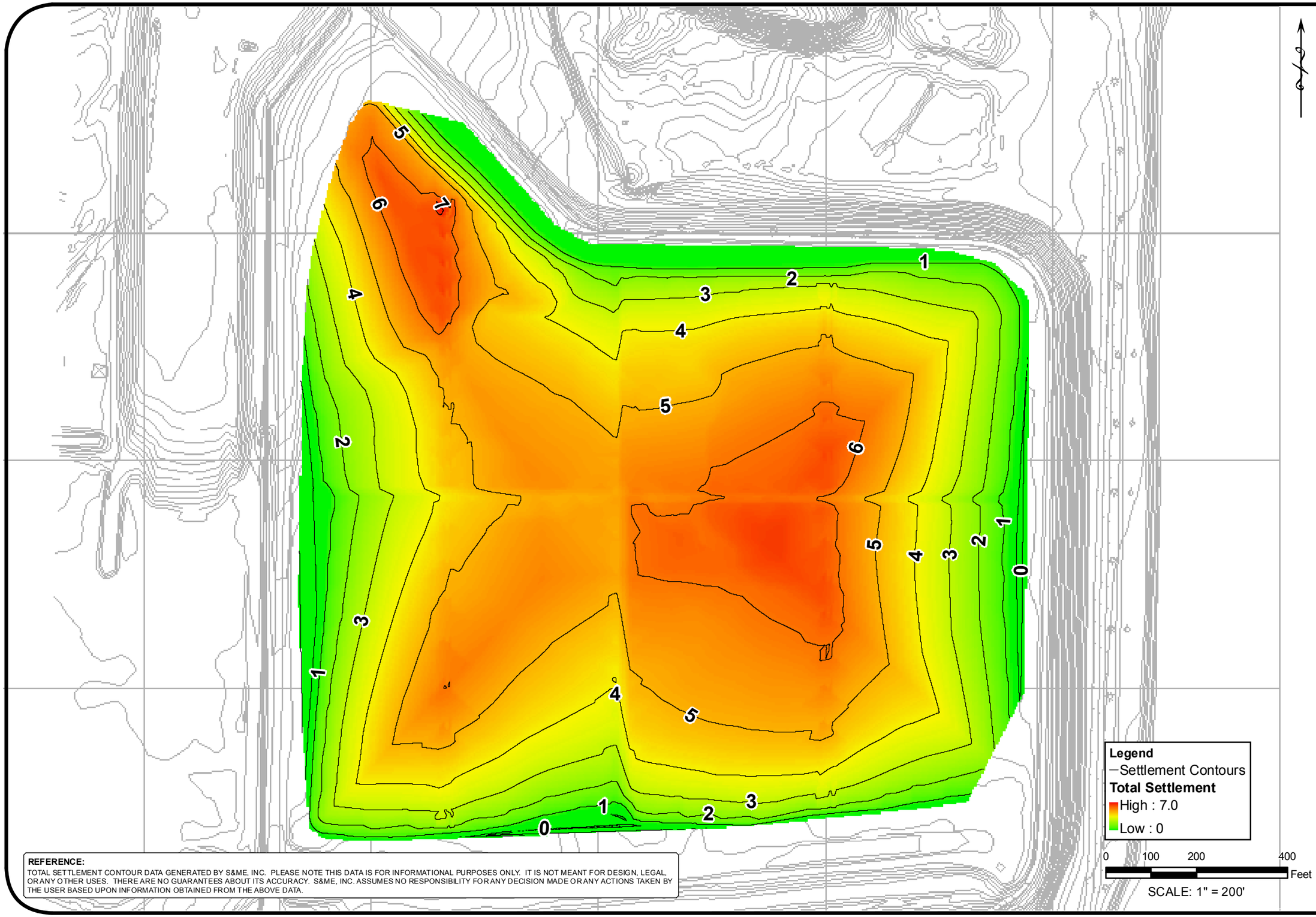
NO.	DATE	DESCRIPTION	BY

LONG-TERM SEASONAL HIGH GROUNDWATER
RETIRED ASH BASIN (RAB) - ASH LANDFILL

DUKE ENERGY-ALLEN STEAM STATION
BELMONT, NORTH CAROLINA

DRAWN BY: CLD	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER 1356-06-825	
SCALE: N.T.S.	DATE: 1/11/08
DRAWING: 6	OF: -

DRAWING PATH: S:\1356\DUKE ENERGY\06-825 PLANT ALLEN\DWG\ENGINEERING\SETTLEMENT CALC FIG 3.4.4.3.DWG



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SCALE: 1" = 200'
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DATE: 02/29/08
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SETTLEMENT CONTOUR MAP

DUKE ENERGY - PLANT ALLEN
GASTON COUNTY, NORTH CAROLINA

FIGURE NO.
7

REFERENCE:
POST SETTLEMENT LINER SYSTEM GRADES AND LONG TERM SEASONAL HIGH GROUNDWATER CONTOUR GIS DATA WAS GENERATED BY S&ME, INC. PLEASE NOTE THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

SCALE:	1" = 200'
DATE:	02/29/08
PROJECT NO:	1356-06-825
DRAWN BY:	CXR
CHECKED BY:	

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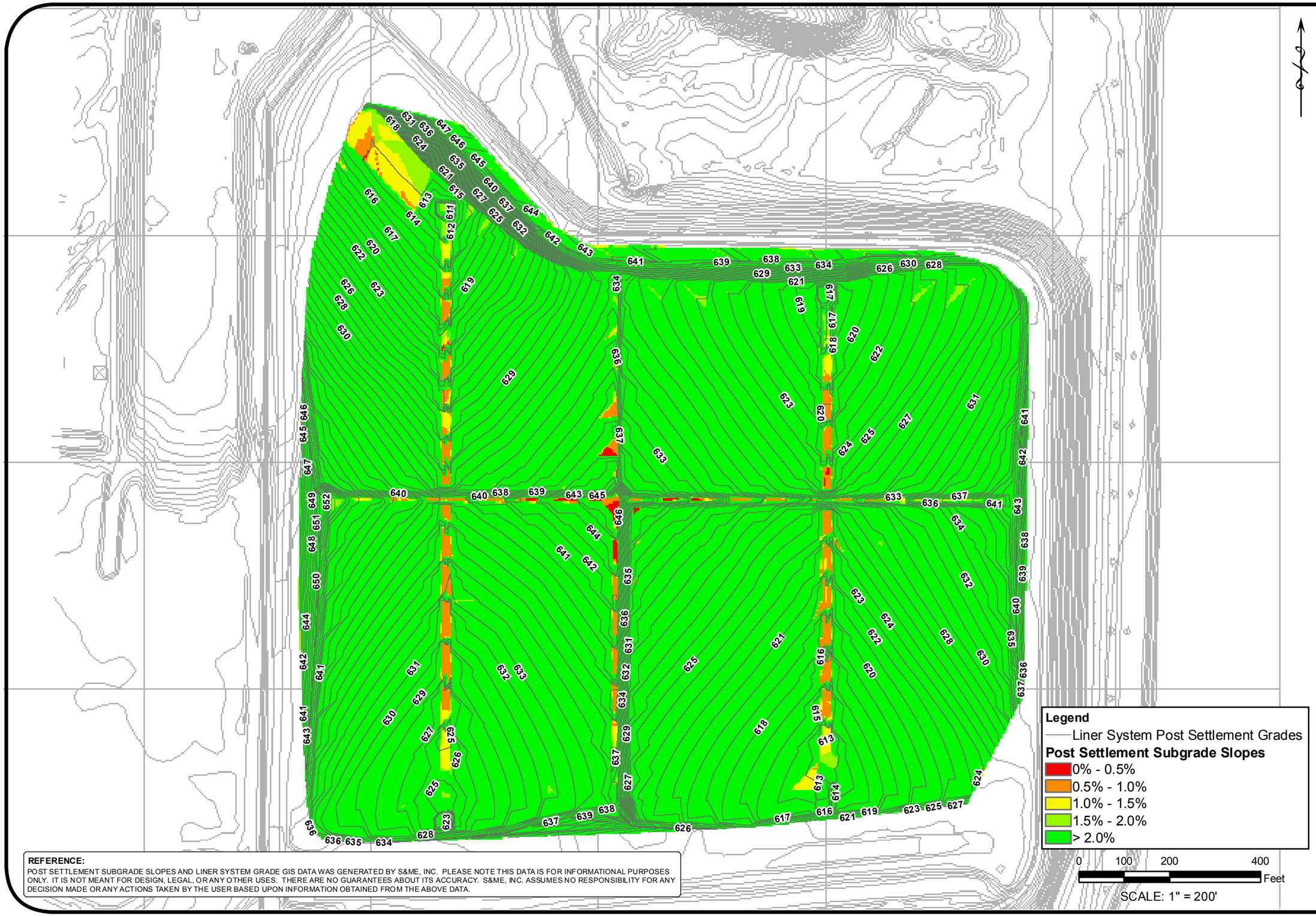
POST SETTLEMENTLINER SYSTEM GRADES WITH LONG TERM SEASONAL HIGH GROUNDWATER CONTOURS

DUKE ENERGY - PLANT ALLEN
GASTON COUNTY, NORTH CAROLINA

FIGURE NO.
8



REFERENCE:
POST SETTLEMENT SUBGRADE SLOPES AND LINER SYSTEM GRADE GIS DATA WAS GENERATED BY S&ME, INC. PLEASE NOTE THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

SCALE: 1" = 200'
DATE: 02/29/08
PROJECT NO: 1356-06-825
DRAWN BY: CXR
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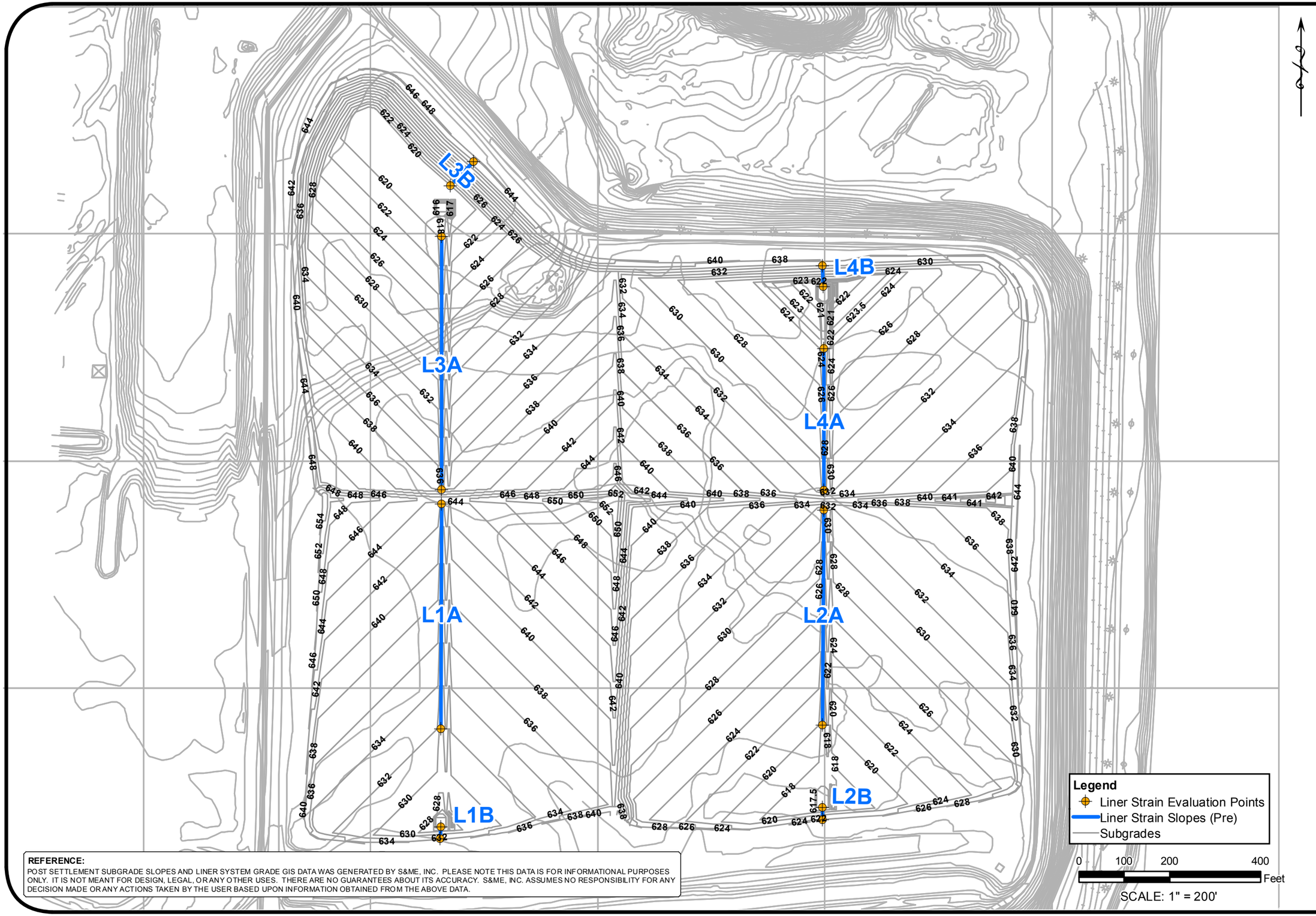
POST SETTLEMENT SUBGRADE SLOPES

DUKE ENERGY - PLANT ALLEN
GASTON COUNTY, NORTH CAROLINA

FIGURE NO.
9



REFERENCE:
POST SETTLEMENT SUBGRADE SLOPES AND LINER SYSTEM GRADE GIS DATA WAS GENERATED BY S&ME, INC. PLEASE NOTE THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

SCALE: 1" = 200'	DATE: 02/29/08
PROJECT NO: 1356-06-825	DRAWN BY: CXR
	CHECKED BY:

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LINER SYSTEM STRAIN EVALUATION LOCATIONS

DUKE ENERGY - PLANT ALLEN
GASTON COUNTY, NORTH CAROLINA

FIGURE NO.
10

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JOB NO. 1356-06-825

SHEET NO. 1 / 22

DATE 3/5/08

COMPUTED BY WMH

CHECKED BY KB

JOB NAME Duke Energy-Plant Allen Ash Landfill

SUBJECT Liquefaction Potential Analysis

COMPUTATIONS BY:

Signature William M. Harrison

Date 03/05/08

Name William Harrison, E.I.

Title Staff Professional

ASSUMPTIONS AND PROCEDURES CHECKED BY:

Signature Kenneth R. Daly

Date 3/11/08

Name Kenneth Daly, P.E.

Title Sr. Project Engineer

COMPUTATIONS CHECKED BY:

Signature Kyle Baucom

Date 3/10/08

Name Kyle Baucom, E.I.

Title Staff Professional

SENIOR REVIEWED BY:

Signature Billy Camp

Date 3/5/08

Name Billy Camp, P.E.

Title Technical Principal/Vice President

REVIEW NOTES / COMMENTS:

OBJECTIVE:

Evaluate the liquefaction potential of subgrade soils at the proposed retired ash basin (RAB) ash landfill.

METHOD:

In order to evaluate the liquefaction potential of subgrade soils, the cyclic stress ratio induced by a seismic event (CSR_{EQ}) was compared to the cyclic resistance ratio (CRR) of subgrade soils developed from cone penetration test (CPT) data. The method used to evaluate liquefaction potential is in general accordance with that proposed by Youd et al. (2001) and the Seismic Design Guidance Manual for MSW Landfill Facilities (USEPA, 1995). The procedure outlined within these documents was coded into a spreadsheet and evaluated for various CPT locations.

A total of eleven CPT soundings within the landfill footprint (shown in Figure 1) were evaluated for liquefaction potential. Surcharge heights expected above CPT sounding locations vary from 0 to 48.8m (160 ft). Due to this variation, CSR_{EQ} was evaluated considering an average surcharge height of 24.4m (80 ft).

Design Criteria

The design criterion of a factor of safety against liquefaction of 1.0 was used for analysis herein (USEPA 1995)

Factor of Safety

The factor of safety of liquefaction was estimated using Equation 1 (Youd et al., 2001).

$$FS_{Liquefaction} = \left(\frac{CRR_{7.5}}{CSR_{EQ}}\right) * MSF * K_{\sigma} > 1.0 \qquad \text{(Equation 1)}$$

Where:

$FS_{Liquefaction}$ = factor of safety against liquefaction failure;

$CRR_{7.5}$ = cyclic resistance ratio developed from CPT data;

CSR_{EQ} = cyclic stress ratio induced by a seismic event;

MSF = magnitude scaling factor; and,

K_{σ} = overburden correction factor.

A lower-bound MSF relationship recommended by Youd et al. (2001) was used and is shown below.

$$MSF = \left(\frac{10^{2.24}}{M_w^{2.56}} \right) \qquad \text{(Equation 2)}$$

Where M_w = Moment magnitude.

A moment magnitude, M_w, of 7.3 was used for the design event.

The overburden correction factor (K_σ) was estimated with the relationship recommended by Youd et al. (2001).

$$K_\sigma = \left(\frac{\sigma_{vo}'}{P_a} \right)^{(f-1)} \qquad \text{(Equation 3)}$$

Where:

σ_{vo}'= effective vertical stress (kPa);

P_a = atmospheric pressure (kPa); and,

f = ranges from 0.7-0.8 for relative densities ranging from 40% to 60% and from 0.6 to 0.7 for relative densities ranging from 60% to 80% respectively.

Evaluation of CSR_{EQ}

The cyclic stress ratio induced by a seismic event (CSR_{EQ}) was estimated using Equation 4.

$$CSR_{EQ} = 0.65 * \frac{a_{\max}}{g} * r_d * \left(\frac{\sigma_{vo}}{\sigma_{vo}'} \right) \qquad \text{(Equation 4)}$$

Where:

a_{max} = peak ground surface acceleration(m/s^2);

g = acceleration of gravity (m/s^2);

r_d = stress reduction factor;

σ_{vo} = total vertical stress (kPa); and

σ_{vo}'= effective vertical stress (kPa).

Evaluation of a_{max}

The site specific peak ground surface acceleration was estimated using USGS Earthquake Ground Motion Parameters v5.0.8 with site-specific input parameters. These included latitude and longitude values for the ash landfill (35.18319, -81.00881) and seismic site classification (D). The site specific peak ground surface acceleration was estimated at 0.20g. A detailed discussion of the site specific peak ground acceleration is provided in the companion calculation package for global slope stability.

Evaluation of r_d

Equation 5, presented within Youd et al. (2001), was used to estimate the stiffness reduction factor at varying depths, z.

$$r_d = \frac{(1.000 - 0.4113z^{0.5} + .04052z + 0.001753z^{1.5})}{(1.000 - 0.4177z^{0.5} + 0.05729z - 0.006205z^{1.5} + 0.001210z^2)} \qquad \text{(Equation 5)}$$

Equation 5 is typically used for depths < 23 m. The behavior of r_d with increasing depth is shown in Figure 2.

As discussed previously, an average surcharge of 24.4m (80ft) is expected. Figure 2 indicates that the use of r_d evaluated at the maximum recommended applicability depth of 23m (r_d = 0.57) for all CPT sounding depths would be conservative.

Evaluation of $\left(\frac{\sigma_{vo}}{\sigma_{vo}'}\right)$

The total and effective vertical stresses used in evaluation of CSR_{EQ} were increased by an expected surcharge stress equivalent to the anticipated average overburden of 24.4m (80ft) x 14.1kN/m^3 (90pcf).

Evaluation of CRR

The cyclic resistance ratio CRR of subgrade soils was evaluated in general accordance with the method recommended by Youd et al. (2001). This involved normalizing cone penetration tip resistance (q_{c1N}); evaluating the soil behavior type index (I_c); and finally, converting normalized tip resistance values to clean-sand equivalent normalized resistance values.

Normalization of q_{C1N}

The field tip resistance (q_c) was normalized with Equation 6

$$q_{c1N} = C_Q\left(\frac{q_c}{P_a}\right) \qquad \text{(Equation 6)}$$

Where:

q_{c1N} = normalized tip resistance;

C_Q = normalizing factor;

q_c = field tip resistance value; and

P_a = 1 atmosphere of pressure.

C_Q was then evaluated with Equation 7

$$C_Q = \left(\frac{P_a}{\sigma_{vo}'}\right)^n \qquad \text{(Equation 7)}$$

Where:

$$0.5 \le n \le 1.0$$

Evaluation of I_c

The soil behavior type index I_c allows for a rough estimation of soil type. The evaluation of I_c and n was simultaneous. The exponent n was evaluated using an iterative procedure relying on Equations 8, 9, and 10 presented below.

$$Q = [(q_c - \sigma_{vo})/P_a][(P_a/\sigma_{vo}')^n] \qquad \text{(Equation 8)}$$

$$I_c = [(3.47 - \log Q)^2 + (1.22 + \log F)^2]^{0.5} \qquad \text{(Equation 9)}$$

$$F = \left[\frac{f_s}{(q_c - \sigma_{vo})} \right] * 100\% \qquad \text{(Equation 10)}$$

Where:

Q = dimensionless tip resistance;

I_c = soil behavior type index;

F = normalized friction ratio; and

f_s = CPT sleeve resistance.

It was first assumed that n = 1.0. Q and I_c were calculated with equations 8 and 9, respectively. If I_c > 2.6, the soil was classified as clayey, non-liquefiable, and the evaluation stopped for that depth. However, if I_c < 2.6, a new evaluation was carried through with n = 0.5.

Using n = 0.5, Q and I_c were recalculated. If I_c < 2.6, then the evaluation stopped and n = 0.5 was used. Otherwise, if I_c > 2.6, it was recalculated using n = 0.7 and the evaluation was stopped.

Conversion of q_{c1N} to $(q_{c1N})_{cs}$

The normalized penetration resistance was converted to clean-sand equivalent normalized cone penetration resistance using Equations 11 and 12-14.

$$(q_{c1N})_{CS} = K_C q_{C1N} \qquad \text{(Equation 11)}$$

$$I_c \le 1.64 \quad K_C = 1.0$$

$$I_c > 1.64 \quad K_C = -0.403 * I_C^{\,4} + 5.581 I_C^{\,3} - 21.63 I_C^{\,2} + 33.75 I_C - 17.88 \qquad \text{(Eq. 12-14)}$$

$$I_c > 2.6 \quad \textit{Not Liquefiable}$$

Where:

$(q_{c1N})_{cs}$ = clean-sand equivalent normalized cone penetration resistance;

K_c = correction factor for grain characteristics.

K_c was evaluated according to the final I_c used when selecting (n). Once K_c is known, the tip resistance can be converted to clean-sand equivalent resistance.

Equations 15 and 16, presented below, were used to determine the cyclic resistance ratio for magnitude 7.5 ($CRR_{7.5}$) earthquakes.

$$(q_{c1N})_{CS} < 50 \rightarrow CRR_{7.5} = 0.833\left[\frac{(q_{c1N})_{CS}}{1000}\right]^3 + 0.05 \qquad \text{(Equation 15)}$$

$$50 \le (q_{c1N})_{CS} < 160 \rightarrow CRR_{7.5} = 93\left[\frac{(q_{c1N})_{CS}}{1000}\right]^3 + 0.08 \qquad \text{(Equation 16)}$$

CALCULATIONS:

MS Excel was used to evaluate $FS_{Liquefaction}$ for a number of CPTs performed on the ash landfill subgrade. The reduction factor r_d and ratio of total to effective stress used in estimating the CSR_{EQ} were based on an assumed surcharge of 7.2ksf (equivalent to 80' of 90pcf overburden). CRR values were estimated for CPT sounding conditions (no surcharge). Calculations are presented in spreadsheets along with hand calculated verification in Attachment 1.

RESULTS:

Figures 3 through 13 compare CSR_{EQ} to $CRR_{7.5}$ values and the location of the seasonal high water table. Results indicate factors of safety greater than 1.0.

The minimum FS against liquefaction from evaluation of CPT logs is presented in Table 1. CPT-16 and 17 are located along the southern boundary of the landfill footprint. The north, east, and west boundaries will be buttressed by existing earthen dikes and a new landfill perimeter berm. The southern landfill boundary does not extend to the existing earthen dikes and will be buttressed only by the new landfill perimeter berm. It is likely

that the average surcharge height used in liquefaction potential evaluation is greater than actual surcharge height at these locations. Accordingly, a minimum surcharge height that provides a FS > 1.0 was estimated. CPT-16 and 17 minimum required surcharges to maintain FS > 1.0 are presented in Table 2.

Table 1. Minimum FS Values with Average 14.4ksf Surcharge

CPT #	Minimum FS
5	1.85
6	1.23
7	1.28
8	1.12
9	1.56
10	1.22
12	1.20
15	1.43
16	1.42
17	1.13
18	1.23

Table 2. Minimum Surcharge Required for FS>1.0

CPT #	Minimum Surcharge	
	(m)	(ft)
16	11	36
17	16	52

DISCUSSION:

The factor of safety evaluation, as coded in the spreadsheets, did not exclude data points above the ground water table. Materials above the ground water table are not subject to liquefaction. Accordingly, the FS values presented in Table 1 were evaluated from soils below the estimated seasonal high water table. The minimum FS for data points below the estimated seasonal high ground water table exceed 1.0. CPT-16 and 17 require at least 11 and 16 meters (33ft and 52ft) of surcharge respectively, to maintain a FS ≥1.0.

REFERENCE:

Youd et al, (2001) "Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils". ASCE Journal of Geotechnical and Geoenvironmental Engineering.

USEPA (1995) EPA/600/R-95/051 "Seismic Design Guidance for Municipal Solid Waste Landfill Facilities"

FIGURES:

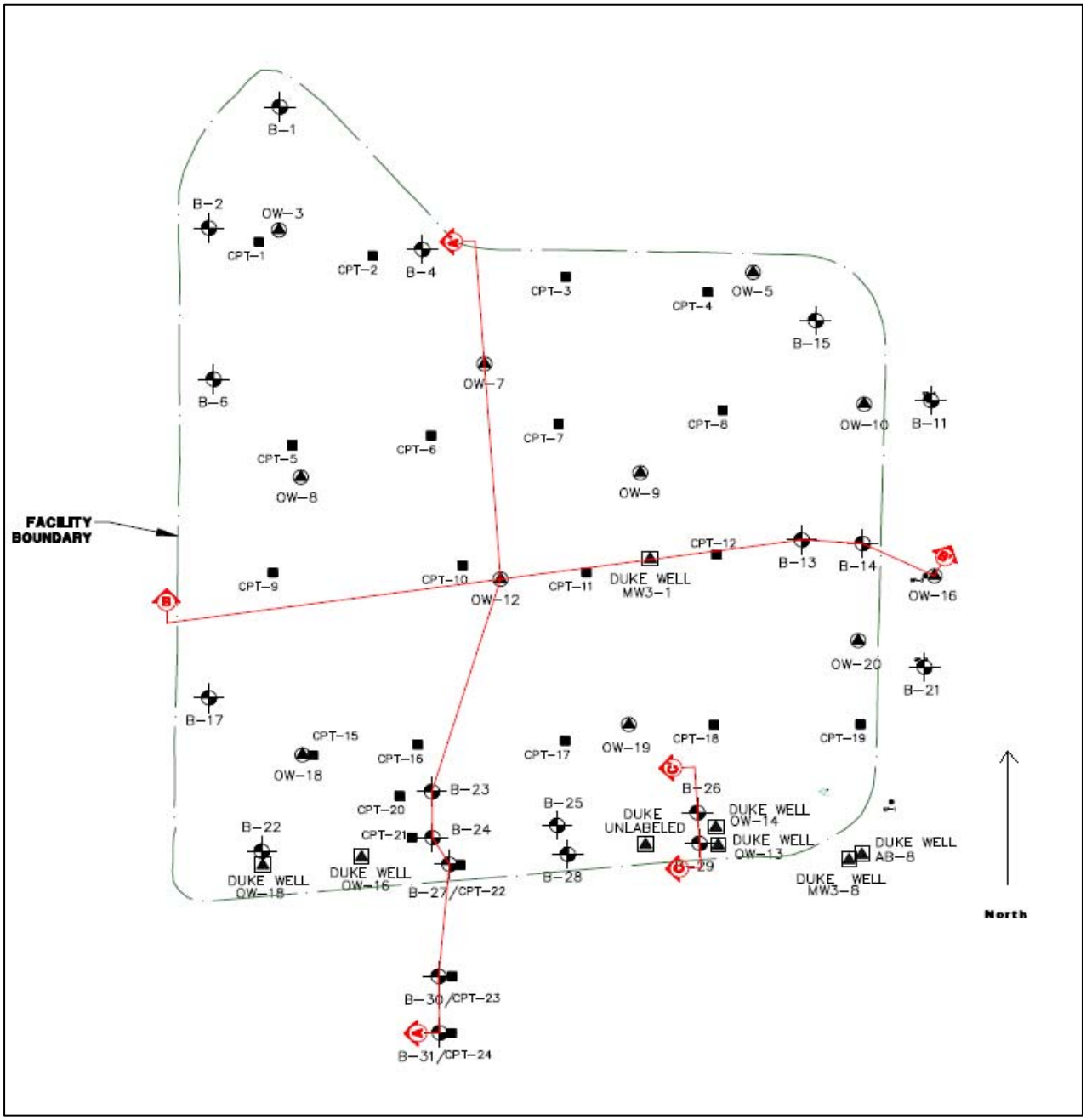

Figure 1. CPT Boring Locations within Landfill Footprint

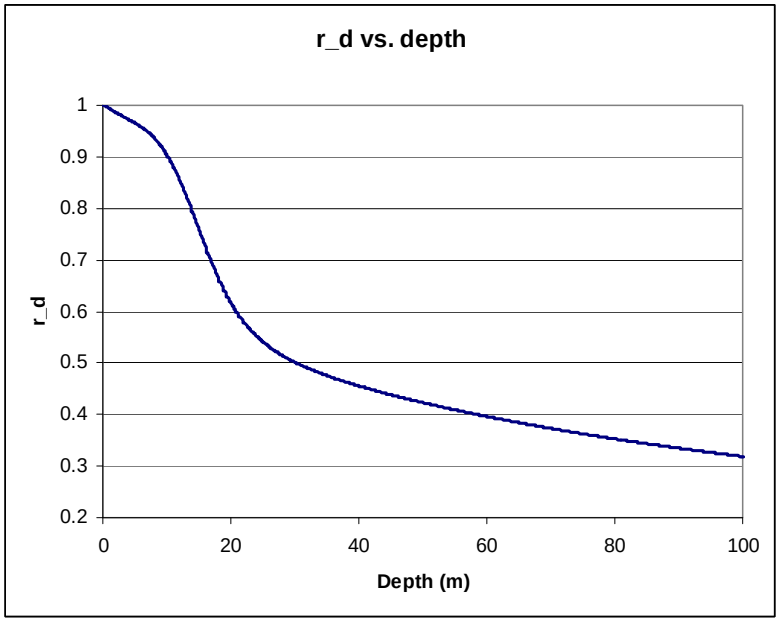

Figure 2. The Effect of Depth on r_d Value.

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	12 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

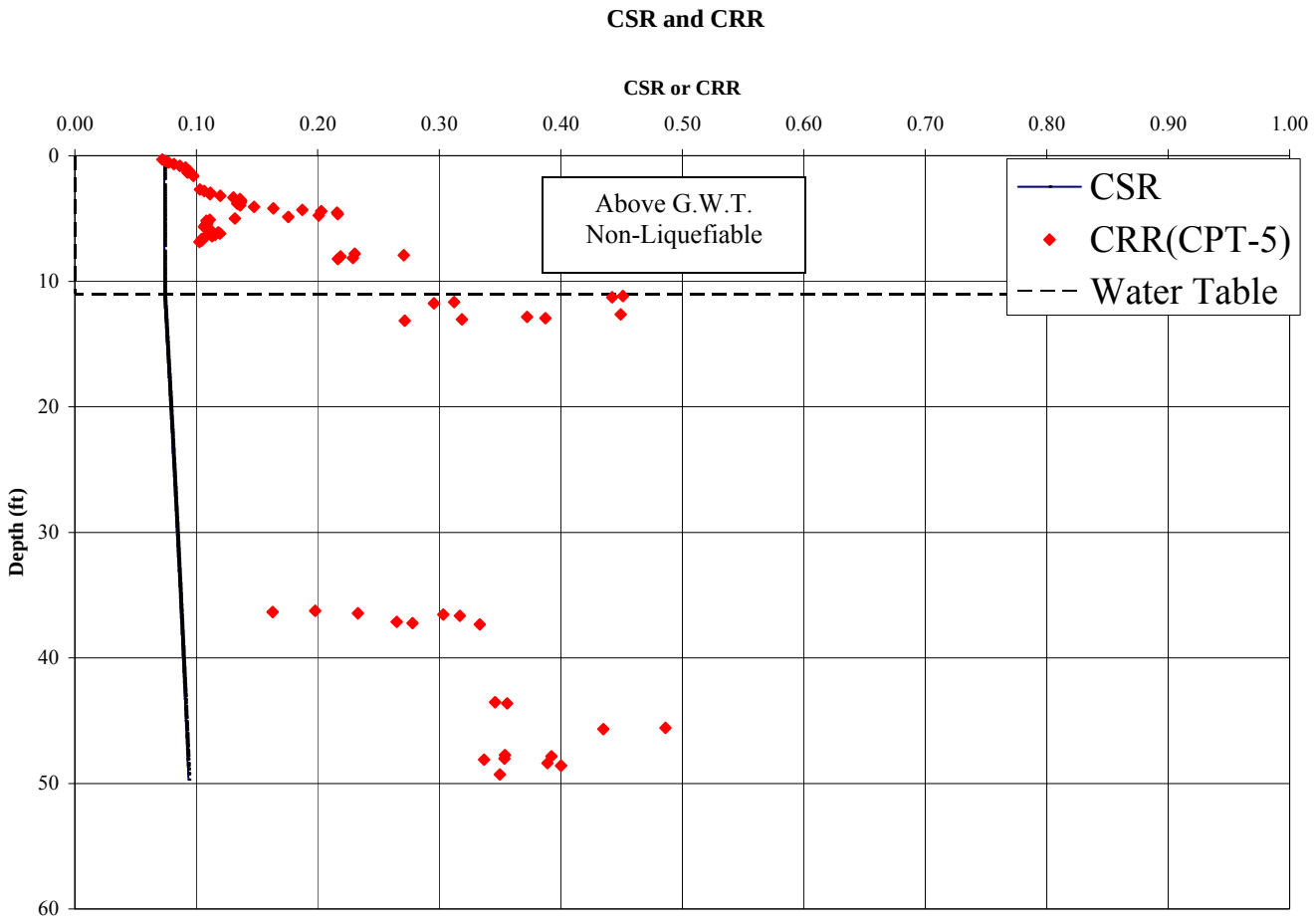

Figure 3. CSR, CRR and Water Table for CPT-5

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	13 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

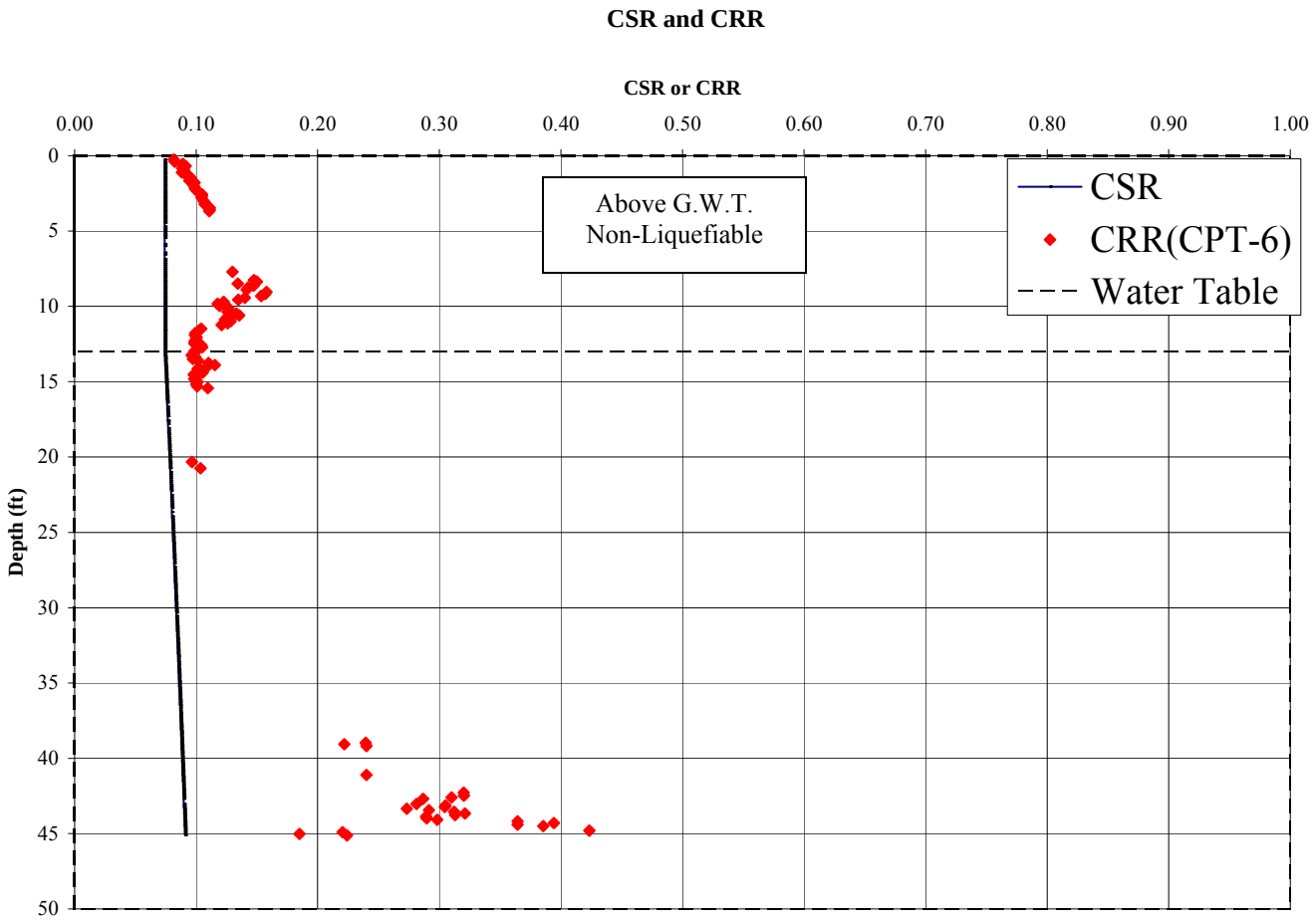

Figure 4. CSR, CRR and Water Table for CPT-6

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	14 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

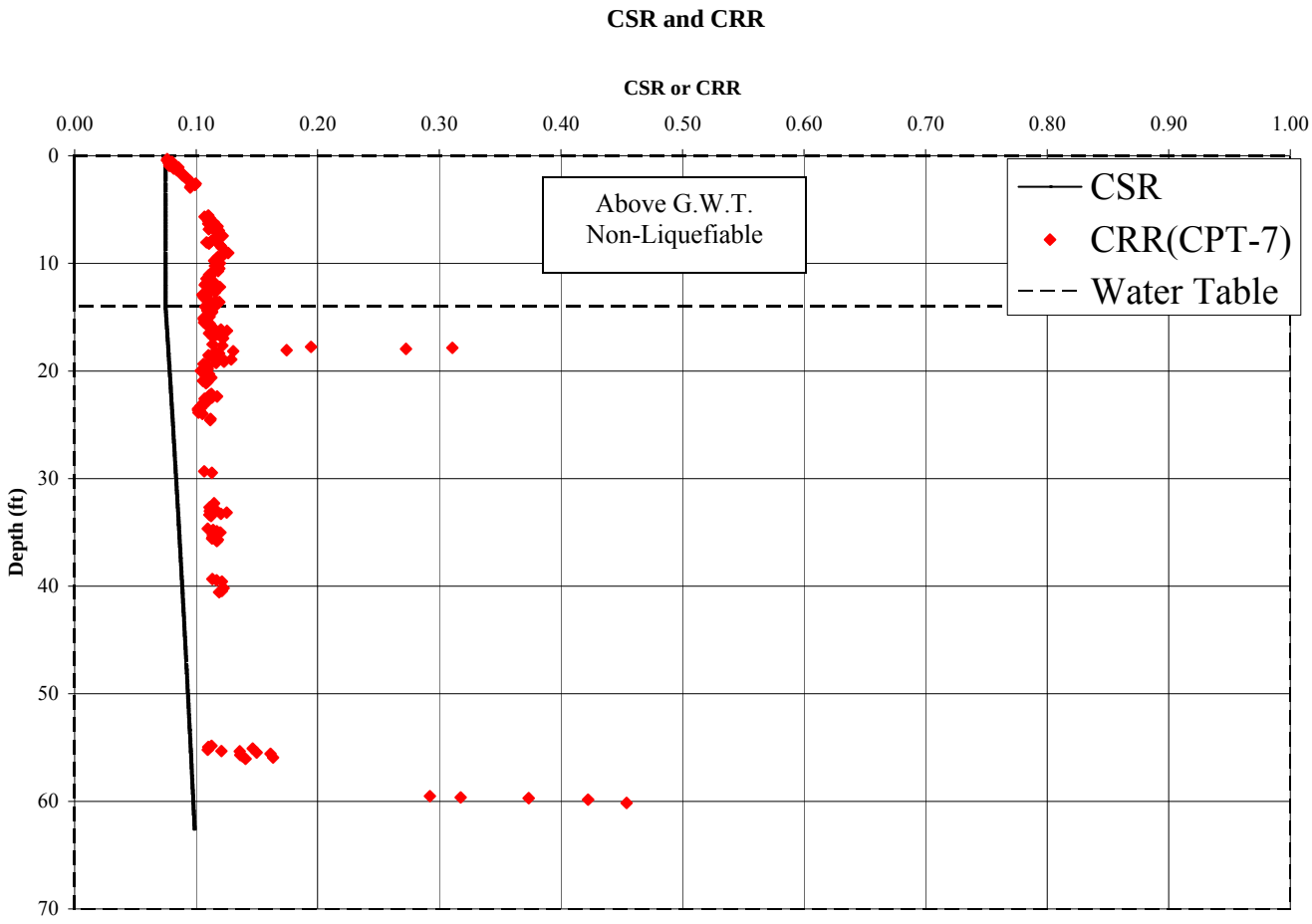

Figure 5. CSR, CRR and Water Table for CPT-7

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	15 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

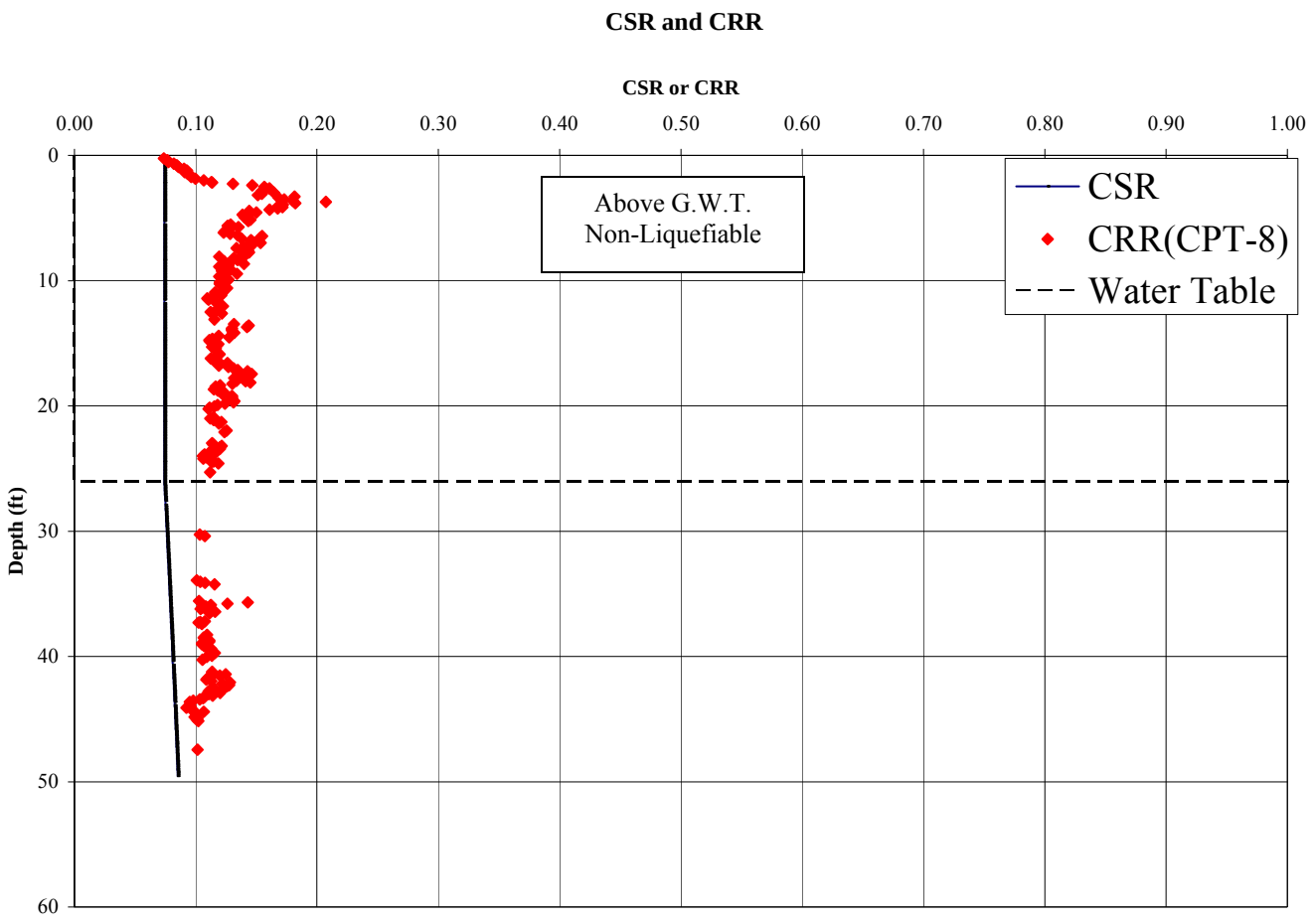

Figure 6. CSR, CRR and Water Table for CPT-8

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	16 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

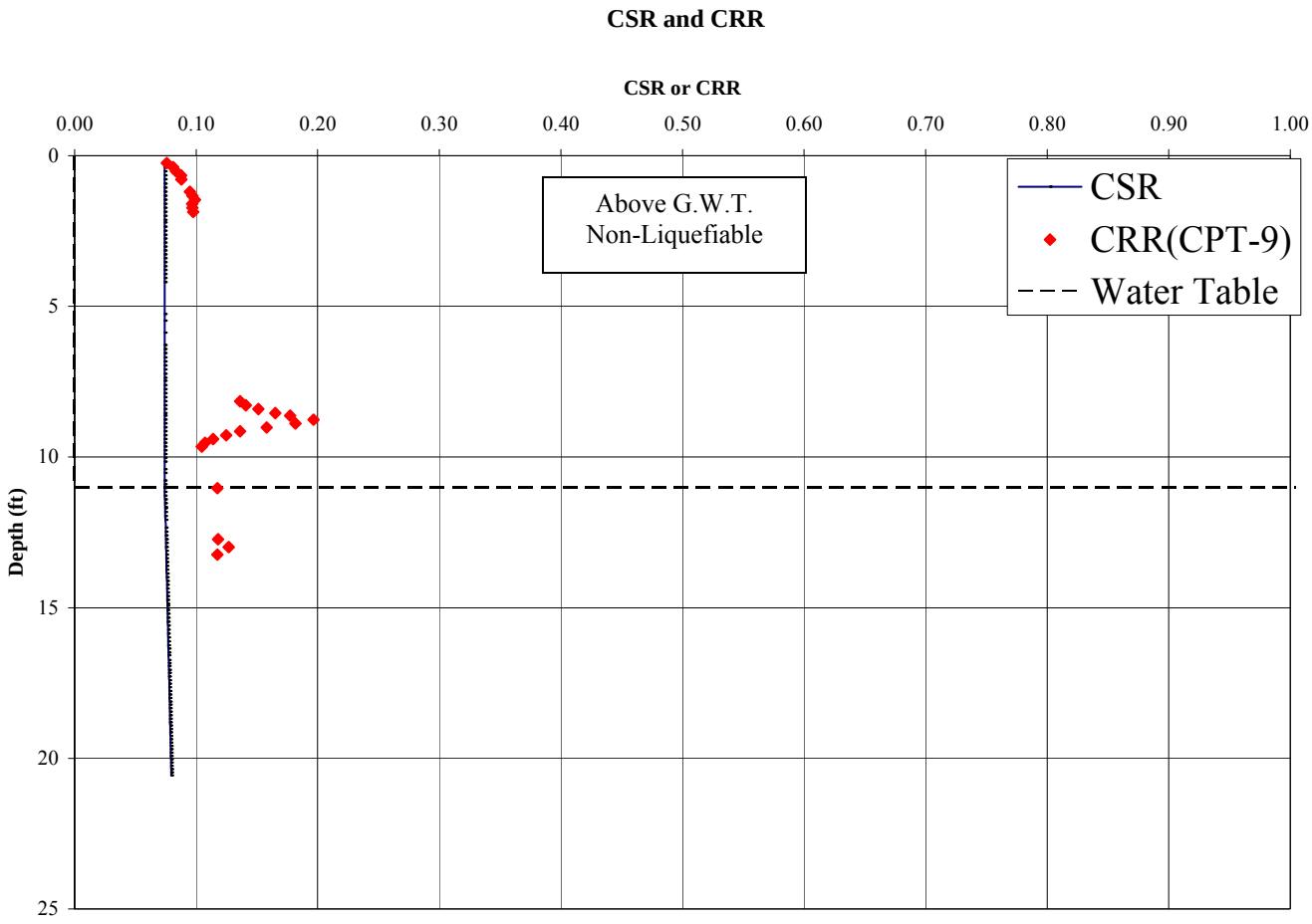

Figure 7. CSR, CRR and Water Table for CPT-9

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	17 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

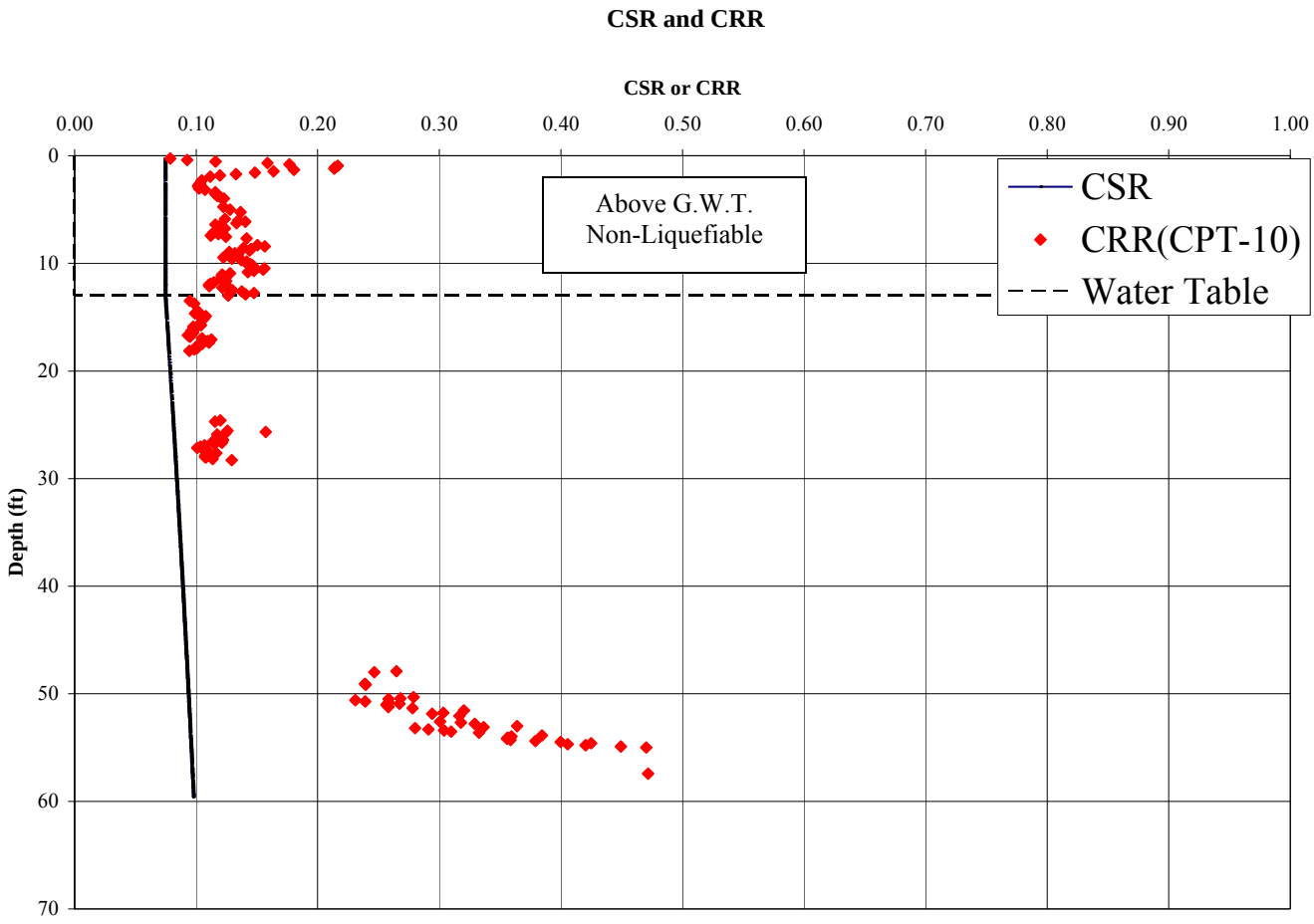

Figure 8. CSR, CRR and Water Table for CPT-10

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	18 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

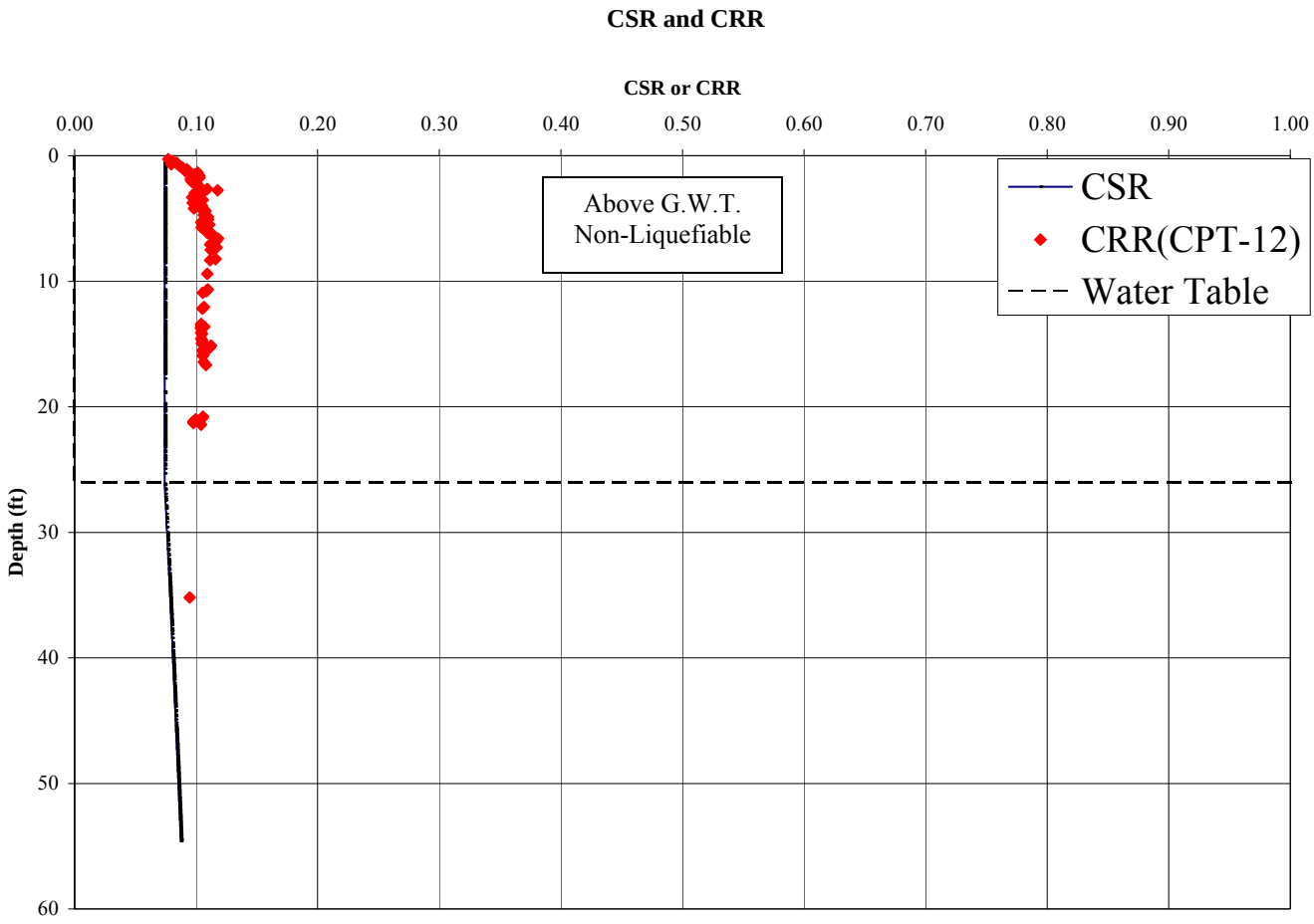

Figure 9. CSR, CRR and Water Table for CPT-12

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	19 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

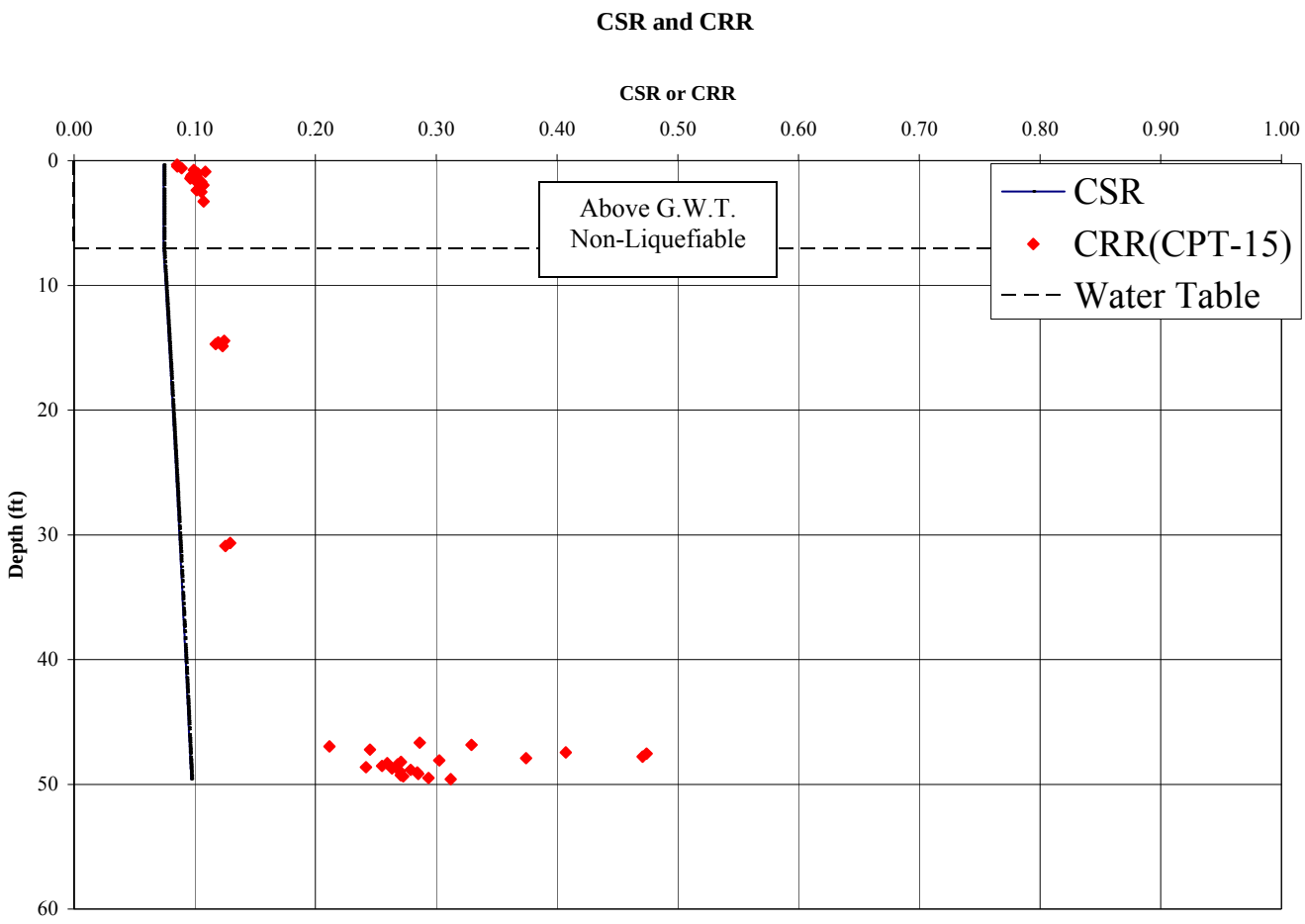

Figure 10. CSR, CRR and Water Table for CPT-15

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	20 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

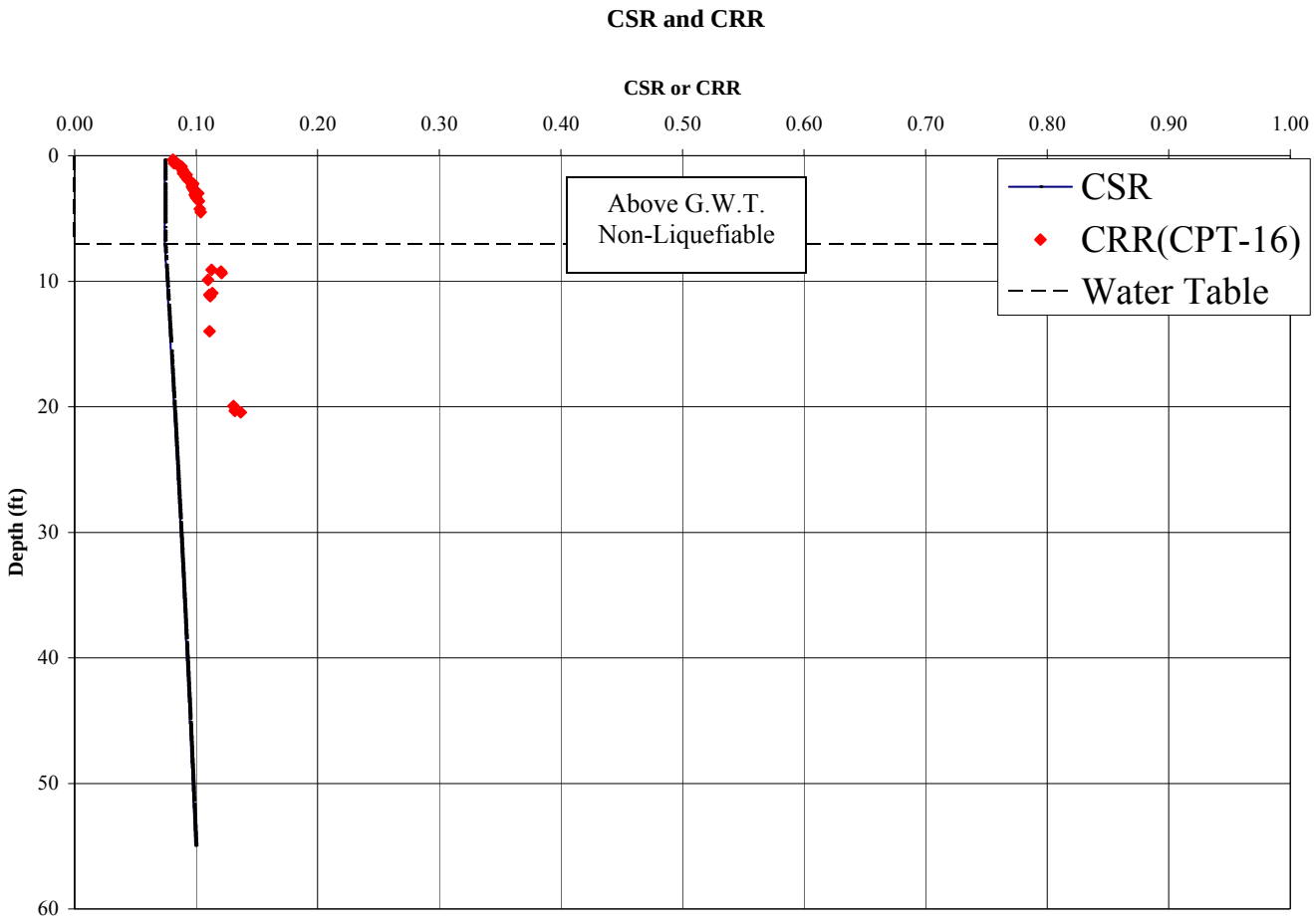

Figure 11. CSR, CRR and Water Table for CPT-16

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	21 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

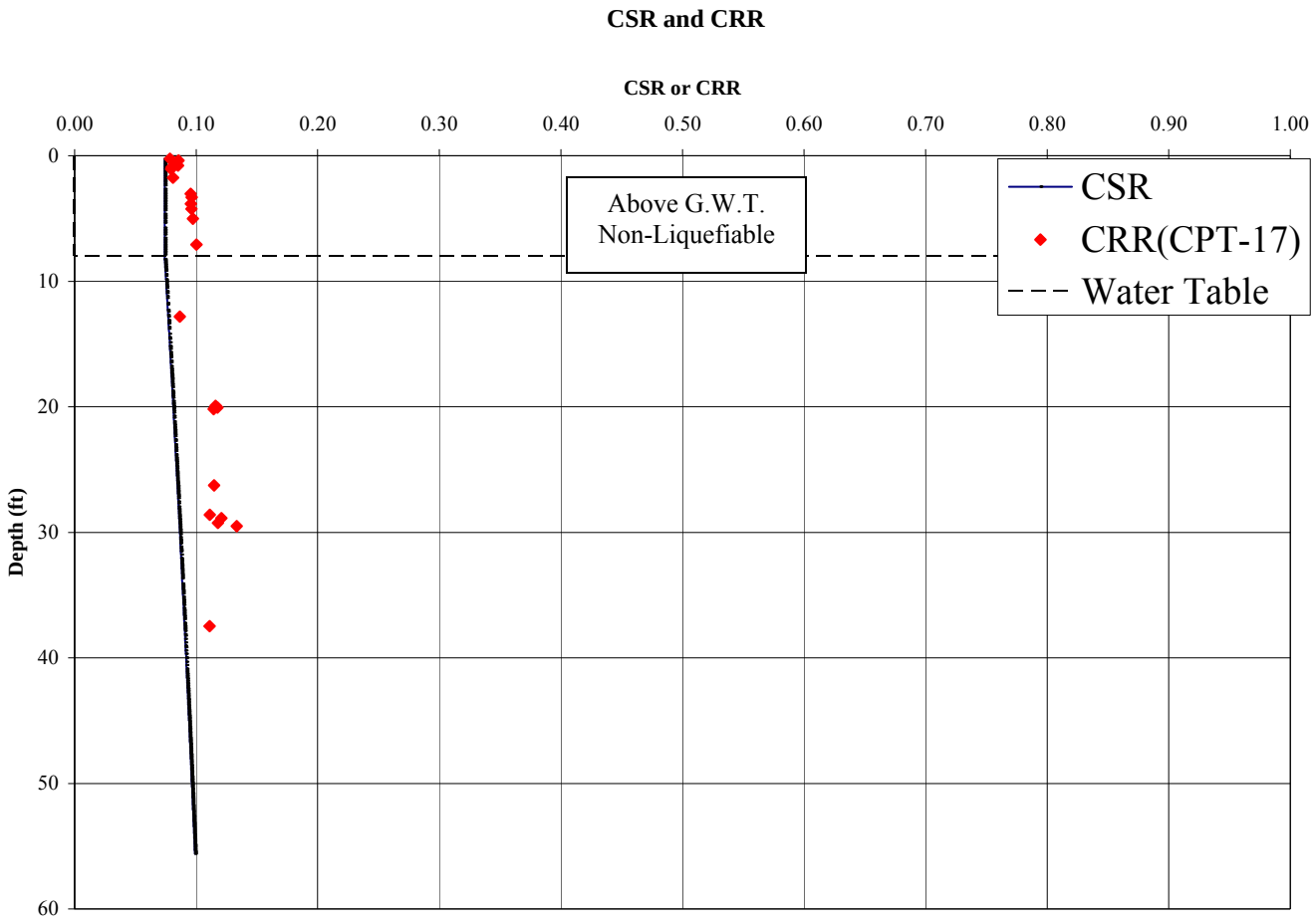

Figure 12. CSR, CRR and Water Table for CPT-17

JOB NAME	Duke Energy-Plant Allen Ash Landfill	JOB NO.	1356-06-825
SUBJECT	Liquefaction Potential Analysis	SHEET NO.	22 / 22
		DATE	3/5/08
		COMPUTED BY	WMH
		CHECKED BY	

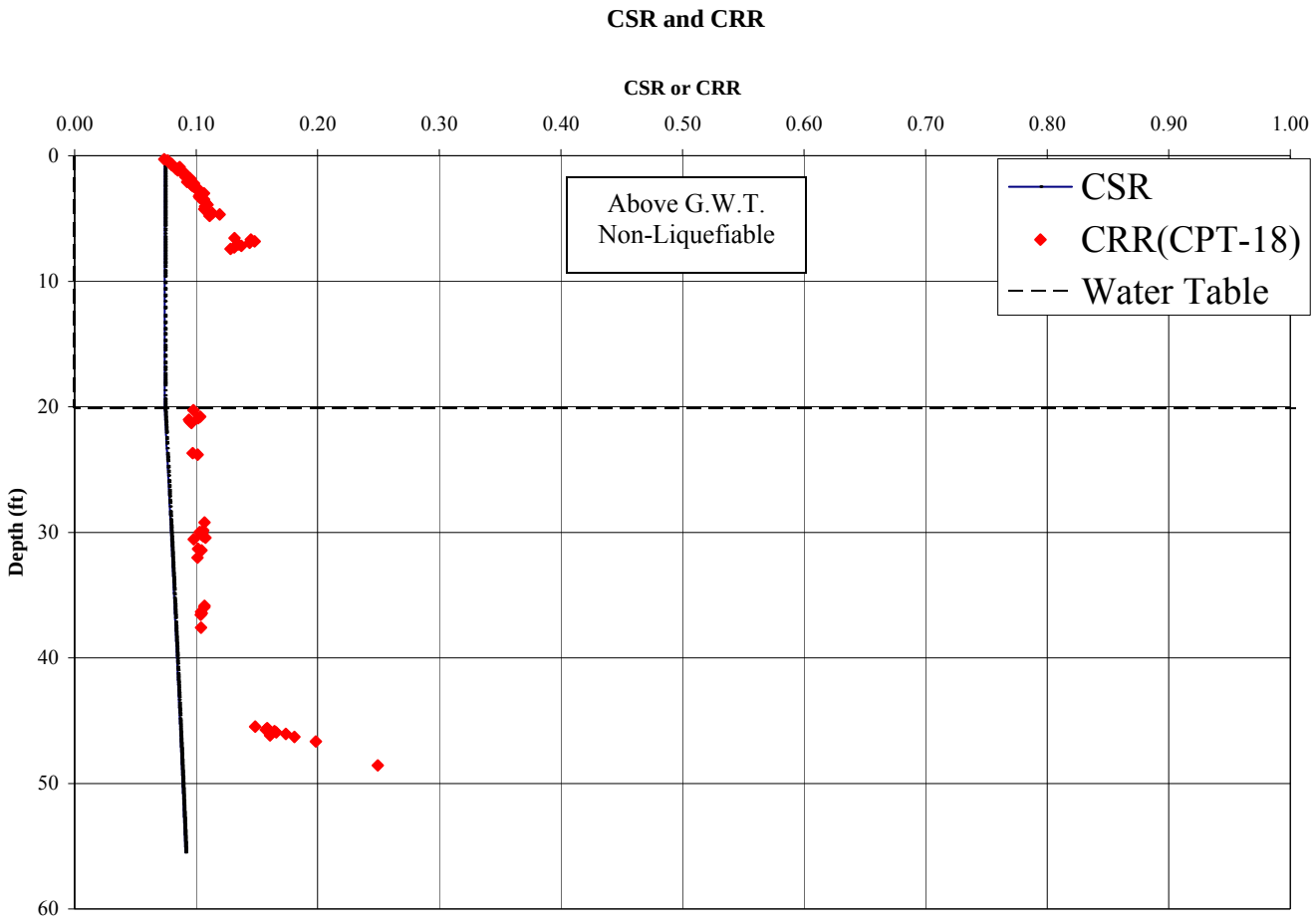

Figure 13. CSR, CRR and Water Table for CPT-18

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft *
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.31089	0.12	9 8.9	0.1	852	11	1.3	1.3	1.4	0.57	0.07	634.7	1.51	8.69	73.0	2.10	14.3	n/a	n/a	n/a	2.10	14.30	1.45	20.77	0.067	73.12	49	0.76	1.00	0.07	0.98
0.42328	0.14	7 7	0.1	670	13	1.8	1.8	2.0	0.57	0.07	366.2	1.77	7.45	49.2	2.34	11.2	n/a	n/a	n/a	2.34	11.25	2.09	23.47	0.070	49.29	40	0.80	1.00	0.07	1.01
0.53738	0.16	9 9.1	0.2	871	15	2.3	2.3	1.8	0.57	0.07	375.0	1.72	6.61	56.7	2.26	14.6	n/a	n/a	n/a	2.26	14.62	1.82	26.60	0.072	56.87	43	0.78	1.00	0.08	1.05
0.66971	0.19	7 6.8	0.2	651	18	2.9	2.9	2.8	0.57	0.07	224.5	2.01	5.92	37.9	2.52	10.9	n/a	n/a	n/a	2.52	10.93	2.88	31.48	0.076	38.07	35	0.80	1.00	0.08	1.11
0.80501	0.25	10 10.4	0.2	996	24	3.5	3.5	2.4	0.57	0.07	285.9	1.90	5.40	52.9	2.37	16.7	n/a	n/a	n/a	2.37	16.71	2.19	36.67	0.081	53.10	42	0.79	1.00	0.09	1.17
0.93861	0.28	8 7.9	0.3	757	27	4.0	4.0	3.6	0.57	0.07	185.9	2.14	5.00	37.2	2.60	12.7	n/a	n/a	n/a	2.60	12.69	3.31	42.07	0.085	37.36	35	0.80	1.00	0.09	1.24
1.07179	0.29	14 14	0.3	1341	28	4.6	4.6	2.1	0.57	0.07	289.1	1.84	4.68	61.7	2.28	22.5	n/a	n/a	n/a	2.28	22.49	1.88	42.23	0.085	61.95	45	0.77	1.00	0.09	1.24
1.20454	0.31	12 12.1	0.4	1159	30	5.2	5.2	2.6	0.57	0.07	222.1	1.98	4.42	50.3	2.41	19.4	n/a	n/a	n/a	2.41	19.44	2.34	45.39	0.088	50.51	41	0.80	1.00	0.09	1.28
1.3373	0.28	14 14.3	0.4	1369	27	5.8	5.8	2.0	0.57	0.07	236.5	1.87	4.19	56.4	2.29	23.0	n/a	n/a	n/a	2.29	22.97	1.92	44.06	0.087	56.65	43	0.78	1.00	0.09	1.26
1.47047	0.32	9 9.2	0.4	881	31	6.3	6.3	3.5	0.57	0.07	137.9	2.21	4.00	34.5	2.62	14.8	7.0	14.8	2.90	2.90	14.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.60281	0.29	9 9.3	0.5	891	28	6.9	6.9	3.1	0.57	0.07	127.8	2.19	3.83	33.4	2.60	14.9	n/a	n/a	n/a	2.60	14.94	3.30	49.31	0.091	33.65	33	0.80	1.00	0.10	1.33
1.73556	0.17	5 4.5	0.5	431	16	7.5	7.5	3.8	0.57	0.07	56.6	2.49	3.68	15.4	2.91	7.2	6.2	7.2	3.17	3.17	7.23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.86789	0.13	6 5.9	0.6	565	12	8.1	8.1	2.2	0.57	0.07	69.1	2.26	3.55	19.5	2.69	9.5	5.9	9.5	2.95	2.95	9.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.28863	0.12	2 2	0.7	192	11	9.9	9.9	6.3	0.57	0.07	18.4	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.41884	0.15	0 0.3	0.7	29	14	10.4	10.4	78.5	0.57	0.07	1.8	4.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.55117	0.22	2 2.5	0.8	239	21	11.0	11.0	9.2	0.57	0.07	20.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.68223	0.3	14 14.5	0.8	1389	29	11.6	11.6	2.1	0.57	0.07	119.0	2.08	2.96	40.2	2.42	23.3	n/a	n/a	n/a	2.42	23.30	2.39	55.68	0.096	40.56	36	0.80	1.00	0.10	1.40
2.81159	0.34	16 16.5	0.9	1580	33	12.1	12.1	2.1	0.57	0.07	129.3	2.05	2.89	44.7	2.38	26.5	n/a	n/a	n/a	2.38	26.51	2.24	59.38	0.099	45.08	38	0.80	1.00	0.11	1.45
2.93883	0.37	14 14.2	0.9	1360	35	12.7	12.7	2.6	0.57	0.07	106.3	2.18	2.83	37.6	2.51	22.8	n/a	n/a	n/a	2.51	22.81	2.80	63.86	0.104	37.95	35	0.80	1.00	0.11	1.52
3.06777	0.38	21 20.6	0.9	1973	36	13.2	13.2	1.9	0.57	0.07	148.1	1.98	2.77	53.5	2.29	33.1	n/a	n/a	n/a	2.29	33.10	1.92	63.57	0.104	53.88	42	0.79	1.00	0.11	1.51
3.19585	0.45	20 19.6	1.0	1877	43	13.8	13.8	2.3	0.57	0.07	135.2	2.07	2.71	49.9	2.38	31.5	n/a	n/a	n/a	2.38	31.49	2.22	69.95	0.112	50.23	41	0.80	1.00	0.12	1.63
3.32267	0.54	26 26.3	1.0	2518	52	14.3	14.3	2.1	0.57	0.07	174.8	1.97	2.66	65.7	2.26	42.3	n/a	n/a	n/a	2.26	42.25	1.81	76.61	0.122	66.10	47	0.77	1.00	0.13	1.77
3.44906	0.57	28 28.3	1.1	2710	55	14.9	14.9	2.0	0.57	0.07	181.2	1.95	2.61	69.4	2.23	45.5	n/a	n/a	n/a	2.23	45.47	1.75	79.52	0.127	69.81	48	0.76	1.00	0.14	1.85
3.57461	0.57	26 25.6	1.1	2451	55	15.4	15.4	2.2	0.57	0.07	158.0	2.02	2.56	61.6	2.30	41.1	n/a	n/a	n/a	2.30	41.13	1.95	80.12	0.128	62.03	45	0.77	1.00	0.14	1.86
3.69676	0.55	30 30.3	1.1	2902	53	15.9	15.9	1.8	0.57	0.07	181.0	1.91	2.52	71.8	2.19	48.7	n/a	n/a	n/a	2.19	48.68	1.64	80.04	0.128	72.19	49	0.76	1.00	0.14	1.86
3.81976	0.5	32 32.3	1.2	3093	48	16.5	16.5	1.6	0.57	0.07	186.8	1.85	2.48	75.3	2.13	51.9	n/a	n/a	n/a	2.13	51.89	1.51	78.34	0.125	75.71	50	0.75	1.00	0.13	1.82
3.94191	0.53	29 29	1.2	2777	51	17.0	17.0	1.8	0.57	0.07	162.4	1.95	2.44	66.5	2.22	46.6	n/a	n/a	n/a	2.22	46.59	1.71	79.70	0.127	66.91	47	0.77	1.00	0.14	1.85
4.06491	0.57	36 36	1.2	3447	55	17.5	17.5	1.6	0.57	0.07	195.7	1.85	2.40	81.4	2.11	57.8	n/a	n/a	n/a	2.11	57.84	1.47	85.24	0.138	81.80	52	0.74	1.00	0.15	2.00
4.18578	0.64	41 40.6	1.3	3888	61	18.1	18.1	1.6	0.57	0.07	214.4	1.82	2.37	90.5	2.08	65.2	n/a	n/a	n/a	2.08	65.23	1.41	92.06	0.153	90.91	55	0.73	1.00	0.16	2.22
4.30497	0.74	46 45.6	1.3	4367	71	18.6	18.6	1.6	0.57	0.07	234.2	1.81	2.34	100.3	2.05	73.3	n/a	n/a	n/a	2.05	73.26	1.37	100.62	0.175	100.68	57	0.71	1.00	0.19	2.55
4.42245	0.86	43 43	1.3	4118	82	19.1	19.1	2.0	0.57	0.07	214.9	1.90	2.31	93.2	2.14	69.1	n/a	n/a	n/a	2.14	69.09	1.53	105.55	0.189	93.67	55	0.72	1.00	0.20	2.76
4.53697	0.92	43 43.4	1.4	4156	88	19.6	19.6	2.1	0.57	0.07	211.4	1.93	2.28	92.9	2.16	69.7	n/a	n/a	n/a	2.16	69.73	1.57	109.34	0.202	93.34	55	0.72	1.00	0.22	2.94
4.65149	0.87	48 47.7	1.4	4568	83	20.1	20.1	1.8	0.57	0.07	226.7	1.86	2.25	100.9	2.09	76.6	n/a	n/a	n/a	2.09	76.64	1.43	109.50	0.202	101.32	58	0.71	1.00	0.22	2.94
4.76261	0.79	46 45.6	1.5	4367	76	20.5	20.5	1.7	0.57	0.07	211.6	1.86	2.22	95.3	2.09	73.3	n/a	n/a	n/a	2.09	73.26	1.43	104.93	0.187	95.72	56	0.72	1.00	0.20	2.73
4.87458	0.69	38 38.4	1.5	3677	66	21.0	21.0	1.8	0.57	0.07	173.9	1.92	2.20	79.2	2.16	61.7	n/a	n/a	n/a	2.16	61.69	1.57	96.64	0.164	79.68	51	0.74	1.00	0.18	2.39
4.98655	0.41	32 32.4	1.5	3103	39	21.5	21.5	1.3	0.57	0.07	143.3	1.87	2.17	66.0	2.12	52.1	n/a	n/a	n/a	2.12	52.05	1.49	77.34	0.123	66.47	47	0.77	1.00	0.13	1.79
5.0964	0.26	25 25.3	1.6	2423	25	22.0	22.0	1.0	0.57	0.07	109.2	1.89	2.15	50.9	2.15	40.6	n/a	n/a	n/a	2.15	40.65	1.56	63.41	0.104	51.34	41	0.79	1.00	0.11	1.51
5.18123	0.24	22 22.4	1.6	2145	23	22.3	22.3	1.1	0.57	0.07	95.0	1.95	2.13	44.6	2.21	36.0	n/a	n/a	n/a	2.21	35.99	1.69	60.96	0.101	45.08	38	0.80	1.00	0.11	1.47
5.3195	0.24	23 22.8	1.6	2183	23	22.9	22.9	1.1	0.57	0.07	94.2	1.95	2.10	44.8	2.21	36.6	n/a	n/a	n/a	2.21	36.63	1.68	61.51	0.102	45.29	39	0.80	1.00	0.11	1.48
5.4302	0.24	19 18.6	1.7	1781	23	23.4	23.4	1.3	0.57	0.07	75.1	2.08	2.08	36.1	2.33	29.9	n/a	n/a	n/a	2.33	29.88	2.06	61.57	0.102	36.57	35	0.80	1.00	0.11	1.48
5.53962	0.22	16 16.3	1.7	1561	21	23.9	23.9	1.4	0.57	0.07	64.3	2.15	2.06	31.2	2.40	26.2	n/a	n/a	n/a	2.40	26.19	2.30	60.18	0.100	31.73	32	0.80	1.00	0.11	1.46
5.6499	0.21	19 18.6	1.7	1781	20	24.4	24.4	1.1	0.57	0.07	72.1	2.06	2.04	35.4	2.31	29.9	n/a	n/a	n/a	2.31	29.88	1.97	59.02	0.099	35.85	34	0.80	1.00	0.11	1.44
5.76145	0.22	17 17.4	1.8	1666	21	24.8	24.8	1.3	0.57	0.07	66.1	2.12	2.02	32.7	2.36	28.0	n/a	n/a	n/a	2.36	27.96	2.17	60.68	0.101	33.21	33	0.80	1.00	0.11	1.47
5.86918	0.22	15 14.9	1.8	1427	21	25.3	25.3	1.5	0.57	0.07	55.4	2.22	2.00	27.7	2.46	23.9	n/a	n/a	n/a	2.46	23.94	2.59	61.91	0.102	28.18	30	0.80	1.00	0.11	1.49
5.97945	0.23	13 13.4	1.8	1283	22	25.8	25.8	1.8	0.57	0.07	48.8	2.31	1.98	24.6	2.54	21.5	n/a	n/a	n/a	2.54	21.53	2.99	64.43	0.105	25.10	29	0.80	1.00	0.11	1.53
6.08888	0.26	13 13.2	1.9	1264	25	26.3	26.3	2.0	0.57	0.07	47.1	2.36	1.96	24.0	2.59	21.2	n/a	n/a	n/a	2.59	21.21	3.24	68.78	0.110	24.51	28	0.80	1.00	0.12	1.61
6.19958	0.28	16 16.2	1.9	1551	27	26.7	26.7	1.8	0.57	0.07	57.0	2.25	1.95	29.3	2.48	26.0	n/a	n/a	n/a	2.48	26.03	2.68	69.72	0.112	29.81	31	0.80	1.00	0.12	1.62
6.30858	0.26	19 18.8	1.9	1800	25	27.2	27.2	1.4	0.57	0.07	65.2	2.15	1.93	33.8	2.37	30.2	n/a	n/a	n/a	2.37	30.20	2.21	66.81	0.108	34.29	34	0.80	1.00	0.12	1.57

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.41928	0.24	19	18.7	2.0	1791	23	27.7	27.7	1.3	0.57	0.07	63.7	2.13	1.91	33.3	2.36	30.0	n/a	n/a	n/a	2.36	30.04	2.16	64.94	0.105	33.81	33	0.80	1.00	0.11	1.54
6.52913	0.19	19	19.4	2.0	1858	18	28.2	28.2	1.0	0.57	0.07	65.0	2.06	1.90	34.3	2.29	31.2	n/a	n/a	n/a	2.29	31.17	1.91	59.41	0.099	34.78	34	0.80	1.00	0.11	1.45
6.63856	0.17	18	18.1	2.0	1733	16	28.6	28.6	1.0	0.57	0.07	59.5	2.08	1.88	31.7	2.31	29.1	n/a	n/a	n/a	2.31	29.08	1.97	57.27	0.097	32.18	32	0.80	1.00	0.10	1.42
6.74926	0.16	13	13.1	2.1	1254	15	29.1	29.1	1.3	0.57	0.07	42.1	2.27	1.87	22.6	2.49	21.0	n/a	n/a	n/a	2.49	21.05	2.73	57.52	0.098	23.10	28	0.80	1.00	0.10	1.42
6.85995	0.14	12	12.1	2.1	1159	13	29.6	29.6	1.2	0.57	0.07	38.2	2.29	1.85	20.6	2.51	19.4	n/a	n/a	n/a	2.51	19.44	2.84	55.26	0.096	21.16	26	0.80	1.00	0.10	1.39
6.97447	0.14	2	2.3	2.1	220	13	30.1	30.1	7.0	0.57	0.07	6.3	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.08984	0.15	1	0.6	2.2	57	14	30.6	30.6	53.4	0.57	0.07	0.9	4.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.20605	0.13	3	2.6	2.2	249	12	31.1	31.1	5.7	0.57	0.07	7.0	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.56402	0.33	6	6.3	2.3	603	32	32.6	32.6	5.5	0.57	0.07	17.5	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.68575	0.55	16	16	2.3	1532	53	33.1	33.1	3.5	0.57	0.07	45.2	2.53	1.75	25.9	2.71	25.7	2.2	25.7	2.71	2.71	25.71	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.80408	0.76	35	34.5	2.4	3304	73	33.7	33.7	2.2	0.57	0.07	97.2	2.16	1.74	56.0	2.33	55.4	n/a	n/a	n/a	2.33	55.43	2.04	113.26	0.215	56.58	43	0.78	1.00	0.23	3.13
7.91944	0.88	48	47.7	2.4	4568	84	34.2	34.2	1.9	0.57	0.07	132.8	2.01	1.72	77.1	2.17	76.6	n/a	n/a	n/a	2.17	76.64	1.60	122.94	0.253	77.65	50	0.75	1.00	0.27	3.68
8.03311	0.55	55	55.2	2.4	5286	53	34.6	34.6	1.0	0.57	0.07	151.6	1.78	1.71	88.6	1.95	88.7	n/a	n/a	n/a	1.95	88.69	1.24	110.13	0.204	89.22	54	0.73	1.00	0.22	2.97
8.14466	0.63	54	53.5	2.5	5123	60	35.1	35.1	1.2	0.57	0.07	144.9	1.84	1.70	85.3	2.01	85.9	n/a	n/a	n/a	2.01	85.88	1.31	112.87	0.214	85.88	53	0.73	1.00	0.23	3.11
8.21888	0.68	43	43.1	2.5	4127	65	35.4	35.4	1.6	0.57	0.07	115.4	2.00	1.69	68.3	2.17	68.9	n/a	n/a	n/a	2.17	68.87	1.59	109.52	0.202	68.87	48	0.76	1.00	0.22	2.95
8.31347	0.79	23	22.5	2.5	2155	76	35.9	35.9	3.6	0.57	0.07	59.1	2.46	1.68	35.2	2.62	35.7	2.1	36.1	2.61	2.61	36.15	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.44283	1.03	20	19.8	2.6	1896	99	36.4	36.4	5.3	0.57	0.07	51.1	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.57049	1.39	33	33.1	2.6	3170	133	37.0	37.0	4.2	0.57	0.07	84.8	2.41	1.66	51.2	2.55	51.8	n/a	n/a	n/a	2.55	51.80	3.05	157.96	0.447	51.80	41	0.79	1.00	0.48	6.50
8.69307	1.81	54	54.2	2.6	5190	173	37.5	37.5	3.4	0.57	0.07	137.5	2.20	1.64	83.6	2.33	84.2	n/a	n/a	n/a	2.33	84.21	2.06	~~173.67~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.80843	1.98	85	85.1	2.7	8149	190	38.0	38.0	2.3	0.57	0.07	213.5	1.96	1.63	130.7	2.09	131.4	n/a	n/a	n/a	2.09	131.36	1.43	~~188.10~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.91913	1.96	87	86.4	2.7	8274	188	38.5	38.5	2.3	0.57	0.07	214.1	1.95	1.62	131.9	2.08	132.5	n/a	n/a	n/a	2.08	132.53	1.41	~~187.32~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.02728	2.19	65	65.2	2.8	6244	210	38.9	38.9	3.4	0.57	0.07	159.4	2.16	1.61	98.8	2.29	99.4	n/a	n/a	n/a	2.29	99.41	1.91	~~189.97~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.13714	2.32	62	62.3	2.8	5966	222	39.4	39.4	3.7	0.57	0.07	150.4	2.21	1.60	93.8	2.34	94.4	n/a	n/a	n/a	2.34	94.42	2.07	~~195.74~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.24826	2.59	46	46.3	2.8	4434	248	39.9	39.9	5.6	0.57	0.07	110.2	2.43	1.59	69.1	2.56	69.7	n/a	n/a	n/a	2.56	69.75	3.08	~~214.94~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.35302	3.2	##	111.5	2.9	10677	306	40.3	40.3	2.9	0.57	0.07	263.7	1.98	1.58	166.4	2.09	167.0	n/a	n/a	n/a	2.09	167.02	1.44	~~240.87~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.45651	3.03	95	95	2.9	9097	290	40.8	40.8	3.2	0.57	0.07	222.1	2.06	1.58	140.9	2.17	141.5	n/a	n/a	n/a	2.17	141.52	1.60	~~226.98~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.56297	2.82	58	58.3	2.9	5583	270	41.2	41.2	4.9	0.57	0.07	134.4	2.33	1.57	85.7	2.45	86.4	n/a	n/a	n/a	2.45	86.37	2.53	~~218.29~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.66985	2.77	50	50.3	2.9	4817	265	41.7	41.7	5.6	0.57	0.07	114.5	2.42	1.56	73.5	2.54	74.1	n/a	n/a	n/a	2.54	74.10	2.96	~~219.24~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.77249	2.08	47	46.6	3.0	4462	199	42.1	42.1	4.5	0.57	0.07	104.9	2.37	1.55	67.6	2.49	68.3	n/a	n/a	n/a	2.49	68.29	2.72	~~185.63~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.87683	2.16	42	42.3	3.0	4051	207	42.6	42.6	5.2	0.57	0.07	94.1	2.44	1.54	61.0	2.56	61.7	n/a	n/a	n/a	2.56	61.66	3.11	~~191.91~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.97777	3.1	##	104.5	3.0	10007	297	43.0	43.0	3.0	0.57	0.07	231.6	2.02	1.53	150.9	2.13	151.6	n/a	n/a	n/a	2.13	151.56	1.51	~~229.16~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.07829	2.83	##	148	3.1	14172	271	43.5	43.5	1.9	0.57	0.07	325.1	1.78	1.53	212.9	1.89	213.6	n/a	n/a	n/a	1.89	213.57	1.18	~~251.42~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.17839	2.85	##	135.8	3.1	13004	273	43.9	43.9	2.1	0.57	0.07	295.3	1.84	1.52	194.3	1.94	195.0	n/a	n/a	n/a	1.94	195.00	1.23	~~240.42~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.27891	1.94	##	102.8	3.1	9844	186	44.3	44.3	1.9	0.57	0.07	221.1	1.87	1.51	146.2	1.99	146.9	n/a	n/a	n/a	1.99	146.89	1.28	~~188.43~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.37815	1.82	##	140	3.2	13406	174	44.8	44.8	1.3	0.57	0.07	298.6	1.67	1.50	198.4	1.78	199.1	n/a	n/a	n/a	1.78	199.09	1.09	~~217.05~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.4774	1.89	##	175.5	3.2	16806	181	45.2	45.2	1.1	0.57	0.07	371.0	1.54	1.50	247.7	1.65	248.4	n/a	n/a	n/a	1.65	248.38	1.00	~~249.55~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.57495	2.57	##	163.9	3.2	15695	246	45.6	45.6	1.6	0.57	0.07	343.2	1.70	1.49	230.2	1.80	230.9	n/a	n/a	n/a	1.80	230.89	1.11	~~255.25~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.67378	3.12	##	136	3.3	13023	299	46.0	46.0	2.3	0.57	0.07	281.9	1.88	1.48	190.0	1.98	190.7	n/a	n/a	n/a	1.98	190.70	1.28	~~243.19~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.7743	2.63	##	125.9	3.3	12056	252	46.5	46.5	2.1	0.57	0.07	258.5	1.87	1.48	175.0	1.97	175.7	n/a	n/a	n/a	1.97	175.71	1.26	~~221.92~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.87482	2.13	93	93	3.3	8906	204	46.9	46.9	2.3	0.57	0.07	188.9	1.98	1.47	128.5	2.09	129.2	n/a	n/a	n/a	2.09	129.19	1.43	~~184.98~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.97576	1.82	56	55.5	3.3	5315	174	47.3	47.3	3.3	0.57	0.07	111.3	2.25	1.46	76.1	2.36	76.7	n/a	n/a	n/a	2.36	76.74	2.14	~~164.36~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.07416	1.82	73	72.7	3.4	6962	174	47.8	47.5	2.5	0.57	0.07	145.5	2.08	1.46	99.6	2.19	100.3	n/a	n/a	n/a	2.19	100.31	1.64	~~164.72~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.17383	1.47	82	81.4	3.4	7795	141	48.2	47.7	1.8	0.57	0.07	162.5	1.94	1.46	111.5	2.05	112.2	n/a	n/a	n/a	2.05	112.16	1.38	154.23	0.421	112.16	61	0.70	1.00	0.45	6.13
11.27266	1.57	70	69.5	3.4	6655	150	48.6	47.8	2.3	0.57	0.07	138.2	2.06	1.46	94.9	2.17	95.6	n/a	n/a	n/a	2.17	95.63	1.60	152.97	0.413	95.63	56	0.72	1.00	0.44	6.00
11.33246	1.77	63	62.6	3.5	5995	169	48.9	47.9	2.9	0.57	0.07	124.2	2.17	1.45	85.4	2.27	86.1	n/a	n/a	n/a	2.27	86.07	1.87	~~160.89~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.45588	1.89	64	63.8	3.5	6109	181	49.4	48.0	3.0	0.57	0.07	126.2	2.18	1.45	86.9	2.28	87.6	n/a	n/a	n/a	2.28	87.57	1.90	~~166.33~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.55555	1.9	65	65.1	3.5	6234	182	49.8	48.2	2.9	0.57	0.07	128.4	2.17	1.45	88.5	2.27	89.2	n/a	n/a	n/a	2.27	89.23	1.87	~~166.68~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.65395	1.19	52	51.6	3.6	4941	114	50.3	48.3	2.3	0.57	0.07	101.3	2.16	1.45	69.9	2.27	70.6	n/a	n/a	n/a	2.27	70.63	1.86	131.51	0.292	70.63	48	0.76	1.00	0.31	4.22

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc		(tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
11.75362	0.81	79		79.3	3.6	7594	78	50.7	48.4	1.0	0.57	0.07	155.7	1.77	1.45	107.7	1.89	108.4	n/a	n/a	n/a	1.89	108.40	1.18	128.22	0.276	108.40	60	0.70	1.00	0.30	4.00
11.85075	1.98	##		148.1	3.6	14182	190	51.1	48.6	1.3	0.57	0.07	291.0	1.68	1.44	201.5	1.78	202.2	n/a	n/a	n/a	1.78	202.18	1.09	~~221.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.94873	1.42	##		140	3.6	13406	136	51.5	48.7	1.0	0.57	0.07	274.3	1.60	1.44	190.1	1.71	190.9	n/a	n/a	n/a	1.71	190.87	1.04	~~199.45~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.04543	1.81	##		164.8	3.7	15781	173	51.9	48.8	1.1	0.57	0.07	322.2	1.59	1.44	223.6	1.69	224.4	n/a	n/a	n/a	1.69	224.38	1.03	~~231.01~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.14383	2.37	85		84.5	3.7	8092	227	52.4	48.9	2.8	0.57	0.07	164.2	2.09	1.44	114.2	2.19	114.9	n/a	n/a	n/a	2.19	114.90	1.64	~~188.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.2435	2.79	##		115.3	3.7	11041	267	52.8	49.1	2.4	0.57	0.07	223.9	1.96	1.44	155.8	2.05	156.6	n/a	n/a	n/a	2.05	156.57	1.37	~~215.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.34275	2.04	##		106.5	3.8	10198	195	53.2	49.2	1.9	0.57	0.07	206.2	1.90	1.43	143.7	2.00	144.4	n/a	n/a	n/a	2.00	144.43	1.30	~~187.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.44115	1.85	88		87.6	3.8	8389	177	53.7	49.3	2.1	0.57	0.07	168.9	1.98	1.43	117.9	2.09	118.6	n/a	n/a	n/a	2.09	118.64	1.43	~~169.61~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.54124	1.93	77		76.7	3.8	7345	185	54.1	49.5	2.5	0.57	0.07	147.4	2.08	1.43	103.0	2.18	103.7	n/a	n/a	n/a	2.18	103.74	1.62	~~168.44~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.64176	1.65	63		62.6	3.9	5995	158	54.5	49.6	2.7	0.57	0.07	119.7	2.15	1.43	83.8	2.26	84.6	n/a	n/a	n/a	2.26	84.55	1.82	153.96	0.419	84.55	53	0.74	1.00	0.45	6.03
12.74186	1.86	73		73	3.9	6990	178	54.9	49.7	2.6	0.57	0.07	139.4	2.10	1.43	97.7	2.20	98.5	n/a	n/a	n/a	2.20	98.47	1.67	~~164.48~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.84153	1.4	63		63.2	3.9	6052	134	55.4	49.9	2.2	0.57	0.07	120.2	2.10	1.43	84.4	2.20	85.1	n/a	n/a	n/a	2.20	85.14	1.67	142.22	0.348	85.14	53	0.74	1.00	0.37	4.99
12.94035	1.36	76		75.5	3.9	7230	130	55.8	50.0	1.8	0.57	0.07	143.5	1.98	1.42	100.8	2.08	101.6	n/a	n/a	n/a	2.08	101.57	1.42	144.69	0.362	101.57	58	0.71	1.00	0.39	5.19
13.0413	1.18	39		38.5	4.0	3687	113	56.2	50.1	3.1	0.57	0.07	72.4	2.35	1.42	50.9	2.46	51.7	n/a	n/a	n/a	2.46	51.73	2.57	132.73	0.297	51.73	41	0.79	1.00	0.32	4.26
13.14394	1	34		34.3	4.0	3285	96	56.7	50.3	3.0	0.57	0.07	64.2	2.37	1.42	45.2	2.48	46.0	n/a	n/a	n/a	2.48	46.02	2.68	123.12	0.254	46.02	39	0.80	1.00	0.27	3.63
13.24573	0.97	20		20.1	4.0	1925	93	57.1	50.4	5.0	0.57	0.07	37.1	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.34668	0.93	14		13.9	4.1	1331	89	57.6	50.5	7.0	0.57	0.07	25.2	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.44847	1.09	15		15.2	4.1	1456	104	58.0	50.7	7.5	0.57	0.07	27.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.55238	1.2	12		11.9	4.1	1140	115	58.4	50.8	10.6	0.57	0.08	21.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.6546	1.17	15		14.9	4.2	1427	112	58.9	50.9	8.2	0.57	0.08	26.9	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.75766	1.14	13		12.8	4.2	1226	109	59.3	51.1	9.4	0.57	0.08	22.8	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.862	1.13	16		16.2	4.2	1551	108	59.8	51.2	7.3	0.57	0.08	29.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.96507	1.07	17		17	4.3	1628	102	60.2	51.4	6.5	0.57	0.08	30.5	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.06855	1.04	16		16	4.3	1532	100	60.7	51.5	6.8	0.57	0.08	28.6	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.17204	1.04	11		11.2	4.3	1073	100	61.1	51.6	9.8	0.57	0.08	19.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.27638	1.02	12		12.2	4.4	1168	98	61.6	51.8	8.8	0.57	0.08	21.4	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.37563	1	15		15.2	4.4	1456	96	62.0	51.9	6.9	0.57	0.08	26.9	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.4244	1	14		13.4	4.4	1283	96	62.2	52.0	7.8	0.57	0.08	23.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.53001	1.06	14		13.8	4.4	1321	102	62.7	52.1	8.1	0.57	0.08	24.2	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.63774	1.03	13		12.8	4.5	1226	99	63.1	52.2	8.5	0.57	0.08	22.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.74378	1.01	13		12.8	4.5	1226	97	63.6	52.4	8.3	0.57	0.08	22.2	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.84981	0.98	11		10.8	4.5	1034	94	64.0	52.5	9.7	0.57	0.08	18.5	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.95754	0.99	16		16.1	4.6	1542	95	64.5	52.7	6.4	0.57	0.08	28.0	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.06612	1	14		13.9	4.6	1331	96	65.0	52.8	7.6	0.57	0.08	24.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.1747	1	14		13.6	4.6	1302	96	65.4	53.0	7.7	0.57	0.08	23.4	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.28285	0.98	12		11.4	4.7	1092	94	65.9	53.1	9.1	0.57	0.08	19.3	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.39101	0.98	13		12.8	4.7	1226	94	66.4	53.2	8.1	0.57	0.08	21.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.49916	0.98	12		11.8	4.7	1130	94	66.8	53.4	8.8	0.57	0.08	19.9	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.60986	0.97	13		13.2	4.8	1264	93	67.3	53.5	7.8	0.57	0.08	22.4	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.71801	0.96	12		11.7	4.8	1120	92	67.8	53.7	8.7	0.57	0.08	19.6	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.82956	0.96	11		10.8	4.8	1034	92	68.3	53.8	9.5	0.57	0.08	17.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.93984	0.97	16		15.4	4.9	1475	93	68.7	54.0	6.6	0.57	0.08	26.1	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.05096	0.98	12		11.5	4.9	1101	94	69.2	54.1	9.1	0.57	0.08	19.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.16166	0.98	12		11.5	4.9	1101	94	69.7	54.3	9.1	0.57	0.08	19.0	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.27236	0.97	15		14.6	5.0	1398	93	70.2	54.4	7.0	0.57	0.08	24.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.38433	0.98	10		9.8	5.0	938	94	70.7	54.6	10.8	0.57	0.08	15.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.49588	1	14		13.9	5.0	1331	96	71.1	54.7	7.6	0.57	0.08	23.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.60616	1.03	13		13.2	5.1	1264	99	71.6	54.8	8.3	0.57	0.08	21.7	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
16.71813	1.05	12.3	5.1	1178	101	72.1	55.0	9.1	0.57	0.08	20.1	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.8301	1.05	13.7	5.1	1312	101	72.6	55.1	8.1	0.57	0.08	22.5	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.94037	1.05	14.1	5.2	1350	101	73.1	55.3	7.9	0.57	0.08	23.1	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.05277	1.07	15	5.2	1436	102	73.5	55.4	7.5	0.57	0.08	24.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.16347	1.09	12.2	5.2	1168	104	74.0	55.6	9.5	0.57	0.08	19.7	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.27417	1.05	10.1	5.3	967	101	74.5	55.7	11.3	0.57	0.08	16.0	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.38486	0.9	15.4	5.3	1475	86	75.0	55.9	6.2	0.57	0.08	25.0	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.49599	0.9	13.2	5.3	1264	86	75.4	56.0	7.3	0.57	0.08	21.2	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.60626	0.92	11.8	5.4	1130	88	75.9	56.2	8.4	0.57	0.08	18.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.6508	0.94	11.3	5.4	1082	90	76.1	56.2	8.9	0.57	0.08	17.9	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.73011	0.98	12.4	5.4	1187	94	76.5	56.3	8.4	0.57	0.08	19.7	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.84463	0.99	14.9	5.4	1427	95	77.0	56.5	7.0	0.57	0.08	23.9	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.95151	1.01	12.1	5.5	1159	97	77.4	56.6	8.9	0.57	0.08	19.1	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.03718	0.97	19.2	5.5	1839	93	77.8	56.7	5.3	0.57	0.08	31.0	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.14152	0.97	14.6	5.5	1398	93	78.2	56.9	7.0	0.57	0.08	23.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.24755	0.98	13.6	5.6	1302	94	78.7	57.0	7.7	0.57	0.08	21.5	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.35147	0.96	17.9	5.6	1714	92	79.1	57.2	5.6	0.57	0.08	28.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.45538	0.96	12.9	5.6	1235	92	79.6	57.3	8.0	0.57	0.08	20.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.56099	0.98	16.6	5.7	1590	94	80.0	57.4	6.2	0.57	0.08	26.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.66618	0.99	15.6	5.7	1494	95	80.5	57.6	6.7	0.57	0.08	24.5	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.76839	1	15	5.7	1436	96	80.9	57.7	7.1	0.57	0.08	23.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.87315	1.04	17.5	5.8	1676	100	81.4	57.8	6.2	0.57	0.08	27.6	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.97834	1.07	18.8	5.8	1800	102	81.8	58.0	6.0	0.57	0.08	29.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.0848	1.05	14	5.8	1341	101	82.3	58.1	8.0	0.57	0.08	21.6	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.18659	1.04	16	5.8	1532	100	82.7	58.3	6.9	0.57	0.08	24.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.28965	1.02	13.7	5.9	1312	98	83.2	58.4	7.9	0.57	0.08	21.0	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.39272	0.99	14.3	5.9	1369	95	83.6	58.5	7.4	0.57	0.08	22.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.49706	0.98	19.7	5.9	1886	94	84.1	58.7	5.2	0.57	0.08	30.7	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.59927	0.92	16.2	6.0	1551	88	84.5	58.8	6.0	0.57	0.08	24.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.70276	0.88	15.4	6.0	1475	84	85.0	58.9	6.1	0.57	0.08	23.6	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.8054	0.75	16	6.0	1532	72	85.4	59.1	5.0	0.57	0.08	24.5	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.90932	0.66	15.5	6.1	1484	63	85.9	59.2	4.5	0.57	0.08	23.6	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.01196	0.65	18.8	6.1	1800	62	86.3	59.4	3.6	0.57	0.08	28.9	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.11544	0.74	18.3	6.1	1752	71	86.7	59.5	4.3	0.57	0.08	28.0	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.21809	0.85	17.8	6.2	1705	81	87.2	59.6	5.0	0.57	0.08	27.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.32115	0.96	21.3	6.2	2040	92	87.6	59.8	4.7	0.57	0.08	32.7	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.42422	0.97	16.8	6.2	1609	93	88.1	59.9	6.1	0.57	0.08	25.4	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.52728	0.9	14.6	6.3	1398	86	88.5	60.0	6.6	0.57	0.08	21.8	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.62823	0.84	17.6	6.3	1685	80	89.0	60.2	5.0	0.57	0.08	26.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.7122	0.83	15.1	6.3	1446	79	89.3	60.3	5.9	0.57	0.08	22.5	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.8475	0.87	12.2	6.4	1168	83	89.9	60.5	7.7	0.57	0.08	17.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.95735	0.9	9.8	6.4	938	86	90.4	60.6	10.2	0.57	0.08	14.0	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.06636	0.93	12.3	6.4	1178	89	90.8	60.7	8.2	0.57	0.08	17.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.17536	0.95	8.4	6.5	804	91	91.3	60.9	12.8	0.57	0.08	11.7	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.28436	0.92	11.7	6.5	1120	88	91.8	61.0	8.6	0.57	0.08	16.9	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.39379	0.91	9.4	6.5	900	87	92.3	61.2	10.8	0.57	0.08	13.2	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.50194	0.91	8.5	6.6	814	87	92.7	61.3	12.1	0.57	0.08	11.8	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.61137	0.91	11.7	6.6	1120	87	93.2	61.5	8.5	0.57	0.08	16.7	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
21.72165	0.94	16	15.7	6.6	1503	90	93.7	61.6	6.4	0.57	0.08	22.9	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.82895	1	10	9.7	6.7	929	96	94.1	61.8	11.5	0.57	0.08	13.5	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.93711	1.07	12	12	6.7	1149	102	94.6	61.9	9.7	0.57	0.08	17.0	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.04611	1.08	16	16.1	6.7	1542	103	95.1	62.0	7.1	0.57	0.08	23.3	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.15469	1.06	13	12.6	6.8	1207	102	95.5	62.2	9.1	0.57	0.08	17.9	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.26242	0.99	18	17.4	6.8	1666	95	96.0	62.3	6.0	0.57	0.08	25.2	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.37015	0.92	16	15.4	6.8	1475	88	96.5	62.5	6.4	0.57	0.08	22.1	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.47746	0.91	17	16.8	6.9	1609	87	96.9	62.6	5.8	0.57	0.08	24.1	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.58561	0.9	21	20.5	6.9	1963	86	97.4	62.8	4.6	0.57	0.08	29.7	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.69376	0.85	19	19	6.9	1819	81	97.9	62.9	4.7	0.57	0.08	27.4	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.80149	0.88	21	20.4	6.9	1954	84	98.3	63.0	4.5	0.57	0.08	29.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.9088	0.91	17	16.9	7.0	1618	87	98.8	63.2	5.7	0.57	0.08	24.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.01822	0.84	15	15.2	7.0	1456	80	99.3	63.3	5.9	0.57	0.08	21.4	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.12384	0.82	21	20.5	7.0	1963	79	99.7	63.5	4.2	0.57	0.08	29.4	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.23157	0.85	17	17.2	7.1	1647	81	100.2	63.6	5.3	0.57	0.08	24.3	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.33887	0.86	17	16.6	7.1	1590	82	100.6	63.8	5.5	0.57	0.08	23.4	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.44618	0.86	20	19.9	7.1	1906	82	101.1	63.9	4.6	0.57	0.08	28.2	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.55264	0.87	16	16.2	7.2	1551	83	101.6	64.0	5.7	0.57	0.08	22.6	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.65952	0.89	18	17.4	7.2	1666	85	102.0	64.2	5.4	0.57	0.08	24.4	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.76555	0.91	18	18.1	7.2	1733	87	102.5	64.3	5.3	0.57	0.08	25.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.88304	0.88	17	17	7.3	1628	84	103.0	64.5	5.5	0.57	0.08	23.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.98525	0.89	15	14.6	7.3	1398	85	103.4	64.6	6.6	0.57	0.08	20.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.08789	0.92	13	13.1	7.3	1254	88	103.9	64.7	7.7	0.57	0.08	17.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.1935	0.93	12	12.1	7.4	1159	89	104.3	64.9	8.4	0.57	0.08	16.3	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.29911	0.96	15	14.6	7.4	1398	92	104.8	65.0	7.1	0.57	0.08	19.9	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.40472	0.95	15	14.6	7.4	1398	91	105.2	65.2	7.0	0.57	0.08	19.8	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.50991	0.93	14	13.4	7.5	1283	89	105.7	65.3	7.6	0.57	0.08	18.0	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.61382	0.92	10	10.1	7.5	967	88	106.1	65.4	10.2	0.57	0.08	13.2	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.71901	0.89	15	14.8	7.5	1417	85	106.6	65.6	6.5	0.57	0.08	20.0	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.82504	0.82	11	11.2	7.6	1073	79	107.1	65.7	8.1	0.57	0.08	14.7	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.92853	0.81	14	13.7	7.6	1312	78	107.5	65.9	6.4	0.57	0.08	18.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.03456	0.86	13	12.8	7.6	1226	82	108.0	66.0	7.4	0.57	0.08	16.9	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.14017	0.86	14	13.4	7.7	1283	82	108.4	66.1	7.0	0.57	0.08	17.8	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.24451	0.84	15	15.3	7.7	1465	80	108.9	66.3	5.9	0.57	0.08	20.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.34927	0.86	13	13	7.7	1245	82	109.3	66.4	7.3	0.57	0.08	17.1	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.45361	0.83	12	12.1	7.8	1159	79	109.8	66.5	7.6	0.57	0.08	15.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.55879	0.8	16	16.1	7.8	1542	77	110.2	66.7	5.4	0.57	0.08	21.5	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.6644	0.84	14	13.9	7.8	1331	80	110.7	66.8	6.6	0.57	0.08	18.3	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.76874	0.82	13	13	7.9	1245	79	111.1	67.0	6.9	0.57	0.08	16.9	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.8735	0.84	19	18.4	7.9	1762	80	111.6	67.1	4.9	0.57	0.08	24.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.97826	0.83	14	14.3	7.9	1369	79	112.0	67.2	6.3	0.57	0.08	18.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.08302	0.81	14	13.6	8.0	1302	78	112.5	67.4	6.5	0.57	0.08	17.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.18694	0.84	19	18.6	8.0	1781	80	112.9	67.5	4.8	0.57	0.08	24.7	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.29212	0.83	14	13.5	8.0	1293	79	113.4	67.7	6.7	0.57	0.08	17.4	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.39646	0.83	12	12.2	8.0	1168	79	113.8	67.8	7.5	0.57	0.08	15.6	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.50122	0.84	18	17.4	8.1	1666	80	114.3	67.9	5.2	0.57	0.08	22.8	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.60556	0.8	14	13.6	8.1	1302	77	114.7	68.1	6.5	0.57	0.08	17.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.71075	0.85	13	12.7	8.1	1216	81	115.2	68.2	7.4	0.57	0.08	16.1	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
26.81381	0.85	17	17.2	8.2	1647	81	115.6	68.3	5.3	0.57	0.08	22.4	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.89567	0.88	14	13.8	8.2	1321	84	116.0	68.5	7.0	0.57	0.08	17.6	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.0017	0.91	15	14.7	8.2	1408	87	116.4	68.6	6.7	0.57	0.08	18.8	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.10858	0.93	18	17.3	8.3	1657	89	116.9	68.7	5.8	0.57	0.08	22.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.21334	0.94	14	14.2	8.3	1360	90	117.4	68.9	7.2	0.57	0.08	18.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.31895	0.96	16	15.8	8.3	1513	92	117.8	69.0	6.6	0.57	0.08	20.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.42499	0.97	17	17	8.4	1628	93	118.3	69.2	6.2	0.57	0.08	21.8	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.53187	1	14	13.4	8.4	1283	96	118.7	69.3	8.2	0.57	0.08	16.8	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.63578	1.01	14	13.9	8.4	1331	97	119.2	69.4	8.0	0.57	0.08	17.5	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.74182	1.02	20	19.5	8.5	1867	98	119.6	69.6	5.6	0.57	0.08	25.1	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.84658	1.03	14	14.1	8.5	1350	99	120.1	69.7	8.0	0.57	0.08	17.6	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.95304	1.07	15	15	8.5	1436	102	120.5	69.9	7.8	0.57	0.08	18.8	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.05737	1.09	19	18.5	8.6	1772	104	121.0	70.0	6.3	0.57	0.08	23.6	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.16256	1.07	17	16.4	8.6	1570	102	121.4	70.1	7.1	0.57	0.08	20.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.26774	1.06	17	17.1	8.6	1637	102	121.9	70.3	6.7	0.57	0.08	21.6	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.37335	1.08	16	15.5	8.6	1484	103	122.4	70.4	7.6	0.57	0.08	19.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.47727	1.09	14	13.6	8.7	1302	104	122.8	70.5	8.8	0.57	0.08	16.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.58118	1.08	19	19.1	8.7	1829	103	123.3	70.7	6.1	0.57	0.08	24.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.68637	1.07	14	13.3	8.7	1274	102	123.7	70.8	8.9	0.57	0.08	16.2	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.79113	1.04	13	12.5	8.8	1197	100	124.2	71.0	9.3	0.57	0.08	15.1	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.89758	1.05	14	14.1	8.8	1350	101	124.6	71.1	8.2	0.57	0.08	17.2	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.00065	1.05	16	15.6	8.8	1494	101	125.1	71.2	7.3	0.57	0.08	19.2	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.10456	1.03	17	17.2	8.9	1647	99	125.5	71.4	6.5	0.57	0.08	21.3	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.2089	1.04	12	12	8.9	1149	100	126.0	71.5	9.7	0.57	0.08	14.3	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.31196	1.02	15	14.6	8.9	1398	98	126.4	71.7	7.7	0.57	0.08	17.7	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.41545	1	17	16.9	9.0	1618	96	126.8	71.8	6.4	0.57	0.08	20.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.51979	1.01	12	11.8	9.0	1130	97	127.3	71.9	9.6	0.57	0.08	13.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.62328	1.01	14	13.6	9.0	1302	97	127.7	72.1	8.2	0.57	0.08	16.3	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.72635	0.95	17	16.9	9.1	1618	91	128.2	72.2	6.1	0.57	0.08	20.6	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.83068	0.93	11	10.4	9.1	996	89	128.6	72.3	10.3	0.57	0.08	12.0	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.9329	0.96	11	10.7	9.1	1025	92	129.1	72.5	10.3	0.57	0.08	12.4	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.01603	1	14	14	9.1	1341	96	129.4	72.6	7.9	0.57	0.08	16.7	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.14072	1.04	12	11.9	9.2	1140	100	130.0	72.7	9.9	0.57	0.08	13.9	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.24124	1	17	17.3	9.2	1657	96	130.4	72.9	6.3	0.57	0.08	20.9	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.34134	0.99	16	15.9	9.2	1523	95	130.8	73.0	6.8	0.57	0.08	19.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.44059	0.99	16	15.9	9.3	1523	95	131.3	73.1	6.8	0.57	0.08	19.0	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.54111	0.99	18	18.1	9.3	1733	95	131.7	73.3	5.9	0.57	0.08	21.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.64163	0.98	12	11.4	9.3	1092	94	132.1	73.4	9.8	0.57	0.08	13.1	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.74088	1.02	11	10.8	9.4	1034	98	132.6	73.5	10.8	0.57	0.08	12.3	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.84012	0.98	12	12.1	9.4	1159	94	133.0	73.7	9.1	0.57	0.08	13.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.93979	0.96	13	12.8	9.4	1226	92	133.4	73.8	8.4	0.57	0.08	14.8	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.04116	0.98	13	12.7	9.5	1216	94	133.9	73.9	8.7	0.57	0.08	14.6	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.13956	0.95	12	11.6	9.5	1111	91	134.3	74.1	9.3	0.57	0.08	13.2	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.23839	0.92	12	11.9	9.5	1140	88	134.7	74.2	8.8	0.57	0.08	13.5	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.33848	0.9	12	11.9	9.6	1140	86	135.1	74.3	8.6	0.57	0.08	13.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.43815	0.92	9	9.3	9.6	891	88	135.6	74.5	11.7	0.57	0.08	10.1	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.5374	0.93	13	12.4	9.6	1187	89	136.0	74.6	8.5	0.57	0.08	14.1	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.6358	0.97	12	12.1	9.6	1159	93	136.4	74.7	9.1	0.57	0.08	13.7	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
31.73462	1.04	11	10.5	9.7	1005	100	136.8	74.9	11.5	0.57	0.08	11.6	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.8343	1.03	14	13.5	9.7	1293	99	137.3	75.0	8.5	0.57	0.08	15.4	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.93397	1	18	18.1	9.7	1733	96	137.7	75.1	6.0	0.57	0.09	21.2	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.03279	1	12	11.4	9.8	1092	96	138.1	75.3	10.0	0.57	0.09	12.7	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.13161	0.98	11	11.3	9.8	1082	94	138.6	75.4	9.9	0.57	0.09	12.5	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.23044	0.99	11	11	9.8	1053	95	139.0	75.5	10.4	0.57	0.09	12.1	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.33011	0.97	13	12.9	9.9	1235	93	139.4	75.6	8.5	0.57	0.09	14.5	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.42681	1	12	11.9	9.9	1140	96	139.8	75.8	9.6	0.57	0.09	13.2	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.52606	1.03	10	9.8	9.9	938	99	140.3	75.9	12.4	0.57	0.09	10.5	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.62488	1.02	13	12.8	9.9	1226	98	140.7	76.0	9.0	0.57	0.09	14.3	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.72328	1.01	17	17.2	10.0	1647	97	141.1	76.2	6.4	0.57	0.09	19.8	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.82168	1.05	11	11.4	10.0	1092	101	141.5	76.3	10.6	0.57	0.09	12.5	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.92008	1.03	12	12	10.0	1149	99	142.0	76.4	9.8	0.57	0.09	13.2	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.01805	1.04	13	13	10.1	1245	100	142.4	76.6	9.0	0.57	0.09	14.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.1156	1.1	14	13.9	10.1	1331	105	142.8	76.7	8.9	0.57	0.09	15.5	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.20086	1.06	17	16.5	10.1	1580	102	143.2	76.8	7.1	0.57	0.09	18.7	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.30265	1.09	14	14	10.2	1341	104	143.6	76.9	8.7	0.57	0.09	15.6	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.40656	1.07	13	13	10.2	1245	102	144.1	77.1	9.3	0.57	0.09	14.3	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.50666	1.08	12	12.3	10.2	1178	103	144.5	77.2	10.0	0.57	0.09	13.4	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.6093	1.12	19	18.6	10.2	1781	107	144.9	77.3	6.6	0.57	0.09	21.2	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.71151	1.09	14	14.3	10.3	1369	104	145.4	77.5	8.5	0.57	0.09	15.8	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.81331	1.1	14	13.5	10.3	1293	105	145.8	77.6	9.2	0.57	0.09	14.8	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.91468	1.08	12	11.5	10.3	1101	103	146.3	77.7	10.8	0.57	0.09	12.3	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.01604	1.09	14	13.7	10.4	1312	104	146.7	77.9	9.0	0.57	0.09	15.0	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.11784	1.09	13	13.1	10.4	1254	104	147.1	78.0	9.4	0.57	0.09	14.2	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.22048	1.1	16	15.7	10.4	1503	105	147.6	78.1	7.8	0.57	0.09	17.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.32312	1.1	14	13.7	10.5	1312	105	148.0	78.3	9.1	0.57	0.09	14.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.42491	1.13	16	15.4	10.5	1475	108	148.5	78.4	8.2	0.57	0.09	16.9	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.52628	1.22	13	12.4	10.5	1187	117	148.9	78.5	11.2	0.57	0.09	13.2	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.6285	1.23	13	12.5	10.6	1197	118	149.3	78.7	11.2	0.57	0.09	13.3	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.72859	1.13	21	20.8	10.6	1992	108	149.8	78.8	5.9	0.57	0.09	23.4	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.82954	3.18	56	55.9	10.6	5353	305	150.2	78.9	5.9	0.57	0.09	65.9	2.58	1.13	58.2	2.62	59.9	1.2	62.9	2.60	2.60	62.91	3.31	~~208.02~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.92624	1.27	##	143.6	10.6	13751	122	150.6	79.1	0.9	0.57	0.09	172.0	1.70	1.13	151.9	1.74	153.6	n/a	n/a	n/a	1.74	153.62	1.07	~~163.71~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.02506	2.34	##	192.3	10.7	18415	224	151.0	79.2	1.2	0.57	0.09	230.6	1.71	1.13	203.9	1.75	205.6	n/a	n/a	n/a	1.75	205.55	1.07	~~220.17~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.12261	2.23	##	190	10.7	18194	214	151.5	79.3	1.2	0.57	0.09	227.4	1.71	1.13	201.2	1.74	202.9	n/a	n/a	n/a	1.74	202.93	1.07	~~216.28~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.22059	2.43	##	176.1	10.7	16863	233	151.9	79.5	1.4	0.57	0.09	210.3	1.78	1.13	186.2	1.82	187.9	n/a	n/a	n/a	1.82	187.93	1.12	~~210.27~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.32238	2.8	49	49.1	10.8	4702	268	152.3	79.6	5.9	0.57	0.09	57.2	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.42375	1.47	32	32.6	10.8	3122	141	152.8	79.7	4.7	0.57	0.09	37.2	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.52681	1.12	25	25.8	10.8	2471	107	153.2	79.9	4.6	0.57	0.09	29.0	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.62818	0.98	10	10.4	10.9	996	94	153.6	80.0	11.1	0.57	0.09	10.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.72955	0.93	15	15.7	10.9	1503	89	154.1	80.1	6.6	0.57	0.09	16.8	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.80505	0.87	16	16.8	10.9	1609	83	154.4	80.2	5.7	0.57	0.09	18.1	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.91829	0.81	10	10.7	10.9	1025	78	154.9	80.4	8.9	0.57	0.09	10.8	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.01881	0.87	15	15.5	11.0	1484	83	155.3	80.5	6.3	0.57	0.09	16.5	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.11933	0.93	12	12.5	11.0	1197	89	155.8	80.7	8.6	0.57	0.09	12.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.22197	0.83	23	23.1	11.0	2212	79	156.2	80.8	3.9	0.57	0.09	25.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.25632	0.78	30	30.4	11.1	2911	75	156.3	80.8	2.7	0.57	0.09	34.1	2.55	1.12	30.4	2.58	32.2	n/a	n/a	n/a	2.58	32.17	3.23	103.99	0.185	32.17	32	0.80	1.00	0.20	2.27
36.35727	0.66	40	39.7	11.1	3802	63	156.8	81.0	1.7	0.57	0.09	45.0	2.33	1.12	40.2	2.37	42.0	n/a	n/a	n/a	2.37	41.97	2.19	91.80	0.152	41.97	37	0.80	1.00	0.16	1.87

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
36.45525	1.06	72	71.6	11.1	6856	102	157.2	81.1	1.5	0.57	0.09	82.6	2.09	1.12	73.9	2.13	75.6	n/a	n/a	n/a	2.13	75.64	1.51	113.95	0.218	75.64	50	0.75	1.00	0.23	2.67
36.5528	0.79	##	114.3	11.1	10945	76	157.6	81.2	0.7	0.57	0.09	132.8	1.72	1.12	118.9	1.76	120.6	n/a	n/a	n/a	1.76	120.65	1.08	129.73	0.283	120.65	63	0.69	1.00	0.30	3.47
36.64865	1.06	##	107.9	11.2	10333	102	158.0	81.4	1.0	0.57	0.09	125.1	1.84	1.12	112.1	1.87	113.8	n/a	n/a	n/a	1.87	113.80	1.16	132.40	0.296	113.80	61	0.69	1.00	0.32	3.63
36.74535	2.42	##	146.2	11.2	14000	232	158.5	81.5	1.7	0.57	0.09	169.9	1.90	1.12	152.3	1.93	154.1	n/a	n/a	n/a	1.93	154.08	1.22	~~188.43~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.84121	1.98	##	151.8	11.2	14536	190	158.9	81.6	1.3	0.57	0.09	176.2	1.82	1.11	158.1	1.85	159.9	n/a	n/a	n/a	1.85	159.86	1.14	~~182.67~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.93918	1.95	##	124.5	11.3	11922	187	159.3	81.7	1.6	0.57	0.09	143.9	1.93	1.11	129.3	1.97	131.0	n/a	n/a	n/a	1.97	131.00	1.26	~~164.76~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.03716	2.25	80	79.9	11.3	7651	215	159.7	81.9	2.9	0.57	0.09	91.5	2.26	1.11	82.3	2.29	84.0	n/a	n/a	n/a	2.29	84.01	1.91	~~160.58~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.13513	1.25	73	73.2	11.3	7010	120	160.1	82.0	1.7	0.57	0.09	83.5	2.13	1.11	75.1	2.16	76.9	n/a	n/a	n/a	2.16	76.90	1.58	121.62	0.247	76.90	50	0.75	1.00	0.26	3.02
37.23311	1.34	67	67.4	11.3	6454	128	160.6	82.1	2.0	0.57	0.09	76.6	2.20	1.11	69.0	2.24	70.8	n/a	n/a	n/a	2.24	70.75	1.76	124.50	0.259	70.75	48	0.76	1.00	0.28	3.17
37.33278	1.52	51	50.7	11.4	4855	146	161.0	82.3	3.1	0.57	0.09	57.1	2.42	1.11	51.4	2.45	53.2	n/a	n/a	n/a	2.45	53.18	2.55	135.46	0.311	53.18	42	0.79	1.00	0.33	3.80
37.42906	1.64	39	39.1	11.4	3744	157	161.4	82.4	4.4	0.57	0.09	43.5	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.52831	1.64	31	30.9	11.4	2959	157	161.8	82.5	5.6	0.57	0.09	33.9	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.62713	1.6	29	28.6	11.5	2739	153	162.3	82.6	5.9	0.57	0.09	31.2	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.72595	1.68	27	27.2	11.5	2605	161	162.7	82.8	6.6	0.57	0.09	29.5	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.82351	1.65	21	20.8	11.5	1992	158	163.1	82.9	8.6	0.57	0.09	22.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.92063	1.69	20	20.4	11.6	1954	162	163.5	83.0	9.0	0.57	0.09	21.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.01776	1.69	24	24.1	11.6	2308	162	163.9	83.2	7.5	0.57	0.09	25.8	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.11531	1.71	21	21	11.6	2011	164	164.4	83.3	8.9	0.57	0.09	22.2	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.21455	1.73	26	25.9	11.6	2480	166	164.8	83.4	7.2	0.57	0.09	27.8	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.31126	1.72	21	21.2	11.7	2030	165	165.2	83.6	8.8	0.57	0.09	22.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.40796	1.73	24	24	11.7	2298	166	165.6	83.7	7.8	0.57	0.09	25.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.50509	1.73	19	18.9	11.7	1810	166	166.0	83.8	10.1	0.57	0.09	19.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.60222	1.75	23	23.2	11.8	2222	168	166.5	83.9	8.2	0.57	0.09	24.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.69892	1.82	20	19.9	11.8	1906	174	166.9	84.1	10.0	0.57	0.09	20.7	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.7935	1.83	25	24.5	11.8	2346	175	167.3	84.2	8.0	0.57	0.09	25.9	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.89105	1.83	21	20.7	11.9	1982	175	167.7	84.3	9.7	0.57	0.09	21.5	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.98775	1.87	28	27.4	11.9	2624	179	168.1	84.4	7.3	0.57	0.09	29.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.08361	1.87	26	25.5	11.9	2442	179	168.5	84.6	7.9	0.57	0.09	26.9	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.16208	1.88	22	21.4	11.9	2049	180	168.9	84.7	9.6	0.57	0.09	22.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.26048	1.9	22	22.2	12.0	2126	182	169.3	84.8	9.3	0.57	0.09	23.1	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.35548	1.9	29	28.8	12.0	2758	182	169.7	84.9	7.0	0.57	0.09	30.5	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.43522	1.93	21	21	12.0	2011	185	170.1	85.0	10.0	0.57	0.09	21.6	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.55482	1.98	26	26.1	12.1	2499	190	170.6	85.2	8.1	0.57	0.09	27.3	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.65237	2	29	28.4	12.1	2720	192	171.0	85.3	7.5	0.57	0.09	29.9	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.75077	2.05	30	30.1	12.1	2882	196	171.4	85.5	7.2	0.57	0.09	31.7	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.8479	2.1	31	31.1	12.1	2978	201	171.8	85.6	7.2	0.57	0.09	32.8	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.94545	2.14	30	29.4	12.2	2815	205	172.3	85.7	7.8	0.57	0.09	30.8	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.04427	2.19	29	29.3	12.2	2806	210	172.7	85.8	8.0	0.57	0.09	30.7	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.14183	2.21	32	31.4	12.2	3007	212	173.1	86.0	7.5	0.57	0.09	33.0	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.2398	2.25	34	33.6	12.3	3218	215	173.5	86.1	7.1	0.57	0.09	35.4	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.33693	2.31	30	29.9	12.3	2863	221	173.9	86.2	8.2	0.57	0.09	31.2	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.43405	2.33	31	30.8	12.3	2949	223	174.4	86.4	8.0	0.57	0.09	32.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.53373	2.36	33	32.7	12.4	3131	226	174.8	86.5	7.6	0.57	0.09	34.2	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.63043	2.43	37	37.3	12.4	3572	233	175.2	86.6	6.9	0.57	0.09	39.2	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.72713	2.48	31	30.8	12.4	2949	237	175.6	86.7	8.6	0.57	0.09	32.0	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.82553	2.53	34	33.9	12.4	3246	242	176.1	86.9	7.9	0.57	0.09	35.3	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.92308	2.44	34	34	12.5	3256	234	176.5	87.0	7.6	0.57	0.09	35.4	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.01894	2.37	36	36.1	12.5	3457	227	176.9	87.1	6.9	0.57	0.09	37.6	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
41.11479	2.35	38.4	12.5	3677	225	177.3	87.3	6.4	0.57	0.09	40.1	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.21022	2.35	30.2	12.6	2892	225	177.7	87.4	8.3	0.57	0.09	31.1	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.3082	2.31	37.4	12.6	3581	221	178.1	87.5	6.5	0.57	0.09	38.9	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.40532	2.32	30.2	12.6	2892	222	178.6	87.6	8.2	0.57	0.09	31.0	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.50076	2.34	33.6	12.6	3218	224	179.0	87.8	7.4	0.57	0.09	34.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.59703	2.29	27.1	12.7	2595	219	179.4	87.9	9.1	0.57	0.09	27.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.69246	2.31	30.2	12.7	2834	221	179.8	88.0	8.3	0.57	0.09	30.2	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.79002	2.34	36.4	12.7	3486	224	180.2	88.2	6.8	0.57	0.09	37.5	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.88332	2.38	32.4	12.8	3103	228	180.6	88.3	7.8	0.57	0.09	33.1	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.9796	2.4	33.1	12.8	3170	230	181.0	88.4	7.7	0.57	0.09	33.8	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.07504	2.38	32.8	12.8	3141	228	181.4	88.5	7.7	0.57	0.09	33.4	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.17004	2.37	31.7	12.9	3036	227	181.9	88.7	8.0	0.57	0.09	32.2	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.26547	2.4	27.2	12.9	2605	230	182.3	88.8	9.5	0.57	0.09	27.3	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.3609	2.46	27.5	12.9	2633	236	182.7	88.9	9.6	0.57	0.09	27.6	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.45591	2.43	29.4	12.9	2815	233	183.1	89.0	8.8	0.57	0.09	29.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.55091	2.45	38.8	13.0	3715	235	183.5	89.2	6.6	0.57	0.09	39.6	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.60139	2.48	39.2	13.0	3754	237	183.7	89.2	6.7	0.57	0.09	40.0	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.69809	2.54	34.5	13.0	3304	243	184.1	89.4	7.8	0.57	0.09	34.9	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.79352	2.63	36.1	13.0	3457	252	184.5	89.5	7.7	0.57	0.09	36.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.88937	2.16	42	13.1	4022	207	185.0	89.6	5.4	0.57	0.09	42.8	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.98438	1.91	36	13.1	3447	183	185.4	89.7	5.6	0.57	0.09	36.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.07896	2.09	37.8	13.1	3620	200	185.8	89.9	5.8	0.57	0.09	38.2	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.24013	2.27	34.6	13.2	3313	217	186.5	90.1	7.0	0.57	0.09	34.7	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.33684	2.43	42.4	13.2	4060	233	186.9	90.2	6.0	0.57	0.09	42.9	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.43269	2.05	44.8	13.2	4290	196	187.3	90.3	4.8	0.57	0.09	45.4	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.5277	1.67	58.3	13.3	5583	160	187.7	90.5	3.0	0.57	0.09	59.6	2.39	1.06	56.4	2.41	58.3	n/a	n/a	n/a	2.41	58.32	2.36	137.74	0.323	58.32	44	0.78	1.00	0.35	3.81
43.6227	1.76	67.8	13.3	6493	169	188.1	90.6	2.7	0.57	0.09	69.6	2.32	1.06	65.8	2.33	67.8	n/a	n/a	n/a	2.33	67.77	2.06	139.45	0.332	67.77	47	0.76	1.00	0.36	3.92
43.83859	2.23	55.7	13.4	5334	214	189.0	90.9	4.2	0.57	0.09	56.6	2.52	1.06	53.6	2.53	55.6	n/a	n/a	n/a	2.53	55.59	2.93	~~163.04~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.93402	2.35	44.6	13.4	4271	225	189.5	91.0	5.5	0.57	0.09	44.9	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.03072	2.27	42.1	13.4	4031	217	189.9	91.1	5.7	0.57	0.09	42.2	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.127	2.19	33.8	13.4	3237	210	190.3	91.2	6.9	0.57	0.09	33.4	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.22073	2.29	32.9	13.5	3151	219	190.7	91.4	7.4	0.57	0.09	32.4	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.31617	2.22	26.5	13.5	2538	213	191.1	91.5	9.1	0.57	0.09	25.6	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.41117	2.14	26.6	13.5	2547	205	191.5	91.6	8.7	0.57	0.09	25.7	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.50703	2.06	24.8	13.6	2375	197	191.9	91.7	9.0	0.57	0.09	23.8	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.60203	1.69	27.5	13.6	2633	162	192.3	91.9	6.6	0.57	0.09	26.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.69619	1.33	29.7	13.6	2844	127	192.7	92.0	4.8	0.57	0.09	28.8	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.78992	1.22	34.3	13.7	3285	117	193.1	92.1	3.8	0.57	0.09	33.6	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.01429	1.64	28	13.7	2681	157	194.1	92.4	6.3	0.57	0.09	26.9	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.10802	1.73	28.3	13.7	2710	166	194.5	92.5	6.6	0.57	0.09	27.2	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.20303	1.88	35.3	13.8	3380	180	194.9	92.7	5.7	0.57	0.09	34.4	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.29889	2.15	36.8	13.8	3524	206	195.3	92.8	6.2	0.57	0.09	35.9	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.39347	2.27	42.3	13.8	4051	217	195.8	92.9	5.6	0.57	0.09	41.5	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.48762	2.35	46.9	13.9	4491	225	196.2	93.0	5.2	0.57	0.09	46.2	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.58178	2.16	56.6	13.9	5420	207	196.6	93.2	4.0	0.57	0.09	56.1	2.50	1.04	53.8	2.52	55.8	n/a	n/a	n/a	2.52	55.78	2.85	159.00	0.454	55.78	43	0.79	1.00	0.49	5.30
45.67552	1.97	54.2	13.9	5190	189	197.0	93.3	3.8	0.57	0.09	53.5	2.50	1.04	51.4	2.52	53.4	n/a	n/a	n/a	2.52	53.38	2.85	151.92	0.406	53.38	42	0.79	1.00	0.44	4.74
45.76925	2.21	56	14.0	5363	212	197.4	93.4	4.1	0.57	0.09	55.3	2.52	1.04	53.1	2.53	55.1	n/a	n/a	n/a	2.53	55.12	2.93	~~161.33~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.98429	2.8	48.9	14.0	4683	268	198.3	93.7	6.0	0.57	0.09	47.9	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-5)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
46.0759	2.69	49	49.1	14.0	4702	258	198.7	93.8	5.7	0.57	0.09	48.0	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.16666	2.58	47	47.1	14.1	4510	247	199.1	93.9	5.7	0.57	0.09	45.9	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.257	2.56	45	45.3	14.1	4338	245	199.5	94.1	5.9	0.57	0.09	44.0	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.34819	2.58	50	50.2	14.1	4807	247	199.9	94.2	5.4	0.57	0.09	48.9	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.43811	2.59	46	46	14.2	4405	248	200.3	94.3	5.9	0.57	0.09	44.6	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.53057	2.63	47	46.9	14.2	4491	252	200.7	94.4	5.9	0.57	0.09	45.4	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.62006	2.61	43	42.9	14.2	4108	250	201.0	94.5	6.4	0.57	0.09	41.3	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.70998	2.59	47	46.9	14.2	4491	248	201.4	94.7	5.8	0.57	0.09	45.3	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.7999	2.51	42	42.1	14.3	4031	240	201.8	94.8	6.3	0.57	0.09	40.4	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.89109	2.14	48	48.1	14.3	4606	205	202.2	94.9	4.7	0.57	0.09	46.4	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.981	1.78	42	41.4	14.3	3964	170	202.6	95.0	4.5	0.57	0.09	39.6	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.06922	1.87	42	42	14.3	4022	179	203.0	95.1	4.7	0.57	0.09	40.1	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.27747	2.18	48	47.5	14.4	4549	209	203.9	95.4	4.8	0.57	0.09	45.5	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.37164	2.14	42	41.5	14.4	3974	205	204.3	95.5	5.4	0.57	0.09	39.5	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.46537	2.18	47	46.9	14.5	4491	209	204.7	95.7	4.9	0.57	0.09	44.8	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.5591	2.27	41	40.6	14.5	3888	217	205.1	95.8	5.9	0.57	0.09	38.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.65241	1.9	44	43.5	14.5	4166	182	205.5	95.9	4.6	0.57	0.09	41.3	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.74656	1.64	49	48.5	14.6	4644	157	205.9	96.0	3.5	0.57	0.09	46.2	2.53	1.03	45.0	2.54	47.1	n/a	n/a	n/a	2.54	47.08	2.96	139.14	0.331	47.08	39	0.80	1.00	0.35	3.82
47.84072	1.83	53	53.3	14.6	5104	175	206.3	96.2	3.6	0.57	0.09	50.9	2.50	1.03	49.6	2.51	51.7	n/a	n/a	n/a	2.51	51.71	2.81	145.48	0.366	51.71	41	0.79	1.00	0.39	4.23
48.01801	1.61	46	45.9	14.6	4395	154	207.1	96.4	3.7	0.57	0.09	43.5	2.56	1.03	42.4	2.57	44.5	n/a	n/a	n/a	2.57	44.48	3.13	139.05	0.330	44.48	38	0.80	1.00	0.35	3.81
48.11217	1.53	44	44.2	14.7	4233	147	207.5	96.5	3.6	0.57	0.09	41.7	2.57	1.02	40.7	2.58	42.8	n/a	n/a	n/a	2.58	42.80	3.18	136.11	0.315	42.80	37	0.80	1.00	0.34	3.63
48.38913	1.78	50	49.5	14.7	4740	170	208.7	96.9	3.8	0.57	0.09	46.8	2.54	1.02	45.7	2.55	47.8	n/a	n/a	n/a	2.55	47.84	3.03	144.96	0.363	47.84	40	0.80	1.00	0.39	4.18
48.48329	1.74	43	42.6	14.8	4079	167	209.1	97.0	4.3	0.57	0.09	39.9	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.5766	1.83	50	50.4	14.8	4826	175	209.5	97.1	3.8	0.57	0.09	47.5	2.54	1.02	46.5	2.55	48.7	n/a	n/a	n/a	2.55	48.65	3.02	146.70	0.374	48.65	40	0.80	1.00	0.40	4.30
48.80987	2.24	46	46.2	14.9	4424	215	210.5	97.4	5.1	0.57	0.09	43.2	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.90191	2.39	49	48.6	14.9	4654	229	210.9	97.6	5.2	0.57	0.09	45.5	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.19753	1.88	46	45.8	15.0	4386	180	212.2	97.9	4.3	0.57	0.09	42.6	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.29084	1.61	47	46.5	15.0	4453	154	212.6	98.1	3.6	0.57	0.09	43.2	2.56	1.02	42.5	2.56	44.7	n/a	n/a	n/a	2.56	44.67	3.10	138.41	0.327	44.67	38	0.80	1.00	0.35	3.74
49.70734	2.81	71	71.3	15.2	6828	269	214.4	98.6	4.1	0.57	0.09	67.1	2.46	1.01	66.2	2.46	68.3	n/a	n/a	n/a	2.46	68.30	2.59	~~176.86~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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				0.0	0	0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.25473	0.16	# 19	0.1	1819	15	1.1	1.1	0.8	0.57	0.07	1655.3	1.17	9.60	172.4	1.68	30.5	n/a	n/a	n/a	1.68	30.53	1.03	31.34	0.076	172.46	75	0.62	1.00	0.08	1.10
0.3961	0.23	# 15.9	0.1	1523	22	1.7	1.7	1.4	0.57	0.07	890.4	1.48	7.70	115.6	1.97	25.5	n/a	n/a	n/a	1.97	25.55	1.26	32.30	0.077	115.74	62	0.69	1.00	0.08	1.11
0.5379	0.25	# 21.4	0.2	2049	24	2.3	2.3	1.2	0.57	0.07	882.5	1.39	6.61	133.5	1.86	34.4	n/a	n/a	n/a	1.86	34.38	1.15	39.71	0.083	133.67	66	0.67	1.00	0.09	1.20
0.67843	0.27	# 22.1	0.2	2116	26	2.9	2.9	1.2	0.57	0.07	722.4	1.44	5.89	122.7	1.90	35.5	n/a	n/a	n/a	1.90	35.51	1.19	42.27	0.085	122.92	63	0.68	1.00	0.09	1.23
0.81938	0.24	# 18.7	0.2	1791	23	3.5	3.5	1.3	0.57	0.07	505.8	1.53	5.36	94.5	2.00	30.0	n/a	n/a	n/a	2.00	30.04	1.30	39.07	0.083	94.64	56	0.72	1.00	0.09	1.19
0.96118	0.29	# 13.2	0.3	1264	28	4.1	4.1	2.2	0.57	0.07	304.0	1.85	4.94	61.5	2.30	21.2	n/a	n/a	n/a	2.30	21.21	1.94	41.04	0.084	61.68	45	0.78	1.00	0.09	1.22
1.09916	0.23	# 15.9	0.3	1523	22	4.7	4.7	1.5	0.57	0.07	320.2	1.69	4.62	69.3	2.14	25.5	n/a	n/a	n/a	2.14	25.55	1.52	38.95	0.082	69.48	48	0.76	1.00	0.09	1.19
1.23883	0.27	# 13.3	0.4	1274	26	5.3	5.3	2.0	0.57	0.07	237.4	1.88	4.36	54.5	2.31	21.4	n/a	n/a	n/a	2.31	21.37	1.99	42.45	0.085	54.74	42	0.79	1.00	0.09	1.23
1.37936	0.29	# 11	0.4	1053	28	5.9	5.9	2.7	0.57	0.07	176.1	2.05	4.13	42.7	2.47	17.7	n/a	n/a	n/a	2.47	17.67	2.61	46.08	0.088	42.91	38	0.80	1.00	0.09	1.28
1.51606	0.3	# 13.8	0.5	1321	29	6.5	6.5	2.2	0.57	0.07	201.1	1.95	3.94	51.1	2.35	22.2	n/a	n/a	n/a	2.35	22.17	2.13	47.21	0.089	51.34	41	0.79	1.00	0.10	1.29
1.65447	0.26	# 11.6	0.5	1111	25	7.1	7.1	2.3	0.57	0.07	154.7	2.03	3.77	41.0	2.43	18.6	n/a	n/a	n/a	2.43	18.64	2.46	45.75	0.088	41.31	37	0.80	1.00	0.09	1.27
1.79117	0.31	# 12.2	0.5	1168	30	7.7	7.7	2.6	0.57	0.07	150.3	2.08	3.62	41.5	2.47	19.6	n/a	n/a	n/a	2.47	19.60	2.60	50.99	0.092	41.76	37	0.80	1.00	0.10	1.33
1.92575	0.28	# 19.3	0.6	1848	27	8.3	8.3	1.5	0.57	0.07	221.6	1.78	3.49	63.4	2.17	31.0	n/a	n/a	n/a	2.17	31.01	1.59	49.29	0.091	63.71	46	0.77	1.00	0.10	1.32
2.05948	0.28	# 20.4	0.6	1954	27	8.9	8.9	1.4	0.57	0.07	219.0	1.77	3.38	64.8	2.14	32.8	n/a	n/a	n/a	2.14	32.78	1.54	50.50	0.092	65.12	46	0.77	1.00	0.10	1.33
2.18642	0.29	# 15.9	0.7	1523	28	9.4	9.4	1.8	0.57	0.07	160.5	1.95	3.28	49.0	2.32	25.5	n/a	n/a	n/a	2.32	25.55	2.01	51.24	0.093	49.26	40	0.80	1.00	0.10	1.34
2.32865	0.3	# 17.7	0.7	1695	29	10.0	10.0	1.7	0.57	0.07	167.8	1.91	3.18	52.8	2.27	28.4	n/a	n/a	n/a	2.27	28.44	1.86	52.92	0.094	53.14	42	0.79	1.00	0.10	1.36
2.44115	0.31	# 21.2	0.7	2030	30	10.5	10.5	1.5	0.57	0.07	191.8	1.83	3.10	61.8	2.18	34.1	n/a	n/a	n/a	2.18	34.06	1.61	54.98	0.095	62.16	45	0.77	1.00	0.10	1.38
2.55535	0.32	# 12.5	0.8	1197	31	11.0	11.0	2.6	0.57	0.07	107.6	2.18	3.03	35.5	2.52	20.1	n/a	n/a	n/a	2.52	20.08	2.87	57.66	0.098	35.82	34	0.80	1.00	0.10	1.41
2.66871	0.32	# 13.7	0.8	1312	31	11.5	11.5	2.4	0.57	0.07	113.0	2.13	2.97	38.1	2.47	22.0	n/a	n/a	n/a	2.47	22.01	2.62	57.78	0.098	38.42	35	0.80	1.00	0.10	1.42
2.78291	0.32	# 17.7	0.8	1695	31	12.0	12.0	1.8	0.57	0.07	140.2	1.99	2.91	48.3	2.32	28.4	n/a	n/a	n/a	2.32	28.44	2.01	57.29	0.097	48.61	40	0.80	1.00	0.10	1.41
2.89584	0.31	# 10.9	0.9	1044	30	12.5	12.5	2.9	0.57	0.07	82.6	2.29	2.85	29.0	2.62	17.5	4.3	17.5	2.79	2.79	17.51	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.00792	0.31	# 13.6	0.9	1302	30	13.0	13.0	2.3	0.57	0.07	99.4	2.16	2.79	35.6	2.49	21.9	n/a	n/a	n/a	2.49	21.85	2.70	59.09	0.099	35.92	34	0.80	1.00	0.11	1.43
3.12085	0.3	# 11.6	1.0	1111	29	13.5	13.5	2.6	0.57	0.07	81.5	2.26	2.74	29.7	2.58	18.6	n/a	n/a	n/a	2.58	18.64	3.22	60.07	0.100	30.08	31	0.80	1.00	0.11	1.45
3.23463	0.31	# 14.8	1.0	1417	30	13.9	13.9	2.1	0.57	0.07	100.6	2.13	2.70	37.3	2.45	23.8	n/a	n/a	n/a	2.45	23.78	2.52	59.85	0.100	37.70	35	0.80	1.00	0.11	1.44
3.34586	0.33	# 9.9	1.0	948	32	14.4	14.4	3.4	0.57	0.07	64.7	2.41	2.65	24.4	2.72	15.9	3.9	15.9	2.86	2.86	15.91	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.45922	0.33	# 14	1.1	1341	32	14.9	14.9	2.4	0.57	0.07	88.9	2.21	2.61	34.1	2.51	22.5	n/a	n/a	n/a	2.51	22.49	2.82	63.51	0.104	34.48	34	0.80	1.00	0.11	1.50
3.5713	0.32	# 13.5	1.1	1293	31	15.4	15.4	2.4	0.57	0.07	82.9	2.23	2.57	32.3	2.53	21.7	n/a	n/a	n/a	2.53	21.69	2.93	63.48	0.104	32.73	33	0.80	1.00	0.11	1.50
3.68253	0.33	# 17.4	1.1	1666	32	15.9	15.9	1.9	0.57	0.07	103.9	2.09	2.53	41.1	2.39	28.0	n/a	n/a	n/a	2.39	27.96	2.26	63.23	0.104	41.54	37	0.80	1.00	0.11	1.50
3.79376	0.31	9 9.3	1.2	891	30	16.4	16.4	3.4	0.57	0.07	53.4	2.47	2.49	21.5	2.76	14.9	3.6	14.9	2.89	2.89	14.94	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.90457	0.26	9 9.4	1.2	900	25	16.8	16.8	2.8	0.57	0.07	52.5	2.42	2.45	21.4	2.71	15.1	3.5	15.1	2.84	2.84	15.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.01877	0.24	4 3.8	1.2	364	23	17.3	17.3	6.6	0.57	0.07	20.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.13213	0.2	9 9	1.3	862	19	17.8	17.8	2.3	0.57	0.07	47.4	2.39	2.38	19.9	2.68	14.5	3.4	14.5	2.80	2.80	14.46	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.24378	0.16	1 1.2	1.3	115	15	18.3	18.3	15.9	0.57	0.07	5.3	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.35586	0.13	5 5.4	1.3	517	12	18.8	18.8	2.5	0.57	0.07	26.5	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.46964	0.09	5 4.8	1.4	460	9	19.3	19.3	2.0	0.57	0.07	22.8	2.60	2.29	10.0	2.90	7.7	3.2	7.7	2.99	2.99	7.71	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.6955	0.09	3 2.7	1.4	259	9	20.2	20.2	3.6	0.57	0.07	11.8	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.80886	0.08	4 4.4	1.5	421	8	20.7	20.7	1.9	0.57	0.07	19.3	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.92306	0.06	1 1.4	1.5	134	6	21.2	21.2	5.1	0.57	0.07	5.3	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.03641	0.04	3 2.8	1.5	268	4	21.7	21.7	1.6	0.57	0.07	11.3	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.15062	0.08	3 2.9	1.6	278	8	22.2	22.2	3.0	0.57	0.07	11.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.26397	0.07	7 6.7	1.6	642	7	22.7	22.7	1.1	0.57	0.07	27.3	2.39	2.11	12.9	2.67	10.8	2.8	10.8	2.74	2.74	10.76	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.31109	0.06	3 2.9	1.6	278	6	22.9	22.9	2.3	0.57	0.07	11.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.44992	0.06	4 3.9	1.7	373	6	23.5	23.5	1.6	0.57	0.07	14.9	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.8681	0.01	1 1.4	1.8	134	1	25.3	25.3	0.9	0.57	0.07	4.3	3.07	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.0065	0.04	2 2.5	1.8	239	4	25.9	25.9	1.8	0.57	0.07	8.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.43063	0.06	3 2.9	2.0	278	6	27.7	27.7	2.3	0.57	0.07	9.0	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.572	0.03	4 4.6	2.0	440	3	28.3	28.3	0.7	0.57	0.07	14.5	2.54	1.89	7.7	2.79	7.4	2.4	7.4	2.81	2.81	7.39	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.85348	0.03	4 3.9	2.1	373	3	29.6	29.6	0.8	0.57	0.07	11.6	2.66	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.99485	0.07	4 4.4	2.1	421	7	30.2	30.2	1.7	0.57	0.07	13.0	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.13835	0.08	5 5.4	2.2	517	8	30.8	30.8	1.6	0.57	0.07	15.8	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.27845	0.13	1 1	2.2	96	12	31.4	31.4	19.3	0.57	0.07	2.1	4.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.42152	0.17	3 3.4	2.3	326	16	32.0	32.0	5.5	0.57	0.07	9.2	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.56332	0.22	5 5.1	2.3	488	21	32.6	32.6	4.6	0.57	0.07	14.0	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.703	0.28	# 14.5	2.3	1389	27	33.2	33.2	2.0	0.57	0.07	40.8	2.40	1.75	23.4	2.59	23.3	n/a	n/a	n/a	2.59	23.30	3.27	76.29	0.121	23.93	28	0.80	1.00	0.13	1.75
7.84565	0.28	8 8.3	2.4	795	27	33.8	33.8	3.5	0.57	0.07	22.5	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.98532	0.32	9 9.1	2.4	871	31	34.4	34.4	3.7	0.57	0.07	24.3	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.12585	0.32	# 11.4	2.5	1092	31	35.0	35.0	2.9	0.57	0.07	30.2	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.2651	0.36	# 17.2	2.5	1647	34	35.6	35.6	2.1	0.57	0.07	45.2	2.39	1.69	26.8	2.56	27.4	n/a	n/a	n/a	2.56	27.41	3.11	85.25	0.138	27.41	30	0.80	1.00	0.15	1.99
8.35383	0.38	# 18.6	2.5	1781	36	36.0	36.0	2.1	0.57	0.07	48.4	2.36	1.68	28.9	2.53	29.5	n/a	n/a	n/a	2.53	29.48	2.93	86.40	0.140	29.48	31	0.80	1.00	0.15	2.02
8.49138	0.33	# 23.5	2.6	2250	32	36.6	36.6	1.4	0.57	0.07	60.5	2.18	1.66	36.3	2.35	36.9	n/a	n/a	n/a	2.35	36.94	2.13	78.69	0.125	36.94	35	0.80	1.00	0.13	1.81
8.62936	0.39	# 21.9	2.6	2097	37	37.2	37.2	1.8	0.57	0.07	55.4	2.27	1.65	33.5	2.44	34.2	n/a	n/a	n/a	2.44	34.15	2.49	85.20	0.138	34.15	33	0.80	1.00	0.15	1.99
8.76479	0.37	# 21.9	2.7	2097	35	37.8	37.8	1.7	0.57	0.07	54.5	2.26	1.64	33.3	2.43	33.9	n/a	n/a	n/a	2.43	33.89	2.45	82.90	0.133	33.89	33	0.80	1.00	0.14	1.92
8.90022	0.38	# 26.7	2.7	2557	36	38.4	38.4	1.4	0.57	0.07	65.6	2.15	1.62	40.4	2.32	41.0	n/a	n/a	n/a	2.32	41.00	2.01	82.46	0.132	41.00	37	0.80	1.00	0.14	1.91
9.03608	0.45	# 23.5	2.8	2250	43	39.0	39.0	1.9	0.57	0.07	56.8	2.29	1.61	35.2	2.45	35.8	n/a	n/a	n/a	2.45	35.81	2.51	89.77	0.147	35.81	34	0.80	1.00	0.16	2.13
9.17108	0.46	# 26.6	2.8	2547	44	39.5	39.5	1.8	0.57	0.07	63.4	2.22	1.60	39.6	2.38	40.2	n/a	n/a	n/a	2.38	40.24	2.22	89.37	0.146	40.24	36	0.80	1.00	0.16	2.12
9.30312	0.45	# 27.8	2.8	2662	43	40.1	40.1	1.6	0.57	0.07	65.4	2.19	1.59	41.1	2.35	41.8	n/a	n/a	n/a	2.35	41.75	2.11	87.97	0.143	41.75	37	0.80	1.00	0.15	2.07
9.436	0.38	# 31.9	2.9	3055	36	40.7	40.7	1.2	0.57	0.07	74.1	2.06	1.58	46.9	2.22	47.6	n/a	n/a	n/a	2.22	47.57	1.72	81.71	0.131	47.57	39	0.80	1.00	0.14	1.89
9.56761	0.35	# 24.3	2.9	2327	34	41.3	41.3	1.5	0.57	0.07	55.4	2.21	1.57	35.4	2.37	36.0	n/a	n/a	n/a	2.37	35.99	2.19	78.88	0.126	35.99	34	0.80	1.00	0.13	1.82
9.69837	0.28	# 22.5	3.0	2155	27	41.8	41.8	1.3	0.57	0.07	50.5	2.21	1.56	32.5	2.36	33.1	n/a	n/a	n/a	2.36	33.10	2.17	71.86	0.115	33.10	33	0.80	1.00	0.12	1.66
9.82956	0.25	# 22.5	3.0	2155	24	42.4	42.4	1.1	0.57	0.07	49.8	2.18	1.55	32.2	2.34	32.9	n/a	n/a	n/a	2.34	32.88	2.08	68.43	0.110	32.88	33	0.80	1.00	0.12	1.59
9.9599	0.26	# 21.3	3.0	2040	25	43.0	43.0	1.2	0.57	0.07	46.5	2.23	1.54	30.3	2.38	30.9	n/a	n/a	n/a	2.38	30.92	2.25	69.62	0.111	30.92	32	0.80	1.00	0.12	1.61
10.08981	0.3	# 20.3	3.1	1944	29	43.5	43.5	1.5	0.57	0.07	43.7	2.30	1.53	28.6	2.45	29.3	n/a	n/a	n/a	2.45	29.28	2.54	74.27	0.118	29.28	31	0.80	1.00	0.13	1.71
10.21887	0.3	# 19.5	3.1	1867	29	44.1	44.1	1.6	0.57	0.07	41.4	2.33	1.52	27.3	2.48	27.9	n/a	n/a	n/a	2.48	27.94	2.67	74.49	0.118	27.94	30	0.80	1.00	0.13	1.71
10.34878	0.31	# 24.7	3.2	2365	30	44.6	44.6	1.3	0.57	0.07	52.0	2.20	1.51	34.5	2.34	35.2	n/a	n/a	n/a	2.34	35.17	2.10	73.78	0.117	35.17	34	0.80	1.00	0.13	1.70
10.47742	0.33	# 18.7	3.2	1791	32	45.2	45.2	1.8	0.57	0.07	38.6	2.39	1.50	25.8	2.53	26.5	n/a	n/a	n/a	2.53	26.47	2.95	77.97	0.124	26.47	29	0.80	1.00	0.13	1.79
10.60393	0.36	# 21.8	3.2	2088	34	45.7	45.7	1.7	0.57	0.07	44.7	2.33	1.49	30.0	2.46	30.7	n/a	n/a	n/a	2.46	30.67	2.59	79.39	0.127	30.67	32	0.80	1.00	0.14	1.83
10.73215	0.31	# 19.1	3.3	1829	30	46.3	46.3	1.7	0.57	0.07	38.5	2.37	1.48	26.0	2.51	26.7	n/a	n/a	n/a	2.51	26.71	2.82	75.27	0.120	26.71	30	0.80	1.00	0.13	1.73
10.85781	0.3	# 22.8	3.3	2183	29	46.8	46.8	1.3	0.57	0.07	45.6	2.26	1.47	31.0	2.39	31.7	n/a	n/a	n/a	2.39	31.70	2.29	72.57	0.116	31.70	32	0.80	1.00	0.12	1.67
10.98518	0.3	# 16.5	3.3	1580	29	47.4	47.4	1.9	0.57	0.07	32.4	2.46	1.46	22.1	2.60	22.8	n/a	n/a	n/a	2.60	22.81	3.31	75.47	0.120	22.81	27	0.80	1.00	0.13	1.73
11.11212	0.29	# 16.8	3.4	1609	28	47.9	47.9	1.8	0.57	0.07	32.6	2.45	1.45	22.4	2.58	23.1	n/a	n/a	n/a	2.58	23.09	3.20	73.99	0.118	23.09	28	0.80	1.00	0.13	1.70
11.23821	0.28	# 20.7	3.4	1982	27	48.5	48.5	1.4	0.57	0.07	39.9	2.31	1.45	27.6	2.44	28.3	n/a	n/a	n/a	2.44	28.29	2.50	70.73	0.113	28.29	30	0.80	1.00	0.12	1.63
11.36472	0.17	# 11.8	3.5	1130	16	49.0	49.0	1.5	0.57	0.07	22.1	2.54	1.44	15.3	2.68	16.0	1.7	18.5	2.61	2.61	18.54	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.49039	0.15	# 13.9	3.5	1331	14	49.6	49.6	1.1	0.57	0.07	25.9	2.42	1.43	18.1	2.55	18.8	n/a	n/a	n/a	2.55	18.79	3.04	57.10	0.097	18.79	25	0.80	1.00	0.10	1.41
11.56087	0.14	# 14	3.5	1341	13	49.9	49.9	1.0	0.57	0.07	25.9	2.40	1.43	18.2	2.53	18.9	n/a	n/a	n/a	2.53	18.86	2.94	55.49	0.096	18.86	25	0.80	1.00	0.10	1.39
11.65808	0.12	8 7.9	3.6	757	11	50.3	50.3	1.6	0.57	0.07	14.0	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.7897	0.11	# 12.2	3.6	1168	11	50.8	50.8	0.9	0.57	0.07	22.0	2.44	1.41	15.6	2.57	16.3	n/a	n/a	n/a	2.57	16.28	3.16	51.42	0.093	16.28	23	0.80	1.00	0.10	1.34
11.9247	0.11	# 12.5	3.6	1197	11	51.4	51.4	0.9	0.57	0.07	22.3	2.43	1.40	15.9	2.56	16.6	n/a	n/a	n/a	2.56	16.58	3.09	51.20	0.092	16.58	23	0.80	1.00	0.10	1.34
12.05759	0.13	# 15.8	3.7	1513	12	52.0	52.0	0.9	0.57	0.07	28.1	2.33	1.40	20.1	2.45	20.8	n/a	n/a	n/a	2.45	20.84	2.54	52.96	0.094	20.84	26	0.80	1.00	0.10	1.36
12.1875	0.13	# 20.9	3.7	2001	12	52.6	52.6	0.6	0.57	0.07	37.1	2.16	1.39	26.7	2.29	27.4	n/a	n/a	n/a	2.29	27.43	1.91	52.25	0.093	27.43	30	0.80	1.00	0.10	1.35
12.31656	0.1	# 27.5	3.8	2633	10	53.1	53.1	0.4	0.57	0.07	48.6	1.95	1.38	35.2	2.08	35.9	n/a	n/a	n/a	2.08	35.90	1.42	50.93	0.092	35.90	34	0.80	1.00	0.10	1.33
12.44775	0.11	# 24.2	3.8	2317	11	53.7	53.7	0.5	0.57	0.07	42.2	2.05	1.37	30.7	2.17	31.4	n/a	n/a	n/a	2.17	31.42	1.60	50.35	0.092	31.42	32	0.80	1.00	0.10	1.33
12.57723	0.17	# 25.3	3.8	2423	16	54.2	54.2	0.7	0.57	0.07	43.7	2.11	1.37	31.9	2.23	32.7	n/a	n/a	n/a	2.23	32.68	1.75	57.14	0.097	32.68	33	0.80	1.00	0.10	1.41
12.70587	0.18	# 22.4	3.9	2145	17	54.8	54.8	0.8	0.57	0.07	38.1	2.20	1.36	28.1	2.32	28.8	n/a	n/a	n/a	2.32	28.79	2.01	57.94	0.098	28.79	31	0.80	1.00	0.11	1.42
12.83748	0.15	# 20.5	3.9	1963	14	55.4	55.4	0.8	0.57	0.07	34.5	2.22	1.35	25.5	2.34	26.2	n/a	n/a	n/a	2.34	26.21	2.07	54.36	0.095	26.21	29	0.80	1.00	0.10	1.37
12.96867	0.12	# 21.4	4.0	2049	11	55.9	55.9	0.6	0.57	0.07	35.6	2.15	1.35	26.5	2.27	27.2	n/a	n/a	n/a	2.27	27.22	1.86	50.52	0.092	27.22	30	0.80	1.00	0.10	1.33
13.1007	0.12	# 20.5	4.0	1963	11	56.5	56.2	0.6	0.57	0.07	33.9	2.18	1.34	25.3	2.30	26.0	n/a	n/a	n/a	2.30	26.02	1.94	50.42	0.092	26.02	29	0.80	1.00	0.10	1.33

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{cIN} n=.5	C_Q n=.7	q_{cIN} n=.7	I_c n=.7	I_c[5]	q_{cIN}	K_c[5]	$(q_{cIN})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
13.23231	0.1 #	21.2	4.0	2030	10	57.1	56.4	0.5	0.57	0.07	35.0	2.13	1.34	26.1	2.24	26.9	n/a	n/a	n/a	2.24	26.86	1.78	47.87	0.090	26.86	30	0.80	1.00	0.10	1.30
13.36732	0.13 #	21	4.1	2011	12	57.6	56.5	0.6	0.57	0.07	34.5	2.19	1.34	25.8	2.30	26.6	n/a	n/a	n/a	2.30	26.57	1.95	51.70	0.093	26.57	30	0.80	1.00	0.10	1.34
13.49808	0.11 #	19.7	4.1	1886	11	58.2	56.7	0.6	0.57	0.07	32.2	2.19	1.34	24.1	2.31	24.9	n/a	n/a	n/a	2.31	24.88	1.97	49.02	0.091	24.88	29	0.80	1.00	0.10	1.31
13.63011	0.15 #	24.4	4.2	2337	14	58.8	56.9	0.6	0.57	0.07	40.0	2.13	1.33	30.0	2.24	30.8	n/a	n/a	n/a	2.24	30.77	1.77	54.37	0.095	30.77	32	0.80	1.00	0.10	1.37
13.76045	0.18 #	37.7	4.2	3610	17	59.3	57.1	0.5	0.57	0.07	62.2	1.91	1.33	46.7	2.02	47.5	n/a	n/a	n/a	2.02	47.48	1.32	62.73	0.103	47.48	39	0.80	1.00	0.11	1.48
13.88654	0.17 #	44.3	4.2	4242	16	59.9	57.2	0.4	0.57	0.07	73.1	1.80	1.33	54.9	1.91	55.7	n/a	n/a	n/a	1.91	55.71	1.20	66.79	0.108	55.71	43	0.79	1.00	0.12	1.55
14.0139	0.14 #	40.1	4.3	3840	13	60.4	57.4	0.4	0.57	0.07	65.8	1.82	1.33	49.6	1.93	50.4	n/a	n/a	n/a	1.93	50.35	1.22	61.60	0.102	50.35	41	0.80	1.00	0.11	1.46
14.14169	0.12 #	31.2	4.3	2988	11	61.0	57.6	0.4	0.57	0.07	50.8	1.94	1.33	38.3	2.05	39.1	n/a	n/a	n/a	2.05	39.12	1.38	53.92	0.095	39.12	36	0.80	1.00	0.10	1.36
14.26736	0.16 #	30.4	4.3	2911	15	61.5	57.7	0.5	0.57	0.07	49.4	2.01	1.32	37.3	2.12	38.1	n/a	n/a	n/a	2.12	38.06	1.50	57.05	0.097	38.06	35	0.80	1.00	0.10	1.39
14.39472	0.17 #	31.4	4.4	3007	16	62.1	57.9	0.6	0.57	0.07	50.9	2.01	1.32	38.4	2.12	39.3	n/a	n/a	n/a	2.12	39.26	1.49	58.33	0.098	39.26	36	0.80	1.00	0.11	1.41
14.51997	0.09 #	29	4.4	2777	9	62.6	58.1	0.3	0.57	0.07	46.7	1.94	1.32	35.4	2.05	36.2	n/a	n/a	n/a	2.05	36.20	1.37	49.76	0.091	36.20	34	0.80	1.00	0.10	1.31
14.5603	0.1 #	33.5	4.4	3208	10	62.8	58.1	0.3	0.57	0.08	54.1	1.87	1.32	41.0	1.99	41.8	n/a	n/a	n/a	1.99	41.80	1.28	53.60	0.094	41.80	37	0.80	1.00	0.10	1.35
14.68724	0.13 #	26.5	4.5	2538	12	63.3	58.3	0.5	0.57	0.08	42.4	2.06	1.32	32.2	2.17	33.0	n/a	n/a	n/a	2.17	33.02	1.59	52.56	0.094	33.02	33	0.80	1.00	0.10	1.33
14.8112	0.11 #	26.3	4.5	2518	11	63.9	58.5	0.4	0.57	0.08	42.0	2.03	1.32	31.9	2.14	32.7	n/a	n/a	n/a	2.14	32.72	1.54	50.35	0.092	32.72	33	0.80	1.00	0.10	1.31
14.93602	0.14 #	23.3	4.6	2231	13	64.4	58.6	0.6	0.57	0.08	37.0	2.15	1.31	28.1	2.26	29.0	n/a	n/a	n/a	2.26	28.95	1.83	52.89	0.094	28.95	31	0.80	1.00	0.10	1.34
15.06169	0.13 #	14.1	4.6	1350	12	65.0	58.8	1.0	0.57	0.08	21.9	2.45	1.31	16.7	2.55	17.5	n/a	n/a	n/a	2.55	17.49	3.04	53.24	0.094	17.49	24	0.80	1.00	0.10	1.34
15.18566	0.13 #	15.7	4.6	1503	12	65.5	59.0	0.9	0.57	0.08	24.4	2.38	1.31	18.6	2.49	19.5	n/a	n/a	n/a	2.49	19.45	2.70	52.51	0.093	19.45	25	0.80	1.00	0.10	1.33
15.30962	0.14 #	17.1	4.7	1637	13	66.0	59.1	0.9	0.57	0.08	26.6	2.35	1.31	20.3	2.45	21.2	n/a	n/a	n/a	2.45	21.16	2.53	53.46	0.094	21.16	26	0.80	1.00	0.10	1.34
15.4319	0.2 #	15.7	4.7	1503	19	66.5	59.3	1.3	0.57	0.08	24.2	2.48	1.31	18.5	2.58	19.4	n/a	n/a	n/a	2.58	19.40	3.21	62.21	0.102	19.40	25	0.80	1.00	0.11	1.45
15.55586	0.19 #	12.9	4.7	1235	18	67.1	59.4	1.6	0.57	0.08	19.7	2.59	1.31	15.1	2.69	15.9	1.5	17.7	2.63	2.63	17.71	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.67686	0.13 8	7.8	4.8	747	12	67.6	59.6	1.8	0.57	0.08	11.4	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.8004	0.14 #	9.9	4.8	948	13	68.1	59.8	1.5	0.57	0.08	14.7	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.92267	0.19 #	11.9	4.9	1140	18	68.7	59.9	1.7	0.57	0.08	17.9	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.04579	0.21 8	8	4.9	766	20	69.2	60.1	2.9	0.57	0.08	11.6	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.16933	0.24 #	9.8	4.9	938	23	69.7	60.3	2.6	0.57	0.08	14.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.29458	0.21 4	4.2	5.0	402	20	70.3	60.4	6.1	0.57	0.08	5.5	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.39434	0.17 7	6.7	5.0	642	16	70.7	60.5	2.9	0.57	0.08	9.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.65247	0.16 1	1.4	5.1	134	15	71.8	60.9	24.6	0.57	0.08	1.0	4.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.78323	0.14 3	3.4	5.1	326	13	72.4	61.1	5.3	0.57	0.08	4.1	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.91144	0.11 2	2.6	5.2	249	11	72.9	61.2	6.0	0.57	0.08	2.9	3.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.04475	0.12 1	1	5.2	96	11	73.5	61.4	51.6	0.57	0.08	0.4	4.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.17594	0.13 8	8.1	5.2	776	12	74.1	61.6	1.8	0.57	0.08	11.4	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.30797	0.18 1	1.2	5.3	115	17	74.6	61.8	42.8	0.57	0.08	0.7	4.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.57501	0.13 8	8.5	5.4	814	12	75.8	62.1	1.7	0.57	0.08	11.9	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.67563	0.12 3	3.6	5.4	345	11	76.2	62.2	4.3	0.57	0.08	4.3	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.81446	0.07 5	4.7	5.4	450	7	76.8	62.4	1.8	0.57	0.08	6.0	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.09296	0.18 4	4.2	5.5	402	17	78.0	62.8	5.3	0.57	0.08	5.2	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.23137	0.17 7	7.5	5.6	718	16	78.6	63.0	2.5	0.57	0.08	10.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.37231	0.25 5	4.8	5.6	460	24	79.2	63.2	6.3	0.57	0.08	6.0	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.50987	0.22 6	6.2	5.6	594	21	79.8	63.3	4.1	0.57	0.08	8.1	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.6487	0.19 6	6.2	5.7	594	18	80.4	63.5	3.5	0.57	0.08	8.1	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.79049	0.24 2	1.9	5.7	182	23	81.0	63.7	22.8	0.57	0.08	1.6	4.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.92932	0.24 4	4.3	5.8	412	23	81.6	63.9	7.0	0.57	0.08	5.2	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.07027	0.28 #	11.7	5.8	1120	27	82.2	64.1	2.6	0.57	0.08	16.2	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.20995	0.26 5	5.1	5.9	488	25	82.8	64.3	6.1	0.57	0.08	6.3	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.3492	0.24 8	8.6	5.9	824	23	83.4	64.5	3.1	0.57	0.08	11.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.4893	0.19 9	9.4	5.9	900	18	84.0	64.6	2.2	0.57	0.08	12.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.63067	0.18 3	3.6	6.0	345	17	84.7	64.8	6.6	0.57	0.08	4.0	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
19.77035	0.19	4	4.4	6.0	421	18	85.3	65.0	5.4	0.57	0.08	5.2	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.91003	0.16	9	9.5	6.1	910	15	85.9	65.2	1.9	0.57	0.08	12.6	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.05013	0.13	4	4.1	6.1	393	12	86.5	65.4	4.1	0.57	0.08	4.7	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.1898	0.1	4	4.8	6.2	460	10	87.1	65.6	2.6	0.57	0.08	5.7	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.32906	0.1	#	12.1	6.2	1159	10	87.7	65.8	0.9	0.57	0.08	16.3	2.54	1.24	13.1	2.63	14.2	1.4	15.5	2.56	2.56	15.48	3.11	48.15	0.090	14.20	22	0.80	1.00	0.10	1.23
20.46958	0.2	3	3.3	6.2	316	19	88.3	65.9	8.4	0.57	0.08	3.5	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.60968	0.17	5	5	6.3	479	16	88.9	66.1	4.2	0.57	0.08	5.9	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.74851	0.16	#	14.6	6.3	1398	15	89.5	66.3	1.2	0.57	0.08	19.7	2.53	1.24	16.0	2.61	17.1	1.3	18.6	2.55	2.55	18.57	3.04	56.40	0.097	17.06	24	0.80	1.00	0.10	1.32
21.00069	0.25	4	4.3	6.4	412	24	90.6	66.6	7.5	0.57	0.08	4.8	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.13952	0.19	5	5.8	6.4	555	18	91.2	66.8	3.9	0.57	0.08	6.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.27962	0.18	#	13.9	6.5	1331	17	91.8	67.0	1.4	0.57	0.08	18.5	2.59	1.23	15.0	2.67	16.2	1.3	17.5	2.61	2.61	17.55	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.41972	0.19	#	11	6.5	1053	18	92.4	67.2	1.9	0.57	0.08	14.3	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.56067	0.18	#	12	6.6	1149	17	93.0	67.4	1.6	0.57	0.08	15.7	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.69865	0.2	#	14.3	6.6	1369	19	93.6	67.6	1.5	0.57	0.08	18.9	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.84342	0.23	#	14.4	6.7	1379	22	94.2	67.8	1.7	0.57	0.08	19.0	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.98267	0.29	7	7.4	6.7	709	28	94.8	67.9	4.5	0.57	0.08	9.0	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.1232	0.26	7	7.6	6.7	728	25	95.4	68.1	3.9	0.57	0.08	9.3	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.23952	0.17	5	5.2	6.8	498	16	95.9	68.3	4.0	0.57	0.08	5.9	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.521	0.18	3	3.8	6.9	364	17	97.1	68.7	6.5	0.57	0.08	3.9	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.67469	0.14	3	3.1	6.9	297	13	97.8	68.9	6.7	0.57	0.08	2.9	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.81521	0.14	2	2.6	7.0	249	13	98.4	69.0	8.9	0.57	0.08	2.2	3.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.95446	0.14	3	3.1	7.0	297	13	99.0	69.2	6.8	0.57	0.08	2.9	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.09456	0.13	4	4.6	7.0	440	12	99.6	69.4	3.7	0.57	0.08	4.9	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.23339	0.12	2	2.5	7.1	239	11	100.2	69.6	8.3	0.57	0.08	2.0	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.37349	0.14	1	1.9	7.1	182	13	100.8	69.8	16.5	0.57	0.08	1.2	4.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.65242	0.14	8	7.9	7.2	757	13	102.0	70.1	2.0	0.57	0.08	9.3	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.93135	0.25	2	2	7.3	192	24	103.2	70.5	27.1	0.57	0.08	1.3	4.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.03451	0.25	4	4.4	7.3	421	24	103.6	70.7	7.5	0.57	0.08	4.5	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.17164	0.27	6	6.4	7.4	613	26	104.2	70.8	5.1	0.57	0.08	7.2	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.31132	0.3	#	13.6	7.4	1302	29	104.8	71.0	2.4	0.57	0.08	16.9	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.45014	0.28	4	4.4	7.5	421	27	105.4	71.2	8.5	0.57	0.08	4.4	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.58982	0.2	7	6.9	7.5	661	19	106.0	71.4	3.5	0.57	0.08	7.8	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.72992	0.25	8	8.2	7.5	785	24	106.6	71.6	3.5	0.57	0.08	9.5	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.8679	0.31	5	5.2	7.6	498	30	107.2	71.8	7.6	0.57	0.08	5.4	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.00715	0.27	6	6.7	7.6	642	26	107.8	71.9	4.8	0.57	0.08	7.4	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.14683	0.3	6	6.3	7.7	603	29	108.4	72.1	5.8	0.57	0.08	6.9	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.28481	0.26	5	5.7	7.7	546	25	109.0	72.3	5.7	0.57	0.08	6.0	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.42406	0.24	6	6.2	7.7	594	23	109.6	72.5	4.7	0.57	0.08	6.7	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.56288	0.24	3	3	7.8	287	23	110.2	72.7	13.0	0.57	0.08	2.4	3.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.69959	0.23	4	4.3	7.8	412	22	110.8	72.9	7.3	0.57	0.08	4.1	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.83799	0.19	6	6.2	7.9	594	18	111.4	73.0	3.8	0.57	0.08	6.6	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.97724	0.18	2	2.7	7.9	259	17	112.0	73.2	11.8	0.57	0.08	2.0	3.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.11437	0.19	3	3.8	8.0	364	18	112.6	73.4	7.2	0.57	0.08	3.4	3.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.25193	0.19	6	6	8.0	575	18	113.2	73.6	3.9	0.57	0.08	6.3	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.39033	0.2	1	1.8	8.0	172	19	113.8	73.8	32.7	0.57	0.08	0.8	4.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.52788	0.18	3	3.3	8.1	316	17	114.4	73.9	8.5	0.57	0.08	2.7	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.66586	0.23	8	8.5	8.1	814	22	115.0	74.1	3.2	0.57	0.08	9.4	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.80214	0.2	1	1.5	8.2	144	19	115.6	74.3	68.3	0.57	0.08	0.4	4.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
26.93927	0.2	6 6.5	8.2	622	19	116.2	74.5	3.8	0.57	0.08	6.8	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.07555	0.22	# 12.2	8.3	1168	21	116.8	74.7	2.0	0.57	0.08	14.1	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.29759	0.21	9 9.5	8.3	910	20	117.7	75.0	2.5	0.57	0.08	10.6	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.43599	0.25	2 2.4	8.4	230	24	118.3	75.2	21.5	0.57	0.08	1.5	4.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.57609	0.32	5 5.3	8.4	508	31	118.9	75.3	7.9	0.57	0.08	5.2	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.71364	0.3	7 7.2	8.4	689	29	119.5	75.5	5.0	0.57	0.08	7.5	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.85247	0.26	1 1.7	8.5	163	25	120.1	75.7	58.3	0.57	0.08	0.6	4.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.993	0.27	6 6.6	8.5	632	26	120.7	75.9	5.1	0.57	0.08	6.7	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.13055	0.25	6 6.4	8.6	613	24	121.3	76.1	4.9	0.57	0.08	6.5	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.26938	0.25	2 2.5	8.6	239	24	121.9	76.3	20.4	0.57	0.08	1.5	4.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.41033	0.23	8 8.2	8.7	785	22	122.5	76.4	3.3	0.57	0.08	8.7	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.54788	0.2	9 9.6	8.7	919	19	123.1	76.6	2.4	0.57	0.08	10.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.68798	0.41	8 7.7	8.7	737	39	123.7	76.8	6.4	0.57	0.08	8.0	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.82553	0.39	# 12.9	8.8	1235	37	124.3	77.0	3.4	0.57	0.08	14.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.96266	0.3	6 6	8.8	575	29	124.9	77.2	6.4	0.57	0.08	5.8	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.10022	0.34	9 8.6	8.9	824	33	125.5	77.4	4.7	0.57	0.08	9.0	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.2382	0.5	8 8.4	8.9	804	48	126.1	77.5	7.1	0.57	0.08	8.7	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.37363	0.56	# 19.5	9.0	1867	54	126.7	77.7	3.1	0.57	0.08	22.4	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.51118	0.65	# 12	9.0	1149	62	127.3	77.9	6.1	0.57	0.08	13.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.64831	0.63	# 12.5	9.0	1197	60	127.9	78.1	5.6	0.57	0.08	13.7	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.78501	0.76	# 13.8	9.1	1321	73	128.4	78.3	6.1	0.57	0.08	15.2	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.92129	0.81	# 11.2	9.1	1073	78	129.0	78.4	8.2	0.57	0.08	12.0	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.05672	0.82	# 14.4	9.2	1379	79	129.6	78.6	6.3	0.57	0.08	15.9	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.19215	0.76	# 11.2	9.2	1073	73	130.2	78.8	7.7	0.57	0.08	12.0	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.32674	0.72	# 11.9	9.2	1140	69	130.8	79.0	6.8	0.57	0.08	12.8	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.56661	0.71	9 9	9.3	862	68	131.8	79.3	9.3	0.57	0.08	9.2	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.70034	0.7	# 12.3	9.4	1178	67	132.4	79.5	6.4	0.57	0.08	13.2	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.83407	0.73	7 7.3	9.4	699	70	133.0	79.6	12.3	0.57	0.08	7.1	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.96696	0.68	8 8.2	9.4	785	65	133.5	79.8	10.0	0.57	0.08	8.2	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.10026	0.62	# 11.3	9.5	1082	59	134.1	80.0	6.3	0.57	0.08	11.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.234	0.63	8 8.1	9.5	776	60	134.7	80.2	9.4	0.57	0.08	8.0	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.36518	0.58	9 9.3	9.6	891	56	135.3	80.3	7.4	0.57	0.08	9.4	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.49722	0.56	# 17	9.6	1628	54	135.8	80.5	3.6	0.57	0.08	18.5	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.63095	0.65	9 8.5	9.6	814	62	136.4	80.7	9.2	0.57	0.08	8.4	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.76171	0.64	# 11.7	9.7	1120	61	137.0	80.9	6.2	0.57	0.08	12.2	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.89332	0.63	# 20.5	9.7	1963	60	137.5	81.0	3.3	0.57	0.08	22.5	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.02451	0.66	# 12.6	9.8	1207	63	138.1	81.2	5.9	0.57	0.08	13.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.154	0.61	# 14.3	9.8	1369	58	138.7	81.4	4.7	0.57	0.08	15.1	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.28263	0.51	# 19.3	9.8	1848	49	139.2	81.6	2.9	0.57	0.08	21.0	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.38495	0.52	# 13.3	9.9	1274	50	139.7	81.7	4.4	0.57	0.08	13.9	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.51698	0.57	# 10.7	9.9	1025	55	140.2	81.9	6.2	0.57	0.08	10.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.6452	0.58	# 17.4	10.0	1666	56	140.8	82.0	3.6	0.57	0.08	18.6	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.77808	0.58	# 13.1	10.0	1254	56	141.3	82.2	5.0	0.57	0.08	13.5	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.90799	0.61	# 13.8	10.0	1321	58	141.9	82.4	5.0	0.57	0.08	14.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.0396	0.56	# 15.1	10.1	1446	54	142.5	82.6	4.1	0.57	0.08	15.8	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.17078	0.59	# 16.5	10.1	1580	56	143.0	82.7	3.9	0.57	0.09	17.4	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.2731	0.67	# 10	10.1	958	64	143.5	82.9	7.9	0.57	0.09	9.8	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.40386	0.98	# 11.1	10.2	1063	94	144.0	83.0	10.2	0.57	0.09	11.1	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
33.53292	0.79	# 15.5	10.2	1484	76	144.6	83.2	5.6	0.57	0.09	16.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.63524	1	# 16.7	10.3	1599	96	145.0	83.3	6.6	0.57	0.09	17.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.66666	1.01	# 15.6	10.3	1494	97	145.2	83.4	7.2	0.57	0.09	16.2	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.78511	0.96	# 19.5	10.3	1867	92	145.7	83.5	5.3	0.57	0.09	20.6	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.81567	0.95	9 9.3	10.3	891	91	145.8	83.6	12.2	0.57	0.09	8.9	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.84837	0.95	# 18.8	10.3	1800	91	146.0	83.6	5.5	0.57	0.09	19.8	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.96597	0.95	# 19.8	10.4	1896	91	146.5	83.8	5.2	0.57	0.09	20.9	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.07847	0.99	# 14.2	10.4	1360	95	147.0	83.9	7.8	0.57	0.09	14.4	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.19267	1	# 20	10.4	1915	96	147.4	84.1	5.4	0.57	0.09	21.0	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.30645	0.99	# 15.7	10.5	1503	95	147.9	84.2	7.0	0.57	0.09	16.1	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.4198	1	# 21.7	10.5	2078	96	148.4	84.4	5.0	0.57	0.09	22.9	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.53146	1	# 21.3	10.5	2040	96	148.9	84.5	5.1	0.57	0.09	22.4	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.64397	1.03	# 20.5	10.6	1963	99	149.4	84.7	5.4	0.57	0.09	21.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.75647	1.07	# 19.5	10.6	1867	102	149.9	84.8	6.0	0.57	0.09	20.2	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.86728	1.06	# 18.1	10.6	1733	102	150.4	85.0	6.4	0.57	0.09	18.6	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.97851	1.02	# 21.1	10.7	2021	98	150.8	85.1	5.2	0.57	0.09	22.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.08932	1.02	# 19.9	10.7	1906	98	151.3	85.3	5.6	0.57	0.09	20.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.20395	1	# 16.7	10.7	1599	96	151.8	85.4	6.6	0.57	0.09	16.9	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.3156	1.02	# 18.9	10.8	1810	98	152.3	85.6	5.9	0.57	0.09	19.4	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.42811	1.03	# 17.4	10.8	1666	99	152.8	85.7	6.5	0.57	0.09	17.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.54146	1.02	# 16	10.8	1532	98	153.3	85.9	7.1	0.57	0.09	16.1	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.65482	1.06	# 19.9	10.9	1906	102	153.8	86.0	5.8	0.57	0.09	20.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.76604	1.11	# 16.4	10.9	1570	106	154.2	86.2	7.5	0.57	0.09	16.4	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.8811	1.09	# 16.6	10.9	1590	104	154.7	86.3	7.3	0.57	0.09	16.6	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.99403	1.06	# 21.8	11.0	2088	102	155.2	86.5	5.3	0.57	0.09	22.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.10654	1.01	# 17.5	11.0	1676	97	155.7	86.6	6.4	0.57	0.09	17.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.21904	0.94	# 21	11.0	2011	90	156.2	86.8	4.9	0.57	0.09	21.4	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.33112	1	# 25.3	11.1	2423	96	156.7	86.9	4.2	0.57	0.09	26.1	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.43089	0.9	# 19.9	11.1	1906	86	157.1	87.0	4.9	0.57	0.09	20.1	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.49075	0.91	# 28.3	11.1	2710	87	157.4	87.1	3.4	0.57	0.09	29.3	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.60325	0.93	# 24.1	11.2	2308	89	157.8	87.3	4.1	0.57	0.09	24.6	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.71788	0.94	# 22.7	11.2	2174	90	158.3	87.4	4.5	0.57	0.09	23.1	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.82996	0.99	# 26.9	11.2	2576	95	158.8	87.6	3.9	0.57	0.09	27.6	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.94374	1.01	# 19.5	11.3	1867	97	159.3	87.7	5.7	0.57	0.09	19.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.05667	0.94	# 22.4	11.3	2145	90	159.8	87.9	4.5	0.57	0.09	22.6	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.17088	0.85	# 28.4	11.3	2720	81	160.3	88.0	3.2	0.57	0.09	29.1	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.28253	0.8	# 21.9	11.4	2097	77	160.8	88.2	4.0	0.57	0.09	22.0	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.39461	0.82	# 25.7	11.4	2461	79	161.3	88.3	3.4	0.57	0.09	26.0	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.50754	0.85	# 22	11.4	2107	81	161.7	88.5	4.2	0.57	0.09	22.0	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.62005	0.86	# 20.4	11.5	1954	82	162.2	88.6	4.6	0.57	0.09	20.2	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.73213	0.91	# 25.6	11.5	2451	87	162.7	88.8	3.8	0.57	0.09	25.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.84505	0.96	# 22.5	11.5	2155	92	163.2	88.9	4.6	0.57	0.09	22.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.95841	0.97	# 20.7	11.6	1982	93	163.7	89.1	5.1	0.57	0.09	20.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.06922	0.95	# 22.1	11.6	2116	91	164.2	89.2	4.7	0.57	0.09	21.9	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.18045	0.98	# 22.1	11.6	2116	94	164.6	89.4	4.8	0.57	0.09	21.8	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.29211	1.02	# 28.5	11.7	2729	98	165.1	89.5	3.8	0.57	0.09	28.6	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.40504	1.04	# 25.5	11.7	2442	100	165.6	89.7	4.4	0.57	0.09	25.4	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.51542	1.09	# 30.6	11.7	2930	104	166.1	89.8	3.8	0.57	0.09	30.8	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
38.62708	1.11	# 28.1	11.8	2691	106	166.6	90.0	4.2	0.57	0.09	28.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.73873	1.15	# 30.6	11.8	2930	110	167.1	90.1	4.0	0.57	0.09	30.7	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.84997	1.13	# 32.9	11.8	3151	108	167.5	90.2	3.6	0.57	0.09	33.1	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.95907	1.04	# 35	11.9	3352	100	168.0	90.4	3.1	0.57	0.09	35.2	2.58	1.06	33.3	2.60	35.0	n/a	n/a	n/a	2.60	35.02	3.30	115.56	0.224	35.02	34	0.80	1.00	0.24	2.72
39.07116	1.02	# 41.4	11.9	3964	98	168.5	90.5	2.6	0.57	0.09	41.9	2.46	1.06	39.6	2.48	41.4	n/a	n/a	n/a	2.48	41.39	2.68	110.98	0.207	41.39	37	0.80	1.00	0.22	2.52
39.18111	1.09	# 35.3	11.9	3380	104	169.0	90.7	3.3	0.57	0.09	35.4	2.59	1.06	33.5	2.60	35.3	1.1	36.1	2.58	2.58	36.06	3.21	115.73	0.224	35.26	34	0.80	1.00	0.24	2.73
39.29192	1.3	# 36.6	12.0	3505	124	169.4	90.8	3.7	0.57	0.09	36.7	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.40145	1.34	# 32.3	12.0	3093	128	169.9	91.0	4.4	0.57	0.09	32.1	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.51141	1.66	# 35.8	12.0	3428	159	170.4	91.1	4.9	0.57	0.09	35.8	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.62009	1.85	# 43.9	12.1	4204	177	170.9	91.3	4.4	0.57	0.09	44.2	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.68802	2.04	# 39.3	12.1	3763	195	171.1	91.4	5.4	0.57	0.09	39.3	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.7984	2.28	# 36.9	12.1	3534	218	171.6	91.5	6.5	0.57	0.09	36.7	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.91048	2.32	# 50.9	12.2	4874	222	172.1	91.6	4.7	0.57	0.09	51.3	2.59	1.05	48.8	2.60	50.6	1.1	51.6	2.58	2.58	51.61	3.23	~~166.68~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.01959	2.47	# 51.3	12.2	4912	237	172.6	91.8	5.0	0.57	0.09	51.6	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.12913	2.61	# 60	12.2	5746	250	173.0	91.9	4.5	0.57	0.09	60.6	2.52	1.05	57.7	2.53	59.5	n/a	n/a	n/a	2.53	59.53	2.95	~~175.49~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.23738	2.68	# 67.4	12.3	6454	257	173.5	92.1	4.1	0.57	0.09	68.2	2.46	1.05	65.0	2.47	66.8	n/a	n/a	n/a	2.47	66.82	2.62	~~175.04~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.34692	2.69	# 56.1	12.3	5372	258	174.0	92.2	5.0	0.57	0.09	56.4	2.57	1.05	53.8	2.59	55.6	n/a	n/a	n/a	2.59	55.57	3.25	~~180.54~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.45433	2.55	# 48.3	12.3	4625	244	174.5	92.4	5.5	0.57	0.09	48.2	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.56174	2.27	# 46.8	12.4	4482	217	174.9	92.5	5.0	0.57	0.09	46.6	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.67	1.9	# 32.4	12.4	3103	182	175.4	92.7	6.2	0.57	0.09	31.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.77784	1.55	# 31.9	12.4	3055	148	175.8	92.8	5.2	0.57	0.09	31.0	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.8844	1.33	# 31.2	12.5	2988	127	176.3	92.9	4.5	0.57	0.09	30.3	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.99223	1.14	# 32.9	12.5	3151	109	176.8	93.1	3.7	0.57	0.09	31.9	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.09922	1.09	# 39	12.5	3735	104	177.2	93.2	2.9	0.57	0.09	38.2	2.53	1.04	36.6	2.55	38.4	n/a	n/a	n/a	2.55	38.43	3.01	115.75	0.224	38.43	35	0.80	1.00	0.24	2.70
41.20535	1.06	# 34	12.6	3256	102	177.7	93.4	3.3	0.57	0.09	33.0	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.31107	1.11	# 31.6	12.6	3026	106	178.1	93.5	3.7	0.57	0.09	30.5	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.41678	1.15	# 33.8	12.6	3237	110	178.6	93.6	3.6	0.57	0.09	32.7	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.52377	1.16	# 27.1	12.7	2595	111	179.1	93.8	4.6	0.57	0.09	25.8	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.63203	1.17	# 32.5	12.7	3112	112	179.5	93.9	3.8	0.57	0.09	31.2	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.73774	1.21	# 31.7	12.7	3036	116	180.0	94.1	4.1	0.57	0.09	30.4	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.8443	1.2	# 32.2	12.8	3083	115	180.4	94.2	4.0	0.57	0.09	30.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.95171	1.25	# 34.5	12.8	3304	120	180.9	94.3	3.8	0.57	0.09	33.1	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.05827	1.33	# 31.9	12.8	3055	127	181.4	94.5	4.4	0.57	0.09	30.4	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.16356	1.43	# 36.3	12.9	3476	137	181.8	94.6	4.2	0.57	0.09	34.8	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.2714	1.45	# 41.9	12.9	4012	139	182.3	94.8	3.6	0.57	0.09	40.4	2.58	1.03	39.1	2.59	40.9	n/a	n/a	n/a	2.59	40.95	3.25	133.01	0.299	40.95	37	0.80	1.00	0.32	3.58
42.37796	1.47	# 37.3	12.9	3572	141	182.7	94.9	4.2	0.57	0.09	35.7	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.48409	1.45	# 41.8	12.9	4003	139	183.2	95.1	3.6	0.57	0.09	40.2	2.58	1.03	38.9	2.59	40.8	n/a	n/a	n/a	2.59	40.79	3.26	133.02	0.299	40.79	37	0.80	1.00	0.32	3.57
42.59066	1.42	# 42.5	13.0	4070	136	183.7	95.2	3.5	0.57	0.09	40.8	2.56	1.03	39.6	2.57	41.4	n/a	n/a	n/a	2.57	41.44	3.16	131.08	0.289	41.44	37	0.80	1.00	0.31	3.46
42.69637	1.39	# 49	13.0	4692	133	184.1	95.3	3.0	0.57	0.09	47.3	2.47	1.03	45.9	2.48	47.7	n/a	n/a	n/a	2.48	47.74	2.65	126.37	0.268	47.74	40	0.80	1.00	0.29	3.20
43.02285	1.46	# 68.4	13.1	6550	140	185.5	95.8	2.2	0.57	0.09	66.5	2.27	1.03	64.6	2.28	66.5	n/a	n/a	n/a	2.28	66.49	1.88	125.21	0.263	66.49	47	0.77	1.00	0.28	3.13
43.12941	1.55	# 60.1	13.1	5755	148	186.0	95.9	2.7	0.57	0.09	58.1	2.37	1.03	56.5	2.38	58.4	n/a	n/a	n/a	2.38	58.38	2.23	130.13	0.285	58.38	44	0.78	1.00	0.31	3.39
43.23597	1.55	# 60.6	13.2	5803	148	186.4	96.0	2.6	0.57	0.09	58.5	2.37	1.03	56.9	2.37	58.8	n/a	n/a	n/a	2.37	58.82	2.21	129.98	0.284	58.82	44	0.78	1.00	0.30	3.38
43.34126	1.42	# 67.2	13.2	6435	136	186.9	96.2	2.2	0.57	0.09	65.0	2.27	1.03	63.3	2.28	65.2	n/a	n/a	n/a	2.28	65.18	1.89	123.50	0.255	65.18	46	0.77	1.00	0.27	3.04
43.44739	1.45	# 53.6	13.2	5133	139	187.4	96.3	2.8	0.57	0.09	51.3	2.42	1.03	50.1	2.43	52.0	n/a	n/a	n/a	2.43	51.95	2.45	127.34	0.272	51.95	41	0.79	1.00	0.29	3.23
43.55438	1.55	# 54.9	13.3	5257	148	187.8	96.5	2.9	0.57	0.09	52.6	2.43	1.02	51.3	2.44	53.2	n/a	n/a	n/a	2.44	53.18	2.47	131.50	0.291	53.18	42	0.79	1.00	0.31	3.46
43.66094	1.51	# 46.4	13.3	4443	145	188.3	96.6	3.4	0.57	0.09	44.0	2.53	1.02	43.0	2.54	44.9	n/a	n/a	n/a	2.54	44.91	2.97	133.20	0.300	44.91	38	0.80	1.00	0.32	3.56
43.76538	1.48	# 46.5	13.3	4453	142	188.7	96.7	3.3	0.57	0.09	44.1	2.52	1.02	43.1	2.53	45.0	n/a	n/a	n/a	2.53	44.97	2.93	131.67	0.292	44.97	38	0.80	1.00	0.31	3.47
43.87152	1.41	# 49.4	13.4	4731	135	189.2	96.9	3.0	0.57	0.09	46.9	2.47	1.02	45.8	2.48	47.7	n/a	n/a	n/a	2.48	47.74	2.66	126.90	0.270	47.74	40	0.80	1.00	0.29	3.20

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-6)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
43.97765	1.36	43.9	#	13.4	4204	130	189.6	97.0	3.2	0.57	0.09	41.4	2.54	1.02	40.5	2.54	42.4	n/a	n/a	n/a	2.54	42.40	2.99	126.98	0.270	42.40	37	0.80	1.00	0.29	3.21
44.08209	1.44	48.4	#	13.4	4635	138	190.1	97.2	3.1	0.57	0.09	45.7	2.49	1.02	44.8	2.50	46.7	n/a	n/a	n/a	2.50	46.71	2.76	128.74	0.278	46.71	39	0.80	1.00	0.30	3.30
44.18696	1.67	46.1	#	13.5	4415	160	190.5	97.3	3.8	0.57	0.09	43.4	2.57	1.02	42.5	2.57	44.5	n/a	n/a	n/a	2.57	44.46	3.17	140.89	0.340	44.46	38	0.80	1.00	0.36	4.03
44.29225	1.82	49.9	#	13.5	4778	174	191.0	97.4	3.8	0.57	0.09	47.1	2.54	1.02	46.2	2.55	48.1	n/a	n/a	n/a	2.55	48.09	3.03	145.75	0.368	48.09	40	0.80	1.00	0.39	4.36
44.39711	1.85	66.8	#	13.5	6397	177	191.5	97.6	2.9	0.57	0.09	63.6	2.36	1.02	62.4	2.37	64.3	n/a	n/a	n/a	2.37	64.33	2.19	140.92	0.340	64.33	46	0.77	1.00	0.36	4.03
44.49985	1.77	111.3	#	13.6	10658	169	191.9	97.7	1.6	0.57	0.09	107.1	2.03	1.02	105.2	2.03	107.1	n/a	n/a	n/a	2.03	107.11	1.35	144.39	0.360	107.11	59	0.70	1.00	0.39	4.26
44.60131	1.6	154.4	#	13.6	14785	153	192.3	97.9	1.0	0.57	0.09	149.1	1.79	1.02	146.6	1.80	148.5	n/a	n/a	n/a	1.80	148.49	1.11	~~164.35~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.70278	1.47	179.7	#	13.6	17208	141	192.8	98.0	0.8	0.57	0.09	173.7	1.68	1.02	170.8	1.68	172.7	n/a	n/a	n/a	1.68	172.70	1.02	~~177.01~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.8051	1.18	146.4	#	13.7	14019	113	193.2	98.1	0.8	0.57	0.09	140.9	1.74	1.02	138.7	1.75	140.6	n/a	n/a	n/a	1.75	140.60	1.07	150.21	0.395	140.60	68	0.66	1.00	0.42	4.67
44.90954	0.93	90.4	#	13.7	8657	89	193.7	98.3	1.1	0.57	0.09	86.1	1.97	1.02	84.8	1.98	86.8	n/a	n/a	n/a	1.98	86.76	1.27	110.56	0.206	86.76	53	0.73	1.00	0.22	2.43
45.0127	0.8	76.5	#	13.7	7326	77	194.1	98.4	1.1	0.57	0.09	72.5	2.04	1.01	71.4	2.04	73.4	n/a	n/a	n/a	2.04	73.37	1.36	99.90	0.173	73.37	49	0.75	1.00	0.19	2.04
45.11629	1.08	81	#	13.8	7757	103	194.6	98.5	1.4	0.57	0.09	76.7	2.09	1.01	75.7	2.09	77.6	n/a	n/a	n/a	2.09	77.63	1.44	111.61	0.209	77.63	50	0.75	1.00	0.22	2.47
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.29699	0.08 #	15.8	0.1	1513	8	1.3	1.3	0.5	0.57	0.07	1180.4	1.01	8.89	132.7	1.63	25.4	n/a	n/a	n/a	1.63	25.38	1.00	25.38	0.071	132.82	66	0.67	1.00	0.08	1.03
0.42589	0.14 #	11.9	0.1	1140	13	1.8	1.8	1.2	0.57	0.07	619.5	1.46	7.43	83.4	2.02	19.1	n/a	n/a	n/a	2.02	19.12	1.32	25.28	0.071	83.54	52	0.74	1.00	0.08	1.03
0.55522	0.15 #	15.3	0.2	1465	14	2.4	2.4	1.0	0.57	0.07	610.9	1.39	6.51	93.9	1.93	24.6	n/a	n/a	n/a	1.93	24.58	1.21	29.86	0.075	94.07	56	0.72	1.00	0.08	1.08
0.68455	0.14 9	8.6	0.2	824	13	3.0	3.0	1.6	0.57	0.07	278.0	1.76	5.86	47.4	2.30	13.8	n/a	n/a	n/a	2.30	13.82	1.94	26.75	0.072	47.62	40	0.80	1.00	0.08	1.04
0.81429	0.12 #	14.6	0.2	1398	11	3.5	3.5	0.8	0.57	0.07	397.2	1.43	5.37	73.9	1.96	23.5	n/a	n/a	n/a	1.96	23.46	1.25	29.43	0.075	74.12	49	0.75	1.00	0.08	1.08
0.94193	0.09 #	13.5	0.3	1293	9	4.1	4.1	0.7	0.57	0.07	317.3	1.43	4.99	63.5	1.97	21.7	n/a	n/a	n/a	1.97	21.69	1.26	27.33	0.073	63.72	46	0.77	1.00	0.08	1.05
1.07042	0.14 #	18.6	0.3	1781	13	4.6	4.6	0.8	0.57	0.07	384.9	1.41	4.69	82.1	1.90	29.9	n/a	n/a	n/a	1.90	29.88	1.19	35.63	0.080	82.36	52	0.74	1.00	0.09	1.15
1.19722	0.12 #	14.6	0.4	1398	11	5.2	5.2	0.8	0.57	0.07	269.8	1.54	4.43	60.9	2.03	23.5	n/a	n/a	n/a	2.03	23.46	1.35	31.55	0.076	61.13	45	0.78	1.00	0.08	1.10
1.32317	0.1 #	18.2	0.4	1743	10	5.7	5.7	0.6	0.57	0.07	304.4	1.38	4.21	72.2	1.88	29.2	n/a	n/a	n/a	1.88	29.24	1.17	34.13	0.078	72.48	49	0.76	1.00	0.08	1.13
1.44871	0.14 #	17.7	0.4	1695	13	6.2	6.2	0.8	0.57	0.07	270.3	1.53	4.03	67.1	1.99	28.4	n/a	n/a	n/a	1.99	28.44	1.29	36.55	0.080	67.37	47	0.77	1.00	0.09	1.16
1.57761	0.15 #	18.6	0.5	1781	14	6.8	6.8	0.8	0.57	0.07	260.8	1.54	3.86	67.6	1.99	29.9	n/a	n/a	n/a	1.99	29.88	1.29	38.49	0.082	67.84	47	0.76	1.00	0.09	1.19
1.70273	0.19 #	12.4	0.5	1187	18	7.3	7.3	1.5	0.57	0.07	160.7	1.89	3.71	43.3	2.31	19.9	n/a	n/a	n/a	2.31	19.92	1.99	39.61	0.083	43.53	38	0.80	1.00	0.09	1.20
1.82952	0.17 #	16.5	0.6	1580	16	7.9	7.9	1.0	0.57	0.07	199.3	1.70	3.58	55.6	2.12	26.5	n/a	n/a	n/a	2.12	26.51	1.50	39.63	0.083	55.88	43	0.79	1.00	0.09	1.20
1.9559	0.19 #	16.8	0.6	1609	18	8.4	8.4	1.1	0.57	0.07	189.7	1.75	3.47	54.7	2.15	27.0	n/a	n/a	n/a	2.15	26.99	1.55	41.96	0.085	55.03	42	0.79	1.00	0.09	1.23
2.08059	0.17 #	21.1	0.6	2021	16	9.0	9.0	0.8	0.57	0.07	224.2	1.59	3.36	66.7	2.00	33.9	n/a	n/a	n/a	2.00	33.90	1.29	43.86	0.087	67.01	47	0.77	1.00	0.09	1.25
2.20613	0.2 #	12.8	0.7	1226	19	9.5	9.5	1.6	0.57	0.07	127.8	1.97	3.26	39.2	2.35	20.6	n/a	n/a	n/a	2.35	20.56	2.13	43.74	0.086	39.48	36	0.80	1.00	0.09	1.25
2.32956	0.22 #	13.5	0.7	1293	21	10.0	10.0	1.6	0.57	0.07	127.7	1.98	3.18	40.2	2.35	21.7	n/a	n/a	n/a	2.35	21.69	2.13	46.29	0.089	40.52	36	0.80	1.00	0.09	1.28
2.58821	0.25 #	21.9	0.8	2097	24	11.2	11.2	1.1	0.57	0.07	186.9	1.75	3.01	62.0	2.11	35.2	n/a	n/a	n/a	2.11	35.19	1.47	51.83	0.093	62.36	45	0.77	1.00	0.10	1.34
2.70785	0.22 #	23.4	0.8	2241	21	11.7	11.7	0.9	0.57	0.07	190.9	1.69	2.95	64.8	2.04	37.6	n/a	n/a	n/a	2.04	37.60	1.36	51.22	0.092	65.14	46	0.77	1.00	0.10	1.34
2.82875	0.16 #	22.8	0.9	2183	15	12.2	12.2	0.7	0.57	0.07	178.0	1.62	2.88	61.8	1.99	36.6	n/a	n/a	n/a	1.99	36.63	1.29	47.17	0.089	62.10	45	0.77	1.00	0.10	1.29
2.94881	0.19 #	15.8	0.9	1513	18	12.7	12.7	1.2	0.57	0.07	118.0	1.91	2.82	41.8	2.26	25.4	n/a	n/a	n/a	2.26	25.38	1.83	46.54	0.089	42.15	37	0.80	1.00	0.10	1.28
3.06971	0.21 7	6.6	0.9	632	20	13.2	13.2	3.2	0.57	0.07	46.7	2.50	2.77	16.9	2.83	10.6	4.2	10.6	3.00	3.00	10.60	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.19229	0.17 8	8.4	1.0	804	16	13.8	13.8	2.1	0.57	0.07	57.4	2.30	2.71	21.2	2.64	13.5	4.0	13.5	2.80	2.80	13.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.31404	0.18 4	3.7	1.0	354	17	14.3	14.3	5.1	0.57	0.07	23.8	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.55668	0.19 6	6	1.1	575	18	15.3	15.3	3.3	0.57	0.07	36.5	2.58	2.57	14.2	2.89	9.6	3.7	9.6	3.03	3.03	9.64	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.67716	0.19 3	3.5	1.1	335	18	15.9	15.9	5.7	0.57	0.07	20.1	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.79933	0.19 2	2.2	1.2	211	18	16.4	16.4	9.4	0.57	0.07	11.9	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.92234	0.21 4	3.7	1.2	354	20	16.9	16.9	6.0	0.57	0.07	19.9	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.0445	0.2 6	6	1.2	575	19	17.4	17.4	3.4	0.57	0.07	31.9	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.16624	0.18 3	3.4	1.3	326	17	18.0	18.0	5.6	0.57	0.07	17.1	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.28841	0.23 2	2.2	1.3	211	22	18.5	18.5	11.5	0.57	0.07	10.4	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.4131	0.21 6	5.6	1.3	536	20	19.0	19.0	3.9	0.57	0.07	27.2	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.53737	0.19 5	5.6	1.4	536	18	19.6	19.6	3.5	0.57	0.07	26.4	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.66122	0.19 1	1.1	1.4	105	18	20.1	20.1	21.3	0.57	0.07	4.2	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.78718	0.21 5	4.8	1.5	460	20	20.6	20.6	4.6	0.57	0.07	21.3	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.91314	0.2 5	5	1.5	479	19	21.2	21.2	4.2	0.57	0.07	21.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.03867	0.19 2	2	1.5	192	18	21.7	21.7	10.7	0.57	0.07	7.8	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.16715	0.24 2	1.6	1.6	153	23	22.3	22.3	17.6	0.57	0.07	5.9	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.29648	0.23 5	5.6	1.6	536	22	22.8	22.8	4.3	0.57	0.07	22.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.42496	0.21 7	7.6	1.7	728	20	23.4	23.4	2.9	0.57	0.07	30.1	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.55176	0.23 #	14	1.7	1341	22	23.9	23.9	1.7	0.57	0.07	55.0	2.25	2.06	26.7	2.50	22.5	n/a	n/a	n/a	2.50	22.49	2.78	62.43	0.103	27.22	30	0.80	1.00	0.11	1.48
5.66297	0.2 #	24.9	1.7	2384	19	24.4	24.4	0.8	0.57	0.07	96.6	1.87	2.04	47.4	2.12	40.0	n/a	n/a	n/a	2.12	40.01	1.49	59.67	0.100	47.93	40	0.80	1.00	0.11	1.44
5.81252	0.24 #	24.4	1.8	2337	23	25.1	25.1	1.0	0.57	0.07	92.2	1.94	2.01	45.9	2.18	39.2	n/a	n/a	n/a	2.18	39.20	1.62	63.49	0.104	46.36	39	0.80	1.00	0.11	1.50
5.93932	0.22 #	27.1	1.8	2595	21	25.6	25.6	0.8	0.57	0.07	100.3	1.86	1.99	50.4	2.10	43.5	n/a	n/a	n/a	2.10	43.54	1.45	63.31	0.104	50.94	41	0.80	1.00	0.11	1.50
6.06528	0.23 #	20.1	1.8	1925	22	26.2	26.2	1.2	0.57	0.07	72.6	2.06	1.97	36.9	2.30	32.3	n/a	n/a	n/a	2.30	32.29	1.94	62.53	0.103	37.39	35	0.80	1.00	0.11	1.49
6.19292	0.26 #	22.7	1.9	2174	25	26.7	26.7	1.2	0.57	0.07	80.4	2.02	1.95	41.3	2.26	36.5	n/a	n/a	n/a	2.26	36.47	1.81	66.17	0.107	41.79	37	0.80	1.00	0.11	1.55
6.32056	0.21 #	25.2	1.9	2413	20	27.3	27.3	0.8	0.57	0.07	87.5	1.91	1.93	45.4	2.14	40.5	n/a	n/a	n/a	2.14	40.49	1.54	62.41	0.103	45.92	39	0.80	1.00	0.11	1.48
6.44778	0.23 #	22.3	2.0	2135	22	27.8	27.8	1.0	0.57	0.07	75.8	2.02	1.91	39.7	2.24	35.8	n/a	n/a	n/a	2.24	35.83	1.78	63.85	0.104	40.23	36	0.80	1.00	0.11	1.51

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.57458	0.27	# 20.7	2.0	1982	26	28.4	28.4	1.3	0.57	0.07	68.9	2.11	1.89	36.5	2.33	33.3	n/a	n/a	n/a	2.33	33.26	2.06	68.45	0.110	36.98	35	0.80	1.00	0.12	1.59
6.698	0.24	# 24.6	2.0	2356	23	28.9	28.9	1.0	0.57	0.07	80.6	1.98	1.87	43.0	2.20	39.5	n/a	n/a	n/a	2.20	39.52	1.67	66.05	0.107	43.54	38	0.80	1.00	0.11	1.54
6.82396	0.21	# 22.1	2.1	2116	20	29.4	29.4	1.0	0.57	0.07	70.9	2.02	1.86	38.2	2.24	35.5	n/a	n/a	n/a	2.24	35.51	1.77	62.76	0.103	38.76	36	0.80	1.00	0.11	1.49
6.94781	0.25	# 28.6	2.1	2739	24	30.0	30.0	0.9	0.57	0.07	90.4	1.91	1.84	49.2	2.13	45.9	n/a	n/a	n/a	2.13	45.95	1.51	69.17	0.111	49.71	40	0.80	1.00	0.12	1.60
7.07124	0.24	# 28.3	2.2	2710	23	30.5	30.5	0.9	0.57	0.07	87.9	1.91	1.82	48.2	2.13	45.5	n/a	n/a	n/a	2.13	45.47	1.51	68.45	0.110	48.75	40	0.80	1.00	0.12	1.59
7.19425	0.24	# 27.5	2.2	2633	23	31.0	31.0	0.9	0.57	0.07	83.9	1.94	1.81	46.4	2.15	44.2	n/a	n/a	n/a	2.15	44.18	1.55	68.37	0.110	46.97	39	0.80	1.00	0.12	1.59
7.31557	0.26	# 24.5	2.2	2346	25	31.5	31.5	1.1	0.57	0.07	73.4	2.03	1.79	40.9	2.24	39.4	n/a	n/a	n/a	2.24	39.36	1.77	69.71	0.112	41.50	37	0.80	1.00	0.12	1.61
7.43815	0.26	# 17	2.3	1628	25	32.1	32.1	1.6	0.57	0.07	49.8	2.27	1.78	28.0	2.47	27.3	n/a	n/a	n/a	2.47	27.31	2.61	71.29	0.114	28.56	31	0.80	1.00	0.12	1.64
7.5599	0.24	# 21.8	2.3	2088	23	32.6	32.6	1.1	0.57	0.07	63.0	2.10	1.76	35.8	2.30	35.0	n/a	n/a	n/a	2.30	35.02	1.94	68.08	0.109	36.32	35	0.80	1.00	0.12	1.58
7.68291	0.22	# 18.7	2.3	1791	21	33.1	33.1	1.2	0.57	0.07	53.0	2.18	1.75	30.3	2.37	30.0	n/a	n/a	n/a	2.37	30.04	2.21	66.45	0.107	30.91	32	0.80	1.00	0.11	1.55
7.80423	0.22	# 16.1	2.4	1542	21	33.7	33.7	1.4	0.57	0.07	44.8	2.27	1.74	25.8	2.47	25.9	n/a	n/a	n/a	2.47	25.87	2.62	67.75	0.109	26.40	29	0.80	1.00	0.12	1.57
7.92639	0.2	# 18.7	2.4	1791	19	34.2	34.2	1.1	0.57	0.07	51.4	2.16	1.72	29.8	2.36	30.0	n/a	n/a	n/a	2.36	30.04	2.15	64.60	0.105	30.43	32	0.80	1.00	0.11	1.52
8.04898	0.17	# 21.9	2.5	2097	16	34.7	34.7	0.8	0.57	0.07	59.4	2.03	1.71	34.8	2.23	35.2	n/a	n/a	n/a	2.23	35.19	1.74	61.24	0.101	35.36	34	0.80	1.00	0.11	1.47
8.1682	0.17	# 26.1	2.5	2499	16	35.2	35.2	0.7	0.57	0.07	70.0	1.93	1.70	41.2	2.13	41.8	n/a	n/a	n/a	2.13	41.84	1.50	62.94	0.103	41.84	37	0.80	1.00	0.11	1.49
8.2891	0.23	# 28.1	2.5	2691	22	35.7	35.7	0.8	0.57	0.07	74.3	1.96	1.68	44.1	2.15	44.7	n/a	n/a	n/a	2.15	44.71	1.56	69.57	0.111	44.71	38	0.80	1.00	0.12	1.61
8.40873	0.24	# 28.1	2.6	2691	23	36.3	36.3	0.9	0.57	0.07	73.2	1.98	1.67	43.8	2.16	44.4	n/a	n/a	n/a	2.16	44.39	1.58	70.28	0.112	44.39	38	0.80	1.00	0.12	1.62
8.52879	0.24	# 16.3	2.6	1561	23	36.8	36.8	1.5	0.57	0.07	41.4	2.32	1.66	25.0	2.50	25.6	n/a	n/a	n/a	2.50	25.57	2.77	70.82	0.113	25.57	29	0.80	1.00	0.12	1.63
8.64927	0.23	9 8.5	2.6	814	22	37.3	37.3	2.8	0.57	0.07	20.8	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.76933	0.22	# 9.7	2.7	929	21	37.8	37.8	2.4	0.57	0.07	23.6	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.03936	0.27	# 16	2.8	1532	26	39.0	39.0	1.7	0.57	0.07	38.3	2.38	1.61	23.8	2.55	24.4	n/a	n/a	n/a	2.55	24.38	3.05	74.24	0.118	24.38	28	0.80	1.00	0.13	1.71
9.16236	0.27	# 29	2.8	2777	26	39.5	39.5	0.9	0.57	0.07	69.3	2.02	1.60	43.3	2.19	43.9	n/a	n/a	n/a	2.19	43.89	1.64	71.99	0.115	43.89	38	0.80	1.00	0.12	1.66
9.282	0.27	# 26.2	2.8	2509	26	40.0	40.0	1.0	0.57	0.07	61.7	2.09	1.59	38.8	2.25	39.4	n/a	n/a	n/a	2.25	39.40	1.81	71.22	0.114	39.40	36	0.80	1.00	0.12	1.64
9.40164	0.24	# 28.2	2.9	2700	23	40.5	40.5	0.9	0.57	0.07	65.6	2.02	1.58	41.5	2.18	42.1	n/a	n/a	n/a	2.18	42.13	1.63	68.55	0.110	42.13	37	0.80	1.00	0.12	1.59
9.52212	0.24	# 26.7	2.9	2557	23	41.1	41.1	0.9	0.57	0.07	61.3	2.06	1.57	39.0	2.22	39.6	n/a	n/a	n/a	2.22	39.64	1.71	67.97	0.109	39.64	36	0.80	1.00	0.12	1.58
9.64176	0.25	# 24.5	2.9	2346	24	41.6	41.6	1.0	0.57	0.07	55.4	2.12	1.56	35.5	2.28	36.1	n/a	n/a	n/a	2.28	36.15	1.90	68.56	0.110	36.15	34	0.80	1.00	0.12	1.59
9.75971	0.23	# 23.7	3.0	2270	22	42.1	42.1	1.0	0.57	0.07	52.9	2.13	1.55	34.1	2.29	34.8	n/a	n/a	n/a	2.29	34.75	1.91	66.27	0.107	34.75	34	0.80	1.00	0.11	1.55
9.87935	0.24	# 30.3	3.0	2902	23	42.6	42.6	0.8	0.57	0.07	67.1	1.99	1.54	43.5	2.15	44.2	n/a	n/a	n/a	2.15	44.16	1.55	68.52	0.110	44.16	38	0.80	1.00	0.12	1.59
9.99898	0.26	# 29.2	3.0	2796	25	43.1	43.1	0.9	0.57	0.07	63.8	2.04	1.53	41.7	2.19	42.3	n/a	n/a	n/a	2.19	42.30	1.65	69.76	0.112	42.30	37	0.80	1.00	0.12	1.61
10.11694	0.24	# 30.6	3.1	2930	23	43.6	43.6	0.8	0.57	0.07	66.2	1.99	1.52	43.4	2.15	44.1	n/a	n/a	n/a	2.15	44.07	1.55	68.25	0.110	44.07	38	0.80	1.00	0.12	1.58
10.23699	0.24	# 24.7	3.1	2365	23	44.1	44.1	1.0	0.57	0.07	52.6	2.13	1.52	34.7	2.28	35.4	n/a	n/a	n/a	2.28	35.37	1.89	66.77	0.108	35.37	34	0.80	1.00	0.12	1.56
10.35663	0.26	# 26.5	3.2	2538	25	44.7	44.7	1.0	0.57	0.07	55.8	2.11	1.51	37.1	2.26	37.7	n/a	n/a	n/a	2.26	37.72	1.82	68.76	0.110	37.72	35	0.80	1.00	0.12	1.59
10.47501	0.26	# 19.9	3.2	1906	25	45.2	45.2	1.3	0.57	0.07	41.2	2.29	1.50	27.5	2.44	28.2	n/a	n/a	n/a	2.44	28.17	2.47	69.51	0.111	28.17	30	0.80	1.00	0.12	1.61
10.59296	0.25	# 19.4	3.2	1858	24	45.7	45.7	1.3	0.57	0.07	39.7	2.30	1.49	26.6	2.45	27.3	n/a	n/a	n/a	2.45	27.31	2.51	68.43	0.110	27.31	30	0.80	1.00	0.12	1.59
10.71133	0.26	# 21.3	3.3	2040	25	46.2	46.2	1.2	0.57	0.07	43.2	2.26	1.48	29.1	2.40	29.8	n/a	n/a	n/a	2.40	29.81	2.31	68.83	0.110	29.81	31	0.80	1.00	0.12	1.59
10.83139	0.22	# 17.8	3.3	1705	21	46.7	46.7	1.3	0.57	0.07	35.5	2.33	1.47	24.1	2.47	24.8	n/a	n/a	n/a	2.47	24.78	2.63	65.24	0.106	24.78	29	0.80	1.00	0.11	1.53
10.94976	0.22	# 20.6	3.3	1973	21	47.2	47.2	1.1	0.57	0.07	40.8	2.25	1.46	27.8	2.38	28.5	n/a	n/a	n/a	2.38	28.52	2.25	64.21	0.105	28.52	31	0.80	1.00	0.11	1.51
11.06729	0.21	# 20.3	3.4	1944	20	47.7	47.7	1.1	0.57	0.07	39.7	2.25	1.46	27.3	2.39	28.0	n/a	n/a	n/a	2.39	27.95	2.25	63.00	0.103	27.95	30	0.80	1.00	0.11	1.49
11.18525	0.22	# 26.7	3.4	2557	21	48.2	48.2	0.8	0.57	0.07	52.0	2.09	1.45	35.9	2.23	36.6	n/a	n/a	n/a	2.23	36.57	1.75	63.85	0.104	36.57	35	0.80	1.00	0.11	1.51
11.3032	0.21	# 24.7	3.4	2365	20	48.7	48.7	0.9	0.57	0.07	47.5	2.13	1.44	33.0	2.27	33.7	n/a	n/a	n/a	2.27	33.66	1.86	62.46	0.103	33.66	33	0.80	1.00	0.11	1.48
11.41947	0.18	# 30.8	3.5	2949	17	49.2	49.2	0.6	0.57	0.07	58.9	1.97	1.43	41.1	2.11	41.8	n/a	n/a	n/a	2.11	41.75	1.47	61.20	0.101	41.75	37	0.80	1.00	0.11	1.46
11.537	0.22	# 28.3	3.5	2710	21	49.8	49.8	0.8	0.57	0.07	53.5	2.07	1.43	37.5	2.20	38.2	n/a	n/a	n/a	2.20	38.17	1.67	63.78	0.104	38.17	35	0.80	1.00	0.11	1.51
11.65326	0.21	# 18.8	3.6	1800	20	50.3	50.3	1.1	0.57	0.07	34.8	2.31	1.42	24.5	2.44	25.2	n/a	n/a	n/a	2.44	25.23	2.50	62.97	0.103	25.23	29	0.80	1.00	0.11	1.49
11.76995	0.25	# 22.9	3.6	2193	24	50.8	50.8	1.1	0.57	0.07	42.2	2.24	1.41	29.9	2.36	30.6	n/a	n/a	n/a	2.36	30.58	2.17	66.37	0.107	30.58	32	0.80	1.00	0.11	1.55
11.88664	0.19	# 17.6	3.6	1685	18	51.3	51.3	1.1	0.57	0.07	31.9	2.34	1.41	22.7	2.46	23.4	n/a	n/a	n/a	2.46	23.39	2.60	60.73	0.101	23.39	28	0.80	1.00	0.11	1.46
12.00165	0.19	# 20.4	3.7	1954	18	51.8	51.8	1.0	0.57	0.07	36.7	2.25	1.40	26.3	2.38	27.0	n/a	n/a	n/a	2.38	26.98	2.22	59.85	0.100	26.98	30	0.80	1.00	0.11	1.44
12.072	0.22	# 18.3	3.7	1752	21	52.1	52.1	1.2	0.57	0.07	32.7	2.36	1.40	23.4	2.48	24.1	n/a	n/a	n/a	2.48	24.13	2.66	64.08	0.104	24.13	28	0.80	1.00	0.11	1.51
12.19416	0.24	# 14.7	3.7	1408	23	52.6	52.6	1.7	0.57	0.07	25.8	2.52	1.39	18.6	2.64	19.3	1.6	22.0	2.57	2.57	21.99	3.17	69.80	0.112	19.28	25	0.80	1.00	0.12	1.61
12.31675	0.22	# 16.6	3.8	1590	21	53.1	53.1	1.4	0.57	0.07	28.9	2.42	1.38	20.9	2.54	21.7	n/a	n/a	n/a	2.54	21.67	2.99	64.74	0.105	21.67	27	0.80	1.00	0.11	1.52

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
12.43723	0.25	# 13.3	3.8	1274	24	53.6	53.6	2.0	0.57	0.07	22.7	2.60	1.37	16.5	2.71	17.3	1.6	19.6	2.65	2.65	19.62	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.55813	0.24	# 13.5	3.8	1293	23	54.2	54.2	1.9	0.57	0.07	22.9	2.58	1.37	16.7	2.70	17.5	1.6	19.8	2.63	2.63	19.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.67987	0.24	# 16.6	3.9	1590	23	54.7	54.7	1.5	0.57	0.07	28.1	2.46	1.36	20.6	2.57	21.4	n/a	n/a	n/a	2.57	21.36	3.14	66.96	0.108	21.36	26	0.80	1.00	0.12	1.56
12.79951	0.21	# 19.5	3.9	1867	20	55.2	55.2	1.1	0.57	0.07	32.8	2.33	1.35	24.2	2.44	25.0	n/a	n/a	n/a	2.44	24.97	2.48	61.93	0.102	24.97	29	0.80	1.00	0.11	1.48
12.91915	0.18	# 21.8	3.9	2088	17	55.7	55.7	0.8	0.57	0.07	36.5	2.23	1.35	27.0	2.34	27.8	n/a	n/a	n/a	2.34	27.78	2.08	57.83	0.098	27.78	30	0.80	1.00	0.10	1.42
13.0392	0.21	# 24	4.0	2298	20	56.2	56.2	0.9	0.57	0.07	39.9	2.21	1.34	29.7	2.32	30.4	n/a	n/a	n/a	2.32	30.45	2.00	60.94	0.101	30.45	32	0.80	1.00	0.11	1.46
13.15884	0.18	# 30.4	4.0	2911	17	56.7	56.7	0.6	0.57	0.07	50.3	2.03	1.34	37.6	2.14	38.4	n/a	n/a	n/a	2.14	38.39	1.54	59.01	0.099	38.39	35	0.80	1.00	0.11	1.43
13.27595	0.18	# 33.3	4.0	3189	17	57.3	57.3	0.6	0.57	0.07	54.7	1.98	1.33	41.1	2.09	41.9	n/a	n/a	n/a	2.09	41.87	1.44	60.15	0.100	41.87	37	0.80	1.00	0.11	1.45
13.39474	0.22	# 32.3	4.1	3093	21	57.8	57.8	0.7	0.57	0.07	52.5	2.05	1.32	39.7	2.15	40.4	n/a	n/a	n/a	2.15	40.43	1.56	62.91	0.103	40.43	36	0.80	1.00	0.11	1.49
13.487	0.26	# 36	4.1	3447	25	58.2	58.2	0.7	0.57	0.07	58.3	2.02	1.32	44.1	2.12	44.9	n/a	n/a	n/a	2.12	44.91	1.50	67.34	0.108	44.91	38	0.80	1.00	0.12	1.57
13.60369	0.29	# 36.1	4.1	3457	28	58.7	58.7	0.8	0.57	0.07	57.9	2.05	1.31	44.1	2.15	44.8	n/a	n/a	n/a	2.15	44.84	1.55	69.47	0.111	44.84	38	0.80	1.00	0.12	1.61
13.72164	0.27	# 35.2	4.2	3371	26	59.2	59.2	0.8	0.57	0.07	56.0	2.05	1.31	42.8	2.15	43.5	n/a	n/a	n/a	2.15	43.53	1.55	67.53	0.109	43.53	38	0.80	1.00	0.12	1.57
13.83833	0.24	# 41.1	4.2	3936	23	59.7	59.7	0.6	0.57	0.07	65.0	1.93	1.30	49.8	2.03	50.6	n/a	n/a	n/a	2.03	50.61	1.34	68.00	0.109	50.61	41	0.80	1.00	0.12	1.58
13.95628	0.2	# 33	4.3	3160	19	60.2	60.2	0.6	0.57	0.07	51.5	2.03	1.30	39.7	2.13	40.5	n/a	n/a	n/a	2.13	40.47	1.51	60.92	0.101	40.47	36	0.80	1.00	0.11	1.46
14.05107	0.21	# 27.6	4.3	2643	20	60.6	60.4	0.8	0.57	0.07	42.7	2.15	1.29	33.0	2.25	33.8	n/a	n/a	n/a	2.25	33.77	1.79	60.33	0.100	33.77	33	0.80	1.00	0.11	1.45
14.1686	0.25	# 23.8	4.3	2279	24	61.1	60.6	1.1	0.57	0.07	36.6	2.28	1.29	28.3	2.38	29.1	n/a	n/a	n/a	2.38	29.09	2.22	64.43	0.105	29.09	31	0.80	1.00	0.11	1.51
14.26338	0.25	# 22.9	4.3	2193	24	61.5	60.7	1.1	0.57	0.07	35.1	2.31	1.29	27.2	2.40	28.0	n/a	n/a	n/a	2.40	27.96	2.31	64.62	0.105	27.96	30	0.80	1.00	0.11	1.52
14.38175	0.22	# 21.6	4.4	2068	21	62.0	60.9	1.1	0.57	0.07	33.0	2.31	1.29	25.5	2.41	26.3	n/a	n/a	n/a	2.41	26.34	2.34	61.69	0.102	26.34	29	0.80	1.00	0.11	1.47
14.50139	0.23	# 16.3	4.4	1561	22	62.5	61.0	1.5	0.57	0.07	24.5	2.50	1.29	19.1	2.59	19.8	n/a	n/a	n/a	2.59	19.85	3.28	65.12	0.106	19.85	26	0.80	1.00	0.11	1.52
14.58901	0.23	# 17.1	4.4	1637	22	62.9	61.2	1.4	0.57	0.07	25.7	2.47	1.29	20.0	2.56	20.8	n/a	n/a	n/a	2.56	20.80	3.11	64.66	0.105	20.80	26	0.80	1.00	0.11	1.51
14.71623	0.22	9 9.4	4.5	900	21	63.5	61.3	2.5	0.57	0.07	13.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.83545	0.23	# 10.8	4.5	1034	22	64.0	61.5	2.3	0.57	0.07	15.8	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.95172	0.22	# 17.4	4.6	1666	21	64.5	61.6	1.3	0.57	0.07	26.0	2.45	1.28	20.3	2.54	21.1	n/a	n/a	n/a	2.54	21.09	3.00	63.28	0.104	21.09	26	0.80	1.00	0.11	1.49
15.06798	0.2	# 26.3	4.6	2518	19	65.0	61.8	0.8	0.57	0.07	39.7	2.18	1.28	31.0	2.27	31.8	n/a	n/a	n/a	2.27	31.83	1.86	59.06	0.099	31.83	32	0.80	1.00	0.11	1.42
15.18299	0.2	# 26.1	4.6	2499	19	65.5	61.9	0.8	0.57	0.07	39.3	2.18	1.28	30.7	2.28	31.5	n/a	n/a	n/a	2.28	31.55	1.87	59.03	0.099	31.55	32	0.80	1.00	0.11	1.42
15.26387	0.22	# 30.6	4.7	2930	21	65.8	62.0	0.7	0.57	0.07	46.2	2.11	1.28	36.1	2.20	37.0	n/a	n/a	n/a	2.20	36.96	1.67	61.54	0.102	36.96	35	0.80	1.00	0.11	1.46
15.38098	0.21	# 27.5	4.7	2633	20	66.3	62.2	0.8	0.57	0.07	41.3	2.16	1.28	32.3	2.25	33.2	n/a	n/a	n/a	2.25	33.17	1.81	60.09	0.100	33.17	33	0.80	1.00	0.11	1.43
15.49724	0.2	# 29	4.7	2777	19	66.8	62.4	0.7	0.57	0.07	43.5	2.12	1.27	34.1	2.21	34.9	n/a	n/a	n/a	2.21	34.94	1.70	59.34	0.099	34.94	34	0.80	1.00	0.11	1.42
15.61351	0.23	# 19.4	4.8	1858	22	67.3	62.5	1.2	0.57	0.08	28.6	2.40	1.27	22.5	2.49	23.3	n/a	n/a	n/a	2.49	23.34	2.72	63.49	0.104	23.34	28	0.80	1.00	0.11	1.48
15.73104	0.22	# 22.7	4.8	2174	21	67.8	62.7	1.0	0.57	0.08	33.6	2.29	1.27	26.4	2.38	27.3	n/a	n/a	n/a	2.38	27.28	2.25	61.32	0.101	27.28	30	0.80	1.00	0.11	1.45
15.84815	0.25	# 33.9	4.8	3246	24	68.3	62.8	0.8	0.57	0.08	50.6	2.08	1.27	39.8	2.17	40.7	n/a	n/a	n/a	2.17	40.69	1.59	64.76	0.105	40.69	37	0.80	1.00	0.11	1.50
15.96611	0.26	# 31.7	4.9	3036	25	68.9	63.0	0.8	0.57	0.08	47.1	2.13	1.27	37.1	2.22	38.0	n/a	n/a	n/a	2.22	38.00	1.71	65.05	0.106	38.00	35	0.80	1.00	0.11	1.50
16.08153	0.22	# 41.2	4.9	3945	21	69.3	63.1	0.5	0.57	0.08	61.4	1.93	1.27	48.5	2.02	49.3	n/a	n/a	n/a	2.02	49.33	1.33	65.75	0.106	49.33	40	0.80	1.00	0.11	1.51
16.1443	0.23	# 47.5	4.9	4549	22	69.6	63.2	0.5	0.57	0.08	70.9	1.86	1.27	56.0	1.95	56.8	n/a	n/a	n/a	1.95	56.84	1.24	70.38	0.112	56.84	43	0.78	1.00	0.12	1.60
16.26478	0.25	# 50.6	5.0	4845	24	70.1	63.4	0.5	0.57	0.08	75.4	1.84	1.26	59.6	1.93	60.5	n/a	n/a	n/a	1.93	60.47	1.22	73.58	0.117	60.47	45	0.78	1.00	0.13	1.66
16.37978	0.23	# 48.5	5.0	4644	22	70.6	63.5	0.5	0.57	0.08	72.0	1.85	1.26	57.0	1.94	57.9	n/a	n/a	n/a	1.94	57.89	1.23	70.97	0.113	57.89	44	0.78	1.00	0.12	1.61
16.49352	0.2	# 39	5.0	3735	19	71.1	63.7	0.5	0.57	0.08	57.5	1.95	1.26	45.6	2.04	46.5	n/a	n/a	n/a	2.04	46.50	1.36	63.02	0.103	46.50	39	0.80	1.00	0.11	1.46
16.61232	0.25	# 41.9	5.1	4012	24	71.6	63.8	0.6	0.57	0.08	61.7	1.96	1.26	49.0	2.04	49.9	n/a	n/a	n/a	2.04	49.89	1.36	67.89	0.109	49.89	40	0.80	1.00	0.12	1.55
16.72732	0.3	# 38.9	5.1	3725	29	72.1	64.0	0.8	0.57	0.08	57.1	2.04	1.26	45.4	2.13	46.3	n/a	n/a	n/a	2.13	46.27	1.51	69.85	0.112	46.27	39	0.80	1.00	0.12	1.58
16.84232	0.27	# 30.4	5.1	2911	26	72.6	64.1	0.9	0.57	0.08	44.3	2.17	1.26	35.2	2.26	36.1	n/a	n/a	n/a	2.26	36.11	1.82	65.57	0.106	36.11	34	0.80	1.00	0.11	1.50
16.95817	0.29	# 17.1	5.2	1637	28	73.1	64.3	1.8	0.57	0.08	24.3	2.55	1.26	19.4	2.63	20.3	1.4	22.2	2.58	2.58	22.22	3.22	71.52	0.114	20.29	26	0.80	1.00	0.12	1.61
17.07359	0.31	# 10.5	5.2	1005	30	73.6	64.4	3.2	0.57	0.08	14.5	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.19197	0.28	# 10.4	5.2	996	27	74.1	64.6	2.9	0.57	0.08	14.3	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.30866	0.3	6 6.2	5.3	594	29	74.6	64.7	5.5	0.57	0.08	8.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.42408	0.26	9 8.9	5.3	852	25	75.1	64.9	3.2	0.57	0.08	12.0	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.53951	0.27	# 29	5.3	2777	26	75.6	65.1	1.0	0.57	0.08	41.5	2.21	1.25	33.3	2.29	34.2	n/a	n/a	n/a	2.29	34.21	1.91	65.40	0.106	34.21	33	0.80	1.00	0.11	1.49
17.64735	0.24	# 48.8	5.4	4673	23	76.1	65.2	0.5	0.57	0.08	70.5	1.86	1.25	56.6	1.95	57.5	n/a	n/a	n/a	1.95	57.50	1.24	71.15	0.114	57.50	43	0.78	1.00	0.12	1.60
17.75308	0.28	# 87.5	5.4	8379	27	76.6	65.3	0.3	0.57	0.08	127.1	1.55	1.25	102.0	1.63	103.0	n/a	n/a	n/a	1.63	102.98	1.00	102.98	0.182	102.98	58	0.71	1.00	0.19	2.55

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
17.85629	0.26	# 111.6	5.4	10687	25	77.0	65.5	0.2	0.57	0.08	162.1	1.39	1.24	130.3	1.48	131.2	n/a	n/a	n/a	1.48	131.21	1.00	131.21	0.290	131.21	66	0.67	1.00	0.31	4.07
17.9574	0.23	# 105	5.5	10055	22	77.4	65.6	0.2	0.57	0.08	152.1	1.41	1.24	122.4	1.49	123.3	n/a	n/a	n/a	1.49	123.32	1.00	123.32	0.254	123.32	64	0.68	1.00	0.27	3.57
18.0606	0.26	# 80.8	5.5	7737	25	77.9	65.7	0.3	0.57	0.08	116.5	1.58	1.24	93.8	1.67	94.8	n/a	n/a	n/a	1.67	94.80	1.02	96.24	0.163	94.80	56	0.72	1.00	0.17	2.28
18.16465	0.21	# 58.4	5.5	5592	20	78.3	65.9	0.4	0.57	0.08	83.7	1.73	1.24	67.5	1.82	68.4	n/a	n/a	n/a	1.82	68.45	1.12	76.64	0.122	68.45	47	0.76	1.00	0.13	1.71
18.26955	0.2	# 47.2	5.6	4520	19	78.8	66.0	0.4	0.57	0.08	67.3	1.85	1.24	54.3	1.93	55.3	n/a	n/a	n/a	1.93	55.26	1.22	67.58	0.109	55.26	43	0.79	1.00	0.12	1.52
18.37149	0.22	# 48.2	5.6	4616	21	79.2	66.2	0.5	0.57	0.08	68.6	1.86	1.24	55.4	1.94	56.4	n/a	n/a	n/a	1.94	56.38	1.23	69.34	0.111	56.38	43	0.79	1.00	0.12	1.55
18.41488	0.22	# 42.5	5.6	4070	21	79.4	66.2	0.5	0.57	0.08	60.3	1.94	1.24	48.7	2.02	49.7	n/a	n/a	n/a	2.02	49.69	1.32	65.68	0.106	49.69	40	0.80	1.00	0.11	1.49
18.52651	0.23	# 34.6	5.6	3313	22	79.9	66.4	0.7	0.57	0.08	48.7	2.07	1.24	39.4	2.15	40.4	n/a	n/a	n/a	2.15	40.41	1.55	62.73	0.103	40.41	36	0.80	1.00	0.11	1.44
18.64278	0.25	# 29.3	5.7	2806	24	80.4	66.5	0.9	0.57	0.08	41.0	2.19	1.23	33.2	2.27	34.2	n/a	n/a	n/a	2.27	34.18	1.86	63.42	0.104	34.18	33	0.80	1.00	0.11	1.45
18.75189	0.24	# 42	5.7	4022	23	80.9	66.7	0.6	0.57	0.08	59.1	1.96	1.23	48.0	2.04	48.9	n/a	n/a	n/a	2.04	48.94	1.36	66.56	0.107	48.94	40	0.80	1.00	0.12	1.50
18.85804	0.24	# 43.2	5.7	4137	23	81.3	66.8	0.6	0.57	0.08	60.7	1.95	1.23	49.3	2.03	50.3	n/a	n/a	n/a	2.03	50.28	1.34	67.17	0.108	50.28	41	0.80	1.00	0.12	1.51
18.94019	0.28	# 53.2	5.8	5094	27	81.7	66.9	0.5	0.57	0.08	74.9	1.86	1.23	60.9	1.93	61.9	n/a	n/a	n/a	1.93	61.87	1.22	75.65	0.120	61.87	45	0.77	1.00	0.13	1.68
19.04382	0.24	# 51.4	5.8	4922	23	82.1	67.0	0.5	0.57	0.08	72.2	1.84	1.23	58.7	1.92	59.7	n/a	n/a	n/a	1.92	59.72	1.21	72.34	0.115	59.72	44	0.78	1.00	0.12	1.60
19.14871	0.26	# 49.3	5.8	4721	25	82.6	67.2	0.5	0.57	0.08	69.0	1.89	1.23	56.2	1.96	57.2	n/a	n/a	n/a	1.96	57.22	1.26	71.91	0.115	57.22	43	0.78	1.00	0.12	1.59
19.25108	0.27	# 40.2	5.9	3850	26	83.0	67.3	0.7	0.57	0.08	56.0	2.02	1.23	45.6	2.10	46.6	n/a	n/a	n/a	2.10	46.61	1.45	67.53	0.109	46.61	39	0.80	1.00	0.12	1.51
19.35386	0.19	# 33.6	5.9	3218	18	83.5	67.5	0.6	0.57	0.08	46.5	2.05	1.23	37.9	2.13	38.9	n/a	n/a	n/a	2.13	38.92	1.52	58.98	0.099	38.92	36	0.80	1.00	0.11	1.38
19.45834	0.21	# 34.7	5.9	3323	20	83.9	67.6	0.6	0.57	0.08	47.9	2.06	1.22	39.1	2.13	40.2	n/a	n/a	n/a	2.13	40.15	1.52	60.96	0.101	40.15	36	0.80	1.00	0.11	1.40
19.56197	0.24	# 26.8	6.0	2566	23	84.4	67.7	0.9	0.57	0.08	36.6	2.25	1.22	30.0	2.32	31.0	n/a	n/a	n/a	2.32	30.98	2.01	62.40	0.103	30.98	32	0.80	1.00	0.11	1.42
19.66517	0.22	# 29.3	6.0	2806	21	84.8	67.9	0.8	0.57	0.08	40.1	2.17	1.22	32.8	2.25	33.8	n/a	n/a	n/a	2.25	33.84	1.79	60.53	0.101	33.84	33	0.80	1.00	0.11	1.39
19.76923	0.23	# 32.6	6.0	3122	22	85.3	68.0	0.7	0.57	0.08	44.7	2.12	1.22	36.6	2.19	37.6	n/a	n/a	n/a	2.19	37.61	1.65	61.92	0.102	37.61	35	0.80	1.00	0.11	1.41
19.87412	0.21	# 17.4	6.1	1666	20	85.7	68.1	1.3	0.57	0.08	23.2	2.49	1.22	19.0	2.56	20.1	n/a	n/a	n/a	2.56	20.05	3.09	61.98	0.102	20.05	26	0.80	1.00	0.11	1.41
19.97859	0.17	# 17.9	6.1	1714	16	86.2	68.3	1.0	0.57	0.08	23.8	2.42	1.22	19.6	2.50	20.6	n/a	n/a	n/a	2.50	20.61	2.75	56.71	0.097	20.61	26	0.80	1.00	0.10	1.34
20.08096	0.23	# 15.5	6.1	1484	22	86.6	68.4	1.6	0.57	0.08	20.4	2.58	1.22	16.8	2.66	17.8	1.3	19.3	2.60	2.60	19.28	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.18585	0.25	9 9.4	6.2	900	24	87.0	68.6	2.9	0.57	0.08	11.9	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.28948	0.22	# 16.1	6.2	1542	21	87.5	68.7	1.4	0.57	0.08	21.2	2.55	1.21	17.4	2.62	18.5	1.3	20.0	2.57	2.57	19.97	3.16	63.08	0.103	18.48	25	0.80	1.00	0.11	1.43
20.39521	0.23	# 14.4	6.2	1379	22	88.0	68.8	1.7	0.57	0.08	18.8	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.50011	0.22	# 24.4	6.2	2337	21	88.4	69.0	0.9	0.57	0.08	32.6	2.29	1.21	26.9	2.36	28.0	n/a	n/a	n/a	2.36	27.95	2.17	60.58	0.101	27.95	30	0.80	1.00	0.11	1.39
20.60711	0.22	# 41.9	6.3	4012	21	88.9	69.1	0.5	0.57	0.08	56.8	1.96	1.21	46.9	2.03	47.9	n/a	n/a	n/a	2.03	47.95	1.35	64.61	0.105	47.95	40	0.80	1.00	0.11	1.45
20.71242	0.23	# 26.9	6.3	2576	22	89.3	69.2	0.9	0.57	0.08	35.9	2.24	1.21	29.7	2.31	30.8	n/a	n/a	n/a	2.31	30.75	1.99	61.29	0.101	30.75	32	0.80	1.00	0.11	1.40
20.81942	0.2	# 18.1	6.3	1733	19	89.8	69.4	1.2	0.57	0.08	23.7	2.46	1.21	19.6	2.53	20.7	n/a	n/a	n/a	2.53	20.67	2.92	60.38	0.100	20.67	26	0.80	1.00	0.11	1.38
20.926	0.19	# 19.8	6.4	1896	18	90.2	69.5	1.0	0.57	0.08	26.0	2.39	1.21	21.5	2.46	22.6	n/a	n/a	n/a	2.46	22.59	2.59	58.42	0.099	22.59	27	0.80	1.00	0.11	1.35
21.03426	0.21	# 17.9	6.4	1714	20	90.7	69.7	1.2	0.57	0.08	23.3	2.48	1.21	19.3	2.55	20.4	n/a	n/a	n/a	2.55	20.40	3.02	61.70	0.102	20.40	26	0.80	1.00	0.11	1.40
21.14253	0.2	# 15.3	6.4	1465	19	91.2	69.8	1.4	0.57	0.08	19.7	2.57	1.20	16.3	2.64	17.4	1.3	18.8	2.59	2.59	18.77	3.24	60.82	0.101	17.42	24	0.80	1.00	0.11	1.38
21.25163	0.24	# 14.2	6.5	1360	23	91.6	70.0	1.8	0.57	0.08	18.1	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.36284	0.2	4 4.6	6.5	440	19	92.1	70.1	5.5	0.57	0.08	5.0	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.47532	0.24	5 5.1	6.5	488	23	92.6	70.3	5.8	0.57	0.08	5.6	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.58443	0.21	6 6.5	6.6	622	20	93.1	70.4	3.8	0.57	0.08	7.5	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.64888	0.2	7 7.6	6.6	728	19	93.4	70.5	3.0	0.57	0.08	9.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.76978	0.21	6 6.1	6.6	584	20	93.9	70.6	4.1	0.57	0.08	6.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.89068	0.24	6 6.3	6.7	603	23	94.4	70.8	4.5	0.57	0.08	7.2	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.0099	0.24	# 12.7	6.7	1216	23	94.9	71.0	2.0	0.57	0.08	15.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.12869	0.24	# 19	6.7	1819	23	95.4	71.1	1.3	0.57	0.08	24.2	2.48	1.19	20.3	2.55	21.4	n/a	n/a	n/a	2.55	21.43	3.01	64.61	0.105	21.43	27	0.80	1.00	0.11	1.43
22.24749	0.25	# 33.5	6.8	3208	24	95.9	71.3	0.8	0.57	0.08	43.7	2.14	1.19	36.6	2.20	37.7	n/a	n/a	n/a	2.20	37.75	1.68	63.28	0.104	37.75	35	0.80	1.00	0.11	1.41
22.36291	0.24	# 47.1	6.8	4510	23	96.4	71.4	0.5	0.57	0.08	61.8	1.92	1.19	51.9	1.99	53.0	n/a	n/a	n/a	1.99	53.02	1.29	68.19	0.109	53.02	42	0.79	1.00	0.12	1.49
22.47623	0.2	# 45.8	6.9	4386	19	96.9	71.6	0.4	0.57	0.08	59.9	1.90	1.19	50.4	1.97	51.5	n/a	n/a	n/a	1.97	51.50	1.26	65.05	0.106	51.50	41	0.79	1.00	0.11	1.43
22.59208	0.2	# 35.4	6.9	3390	19	97.4	71.7	0.6	0.57	0.08	45.9	2.06	1.19	38.6	2.13	39.8	n/a	n/a	n/a	2.13	39.76	1.50	59.73	0.100	39.76	36	0.80	1.00	0.11	1.36
22.70877	0.23	# 27.2	6.9	2605	22	97.9	71.9	0.9	0.57	0.08	34.9	2.25	1.19	29.4	2.32	30.5	n/a	n/a	n/a	2.32	30.52	2.00	61.05	0.101	30.52	32	0.80	1.00	0.11	1.37
22.82714	0.23	# 22.6	7.0	2164	22	98.4	72.0	1.1	0.57	0.08	28.7	2.37	1.19	24.2	2.43	25.3	n/a	n/a	n/a	2.43	25.33	2.44	61.92	0.102	25.33	29	0.80	1.00	0.11	1.38

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
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Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
22.94593	0.21	# 27	7.0	2586	20	98.9	72.2	0.8	0.57	0.08	34.4	2.24	1.18	29.1	2.30	30.2	n/a	n/a	n/a	2.30	30.23	1.95	59.08	0.099	30.23	31	0.80	1.00	0.11	1.34
23.06557	0.21	# 26.9	7.0	2576	20	99.5	72.4	0.8	0.57	0.08	34.2	2.24	1.18	28.9	2.30	30.1	n/a	n/a	n/a	2.30	30.08	1.96	59.07	0.099	30.08	31	0.80	1.00	0.11	1.34
23.1553	0.2	# 25.8	7.1	2471	19	99.9	72.5	0.8	0.57	0.08	32.7	2.26	1.18	27.7	2.32	28.8	n/a	n/a	n/a	2.32	28.83	2.02	58.11	0.098	28.83	31	0.80	1.00	0.11	1.33
23.27704	0.18	# 27.7	7.1	2653	17	100.4	72.6	0.7	0.57	0.08	35.1	2.19	1.18	29.7	2.26	30.9	n/a	n/a	n/a	2.26	30.92	1.81	56.09	0.096	30.92	32	0.80	1.00	0.10	1.30
23.39415	0.19	# 24.3	7.1	2327	18	100.9	72.8	0.8	0.57	0.08	30.6	2.28	1.18	25.9	2.35	27.1	n/a	n/a	n/a	2.35	27.09	2.11	57.19	0.097	27.09	30	0.80	1.00	0.10	1.32
23.51337	0.16	# 22.2	7.2	2126	15	101.4	73.0	0.8	0.57	0.08	27.8	2.31	1.18	23.5	2.37	24.7	n/a	n/a	n/a	2.37	24.73	2.19	54.11	0.095	24.73	28	0.80	1.00	0.10	1.28
23.63132	0.16	# 28.6	7.2	2739	15	101.9	73.1	0.6	0.57	0.08	36.1	2.15	1.18	30.6	2.21	31.8	n/a	n/a	n/a	2.21	31.82	1.70	54.19	0.095	31.82	32	0.80	1.00	0.10	1.28
23.74885	0.18	# 27.8	7.2	2662	17	102.4	73.3	0.7	0.57	0.08	34.9	2.19	1.18	29.7	2.26	30.9	n/a	n/a	n/a	2.26	30.90	1.81	56.04	0.096	30.90	32	0.80	1.00	0.10	1.30
23.8668	0.16	# 30.9	7.3	2959	15	102.9	73.4	0.5	0.57	0.08	38.9	2.11	1.17	33.1	2.17	34.3	n/a	n/a	n/a	2.17	34.31	1.59	54.68	0.095	34.31	34	0.80	1.00	0.10	1.28
23.98518	0.2	# 25.4	7.3	2432	19	103.4	73.6	0.8	0.57	0.08	31.7	2.27	1.17	27.0	2.33	28.2	n/a	n/a	n/a	2.33	28.17	2.06	58.08	0.098	28.17	30	0.80	1.00	0.11	1.32
24.10271	0.23	# 11.3	7.3	1082	22	103.9	73.7	2.3	0.57	0.08	13.3	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.22235	0.22	# 10	7.4	958	21	104.5	73.9	2.5	0.57	0.08	11.5	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.3424	0.23	8 8.8	7.4	843	22	105.0	74.0	3.0	0.57	0.08	10.0	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.45994	0.23	# 18.1	7.5	1733	22	105.5	74.2	1.4	0.57	0.08	21.9	2.52	1.17	18.8	2.58	20.0	n/a	n/a	n/a	2.58	19.99	3.20	63.96	0.104	19.99	26	0.80	1.00	0.11	1.40
24.57873	0.23	# 18.2	7.5	1743	22	106.0	74.4	1.3	0.57	0.08	22.0	2.52	1.17	18.9	2.58	20.1	n/a	n/a	n/a	2.58	20.08	3.18	63.90	0.104	20.08	26	0.80	1.00	0.11	1.40
24.69669	0.26	# 10.7	7.5	1025	25	106.5	74.5	2.7	0.57	0.08	12.3	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.81379	0.27	# 11.1	7.6	1063	26	107.0	74.7	2.7	0.57	0.08	12.8	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.93722	0.26	# 10.4	7.6	996	25	107.5	74.8	2.8	0.57	0.08	11.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.06149	0.26	7 6.9	7.6	661	25	108.1	75.0	4.5	0.57	0.08	7.4	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.18408	0.26	5 5.2	7.7	498	25	108.6	75.2	6.4	0.57	0.08	5.2	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.30793	0.24	# 10.4	7.7	996	23	109.1	75.3	2.6	0.57	0.08	11.8	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.43178	0.24	6 6.8	7.8	651	23	109.7	75.5	4.2	0.57	0.08	7.2	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.55479	0.23	4 4.4	7.8	421	22	110.2	75.7	7.1	0.57	0.08	4.1	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.67779	0.24	6 6.3	7.8	603	23	110.7	75.8	4.7	0.57	0.08	6.5	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.80122	0.25	3 4	7.9	383	24	111.3	76.0	8.8	0.57	0.08	3.6	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.92381	0.23	6 6.7	7.9	642	22	111.8	76.1	4.2	0.57	0.08	7.0	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.04682	0.23	5 5.7	7.9	546	22	112.3	76.3	5.1	0.57	0.08	5.7	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.17151	0.23	3 3.3	8.0	316	22	112.9	76.5	10.8	0.57	0.08	2.7	3.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.29536	0.22	7 7.5	8.0	718	21	113.4	76.6	3.5	0.57	0.08	7.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.41837	0.25	6 6.3	8.1	603	24	113.9	76.8	4.9	0.57	0.08	6.4	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.54222	0.24	7 7.5	8.1	718	23	114.5	77.0	3.8	0.57	0.08	7.8	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.66733	0.24	6 6.1	8.1	584	23	115.0	77.1	4.9	0.57	0.08	6.1	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.79329	0.25	5 5.4	8.2	517	24	115.5	77.3	6.0	0.57	0.08	5.2	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.91924	0.25	9 9.2	8.2	881	24	116.1	77.5	3.1	0.57	0.08	9.9	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.04604	0.26	6 6.1	8.2	584	25	116.6	77.6	5.3	0.57	0.08	6.0	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.17158	0.24	8 8.5	8.3	814	23	117.2	77.8	3.3	0.57	0.08	9.0	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.29753	0.22	6 6.6	8.3	632	21	117.7	78.0	4.1	0.57	0.08	6.6	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.42644	0.25	6 6.7	8.4	642	24	118.3	78.1	4.6	0.57	0.08	6.7	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.55366	0.22	8 8.3	8.4	795	21	118.8	78.3	3.1	0.57	0.08	8.6	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.68046	0.24	5 5.5	8.4	527	23	119.4	78.5	5.6	0.57	0.08	5.2	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.80683	0.19	8 8.6	8.5	824	18	119.9	78.6	2.6	0.57	0.08	8.9	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.90541	0.15	5 5.7	8.5	546	14	120.3	78.8	3.4	0.57	0.08	5.4	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.03852	0.19	5 5.5	8.5	527	18	120.9	78.9	4.5	0.57	0.08	5.1	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.16743	0.19	3 3.5	8.6	335	18	121.5	79.1	8.5	0.57	0.08	2.7	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.29676	0.18	7 7.6	8.6	728	17	122.0	79.3	2.8	0.57	0.08	7.6	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.42524	0.22	3 3.8	8.7	364	21	122.6	79.4	8.7	0.57	0.08	3.0	3.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.55414	0.18	6 7	8.7	670	17	123.1	79.6	3.2	0.57	0.08	6.9	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.68431	0.2	7 7.7	8.7	737	19	123.7	79.8	3.1	0.57	0.08	7.7	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
28.81322	0.2	4 4.3	8.8	412	19	124.3	80.0	6.7	0.57	0.08	3.6	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.94086	0.19	9 9.1	8.8	871	18	124.8	80.1	2.4	0.57	0.08	9.3	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.07061	0.23	6 6.9	8.9	661	22	125.4	80.3	4.1	0.57	0.08	6.7	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.19741	0.21	9 9.7	8.9	929	20	125.9	80.5	2.5	0.57	0.08	10.0	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.32758	0.22	# 27.9	8.9	2672	21	126.5	80.6	0.8	0.57	0.08	31.6	2.28	1.12	28.2	2.32	29.6	n/a	n/a	n/a	2.32	29.56	2.01	59.42	0.100	29.56	31	0.80	1.00	0.11	1.29
29.45564	0.24	# 18.5	9.0	1772	23	127.0	80.8	1.4	0.57	0.08	20.4	2.56	1.12	18.2	2.60	19.6	n/a	n/a	n/a	2.60	19.58	3.32	64.92	0.105	19.58	25	0.80	1.00	0.11	1.37
29.58159	0.21	# 15	9.0	1436	20	127.6	81.0	1.5	0.57	0.08	16.2	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.70839	0.26	7 7.9	9.1	757	25	128.1	81.1	4.0	0.57	0.08	7.7	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.83603	0.25	6 6.4	9.1	613	24	128.7	81.3	4.9	0.57	0.08	6.0	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.96494	0.23	8 8	9.1	766	22	129.2	81.5	3.5	0.57	0.08	7.8	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.09174	0.23	3 4	9.2	383	22	129.8	81.7	8.7	0.57	0.08	3.1	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.21896	0.25	6 6.1	9.2	584	24	130.3	81.8	5.3	0.57	0.08	5.5	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.3466	0.28	4 4.2	9.2	402	27	130.9	82.0	9.9	0.57	0.08	3.3	3.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.47213	0.25	6 6.3	9.3	603	24	131.4	82.2	5.1	0.57	0.08	5.7	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.59893	0.26	7 7.8	9.3	747	25	132.0	82.3	4.0	0.57	0.08	7.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.72489	0.24	7 7.5	9.4	718	23	132.5	82.5	3.9	0.57	0.08	7.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.85	0.24	9 9.8	9.4	938	23	133.0	82.7	2.9	0.57	0.08	9.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.97596	0.26	9 9.2	9.4	881	25	133.6	82.8	3.3	0.57	0.08	9.0	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.10065	0.21	# 12.9	9.5	1235	20	134.1	83.0	1.8	0.57	0.08	13.3	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.15752	0.23	# 11.9	9.5	1140	22	134.4	83.1	2.2	0.57	0.08	12.1	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.28306	0.27	7 7.5	9.5	718	26	134.9	83.2	4.4	0.57	0.08	7.0	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.41028	0.23	5 5.9	9.6	565	22	135.5	83.4	5.1	0.57	0.08	5.2	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.53497	0.24	9 9.1	9.6	871	23	136.0	83.6	3.1	0.57	0.08	8.8	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.66135	0.26	8 8.6	9.7	824	25	136.5	83.7	3.6	0.57	0.08	8.2	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.78773	0.24	8 8.6	9.7	824	23	137.1	83.9	3.3	0.57	0.08	8.2	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.91452	0.27	5 6	9.7	575	26	137.6	84.1	5.9	0.57	0.08	5.2	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.03964	0.24	9 10	9.8	958	23	138.2	84.2	2.8	0.57	0.08	9.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.16728	0.28	# 16.5	9.8	1580	27	138.7	84.4	1.9	0.57	0.08	17.1	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.29197	0.27	# 21.6	9.8	2068	26	139.3	84.6	1.3	0.57	0.08	22.8	2.50	1.09	20.8	2.54	22.3	n/a	n/a	n/a	2.54	22.35	2.97	66.34	0.107	22.35	27	0.80	1.00	0.11	1.37
32.4154	0.25	# 18.1	9.9	1733	24	139.8	84.7	1.5	0.57	0.08	18.8	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.54136	0.27	# 17.4	9.9	1666	26	140.3	84.9	1.7	0.57	0.08	18.0	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.66605	0.27	# 32.8	10.0	3141	26	140.9	85.1	0.9	0.57	0.08	35.3	2.24	1.09	32.3	2.28	33.8	n/a	n/a	n/a	2.28	33.83	1.87	63.38	0.104	33.83	33	0.80	1.00	0.11	1.32
32.78863	0.29	# 25.7	10.0	2461	28	141.4	85.2	1.2	0.57	0.08	27.2	2.41	1.09	25.0	2.45	26.5	n/a	n/a	n/a	2.45	26.48	2.51	66.44	0.107	26.48	29	0.80	1.00	0.11	1.36
32.91164	0.28	# 31.5	10.0	3016	27	141.9	85.4	0.9	0.57	0.08	33.7	2.28	1.09	30.9	2.31	32.4	n/a	n/a	n/a	2.31	32.43	1.98	64.25	0.105	32.43	33	0.80	1.00	0.11	1.33
33.03381	0.25	# 42	10.1	4022	24	142.5	85.5	0.6	0.57	0.08	45.4	2.08	1.09	41.7	2.11	43.2	n/a	n/a	n/a	2.11	43.20	1.47	63.49	0.104	43.20	38	0.80	1.00	0.11	1.32
33.15344	0.24	# 61.4	10.1	5880	23	143.0	85.7	0.4	0.57	0.08	66.9	1.84	1.09	61.6	1.87	63.1	n/a	n/a	n/a	1.87	63.10	1.16	73.38	0.117	63.10	45	0.77	1.00	0.13	1.48
33.26887	0.22	# 58.3	10.1	5583	21	143.5	85.9	0.4	0.57	0.08	63.4	1.85	1.09	58.3	1.89	59.9	n/a	n/a	n/a	1.89	59.86	1.18	70.39	0.112	59.86	44	0.78	1.00	0.12	1.43
33.38345	0.23	# 44.6	10.2	4271	22	144.0	86.0	0.5	0.57	0.08	48.0	2.02	1.09	44.2	2.06	45.8	n/a	n/a	n/a	2.06	45.75	1.38	63.14	0.103	45.75	39	0.80	1.00	0.11	1.31
33.50098	0.28	# 29.7	10.2	2844	27	144.5	86.2	1.0	0.57	0.08	31.3	2.32	1.08	28.9	2.35	30.4	n/a	n/a	n/a	2.35	30.44	2.12	64.42	0.105	30.44	32	0.80	1.00	0.11	1.33
33.61852	0.3	# 13.8	10.2	1321	29	145.0	86.3	2.4	0.57	0.08	13.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.73983	0.31	# 13.2	10.3	1264	30	145.5	86.5	2.7	0.57	0.08	12.9	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.85947	0.3	8 8	10.3	766	29	146.0	86.6	4.6	0.57	0.08	7.2	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.97911	0.32	# 11.4	10.4	1092	31	146.5	86.8	3.2	0.57	0.08	10.9	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.09833	0.23	7 7.4	10.4	709	22	147.0	87.0	3.9	0.57	0.08	6.5	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.21586	0.26	# 10.1	10.4	967	25	147.5	87.1	3.0	0.57	0.08	9.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.28663	0.25	9 9.3	10.5	891	24	147.9	87.2	3.2	0.57	0.08	8.5	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.32497	0.25	# 10.2	10.5	977	24	148.0	87.3	2.9	0.57	0.09	9.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.44207	0.24	8 8.6	10.5	824	23	148.5	87.4	3.4	0.57	0.09	7.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
34.55834	0.23	# 15.9	10.5	1523	22	149.0	87.6	1.6	0.57	0.09	15.7	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.67039	0.25	# 26.7	10.6	2557	24	149.5	87.7	1.0	0.57	0.09	27.4	2.37	1.07	25.5	2.40	27.1	n/a	n/a	n/a	2.40	27.12	2.29	62.21	0.102	27.12	30	0.80	1.00	0.11	1.29
34.78161	0.28	# 24.8	10.6	2375	27	150.0	87.9	1.2	0.57	0.09	25.3	2.44	1.07	23.6	2.47	25.2	n/a	n/a	n/a	2.47	25.17	2.61	65.76	0.106	25.17	29	0.80	1.00	0.11	1.34
34.89577	0.29	# 22.2	10.6	2126	28	150.5	88.0	1.4	0.57	0.09	22.4	2.52	1.07	20.9	2.55	22.5	n/a	n/a	n/a	2.55	22.51	3.02	68.04	0.109	22.51	27	0.80	1.00	0.12	1.37
35.00951	0.32	# 23.8	10.7	2279	31	151.0	88.2	1.4	0.57	0.09	24.1	2.50	1.07	22.5	2.53	24.1	n/a	n/a	n/a	2.53	24.11	2.91	70.09	0.112	24.11	28	0.80	1.00	0.12	1.41
35.12199	0.3	# 24	10.7	2298	29	151.5	88.3	1.3	0.57	0.09	24.3	2.48	1.07	22.7	2.51	24.3	n/a	n/a	n/a	2.51	24.30	2.80	68.06	0.109	24.30	28	0.80	1.00	0.12	1.37
35.23488	0.3	# 34.3	10.7	3285	29	151.9	88.5	0.9	0.57	0.09	35.4	2.26	1.07	33.1	2.28	34.7	n/a	n/a	n/a	2.28	34.69	1.89	65.52	0.106	34.69	34	0.80	1.00	0.11	1.33
35.34904	0.31	# 38.3	10.8	3668	30	152.4	88.6	0.8	0.57	0.09	39.7	2.19	1.07	37.1	2.22	38.7	n/a	n/a	n/a	2.22	38.71	1.72	66.44	0.107	38.71	36	0.80	1.00	0.11	1.34
35.4611	0.29	# 40.2	10.8	3850	28	152.9	88.8	0.8	0.57	0.09	41.7	2.15	1.07	39.0	2.18	40.6	n/a	n/a	n/a	2.18	40.59	1.61	65.29	0.106	40.59	36	0.80	1.00	0.11	1.33
35.574	0.29	# 29.9	10.8	2863	28	153.4	88.9	1.0	0.57	0.09	30.5	2.34	1.07	28.6	2.36	30.2	n/a	n/a	n/a	2.36	30.17	2.16	65.11	0.106	30.17	31	0.80	1.00	0.11	1.32
35.689	0.29	# 21.2	10.9	2030	28	153.9	89.1	1.5	0.57	0.09	21.1	2.56	1.07	19.8	2.58	21.4	n/a	n/a	n/a	2.58	21.37	3.21	68.64	0.110	21.37	26	0.80	1.00	0.12	1.38
35.80526	0.28	# 20.5	10.9	1963	27	154.4	89.2	1.5	0.57	0.09	20.3	2.57	1.07	19.0	2.59	20.6	n/a	n/a	n/a	2.59	20.65	3.30	68.06	0.109	20.65	26	0.80	1.00	0.12	1.37
35.92153	0.34	# 19.6	10.9	1877	33	154.9	89.4	1.9	0.57	0.09	19.3	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.03864	0.35	# 16.3	11.0	1561	34	155.4	89.5	2.4	0.57	0.09	15.7	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.13048	0.34	# 16	11.0	1532	33	155.8	89.6	2.4	0.57	0.09	15.4	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.25096	0.34	# 16.5	11.0	1580	33	156.3	89.8	2.3	0.57	0.09	15.9	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.37143	0.34	# 15.5	11.1	1484	33	156.8	90.0	2.5	0.57	0.09	14.8	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.49023	0.34	# 12.3	11.1	1178	33	157.4	90.1	3.2	0.57	0.09	11.3	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.60903	0.32	# 10.9	11.2	1044	31	157.9	90.3	3.5	0.57	0.09	9.8	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.70255	0.31	8 8.4	11.2	804	30	158.3	90.4	4.6	0.57	0.09	7.1	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.82008	0.33	9 9.9	11.2	948	32	158.8	90.6	4.0	0.57	0.09	8.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.94014	0.34	8 9.1	11.3	871	33	159.3	90.7	4.6	0.57	0.09	7.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.05767	0.35	9 9.8	11.3	938	34	159.8	90.9	4.3	0.57	0.09	8.6	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.17688	0.3	# 10.4	11.3	996	29	160.3	91.0	3.4	0.57	0.09	9.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.29568	0.27	# 10.3	11.4	986	26	160.8	91.2	3.1	0.57	0.09	9.1	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.3913	0.29	9 9.5	11.4	910	28	161.2	91.3	3.7	0.57	0.09	8.2	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.45365	0.29	8 8	11.4	766	28	161.5	91.4	4.6	0.57	0.09	6.6	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.59814	0.25	# 10.5	11.5	1005	24	162.1	91.6	2.8	0.57	0.09	9.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.71989	0.26	9 9.8	11.5	938	25	162.7	91.7	3.2	0.57	0.09	8.5	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.84289	0.28	7 7.4	11.5	709	27	163.2	91.9	4.9	0.57	0.09	5.9	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.96506	0.27	# 13.1	11.6	1254	26	163.7	92.1	2.4	0.57	0.09	11.8	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.08849	0.26	# 10.8	11.6	1034	25	164.2	92.2	2.9	0.57	0.09	9.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.21486	0.29	# 11.2	11.6	1073	28	164.8	92.4	3.1	0.57	0.09	9.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.33745	0.29	# 11.9	11.7	1140	28	165.3	92.6	2.9	0.57	0.09	10.5	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.46256	0.27	9 9.8	11.7	938	26	165.9	92.7	3.3	0.57	0.09	8.3	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.58768	0.25	# 12.2	11.8	1168	24	166.4	92.9	2.4	0.57	0.09	10.8	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.70984	0.29	# 12.6	11.8	1207	28	166.9	93.0	2.7	0.57	0.09	11.2	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.83537	0.26	9 9.9	11.8	948	25	167.5	93.2	3.2	0.57	0.09	8.4	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.96133	0.26	# 10.4	11.9	996	25	168.0	93.4	3.0	0.57	0.09	8.9	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.08518	0.3	8 9.1	11.9	871	29	168.5	93.5	4.1	0.57	0.09	7.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.2103	0.29	8 9.1	12.0	871	28	169.1	93.7	4.0	0.57	0.09	7.5	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.33541	0.29	# 20.8	12.0	1992	28	169.6	93.9	1.5	0.57	0.09	19.4	2.59	1.04	18.7	2.61	20.4	1.1	20.7	2.57	2.57	20.74	3.15	65.28	0.106	20.42	26	0.80	1.00	0.11	1.30
39.45884	0.33	# 31.7	12.0	3036	32	170.2	94.0	1.1	0.57	0.09	30.5	2.35	1.04	29.4	2.37	31.1	n/a	n/a	n/a	2.37	31.10	2.18	67.89	0.109	31.10	32	0.80	1.00	0.12	1.33
39.58059	0.36	# 22.8	12.1	2183	34	170.7	94.2	1.7	0.57	0.09	21.4	2.59	1.04	20.6	2.60	22.3	1.1	22.7	2.57	2.57	22.68	3.12	70.85	0.113	22.35	27	0.80	1.00	0.12	1.38
39.70275	0.37	# 12.8	12.1	1226	35	171.2	94.4	3.4	0.57	0.09	11.2	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.82618	0.33	8 8.7	12.1	833	32	171.7	94.5	4.8	0.57	0.09	7.0	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.94708	0.34	9 9.7	12.2	929	33	172.3	94.7	4.3	0.57	0.09	8.0	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.06966	0.34	# 21.7	12.2	2078	33	172.8	94.8	1.7	0.57	0.09	20.1	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
40.19351	0.33	# 22.4	12.3	2145	32	173.3	95.0	1.6	0.57	0.09	20.8	2.58	1.03	20.1	2.59	21.9	n/a	n/a	n/a	2.59	21.86	3.29	71.85	0.114	21.86	27	0.80	1.00	0.12	1.40
40.31483	0.35	# 19.9	12.3	1906	34	173.9	95.2	1.9	0.57	0.09	18.2	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.43616	0.32	# 22.5	12.3	2155	31	174.4	95.3	1.5	0.57	0.09	20.8	2.57	1.03	20.1	2.58	21.9	n/a	n/a	n/a	2.58	21.92	3.23	70.83	0.113	21.92	27	0.80	1.00	0.12	1.38
40.55622	0.3	# 21.7	12.4	2078	29	174.9	95.5	1.5	0.57	0.09	19.9	2.58	1.03	19.3	2.59	21.1	n/a	n/a	n/a	2.59	21.13	3.28	69.38	0.111	21.13	26	0.80	1.00	0.12	1.35
40.66659	0.3	# 17.7	12.4	1695	29	175.4	95.6	1.9	0.57	0.09	15.9	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.70492	0.3	# 17.4	12.4	1666	29	175.5	95.7	1.9	0.57	0.09	15.6	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.82751	0.29	# 16.4	12.4	1570	28	176.1	95.9	2.0	0.57	0.09	14.5	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.94967	0.31	# 19.3	12.5	1848	30	176.6	96.0	1.8	0.57	0.09	17.4	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.06931	0.32	# 14.8	12.5	1417	31	177.1	96.2	2.5	0.57	0.09	12.9	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.18979	0.32	# 14.5	12.6	1389	31	177.6	96.3	2.5	0.57	0.09	12.6	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.31153	0.31	# 12.1	12.6	1159	30	178.1	96.5	3.0	0.57	0.09	10.2	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.43285	0.31	# 12.6	12.6	1207	30	178.7	96.7	2.9	0.57	0.09	10.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.55165	0.32	# 10.9	12.7	1044	31	179.2	96.8	3.5	0.57	0.09	8.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.67086	0.32	# 11.2	12.7	1073	31	179.7	97.0	3.4	0.57	0.09	9.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.79219	0.34	9 9.9	12.7	948	33	180.2	97.1	4.2	0.57	0.09	7.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.91098	0.32	8 9	12.8	862	31	180.7	97.3	4.5	0.57	0.09	7.0	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.0323	0.31	# 10.8	12.8	1034	30	181.3	97.4	3.5	0.57	0.09	8.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.15363	0.32	9 10	12.8	958	31	181.8	97.6	3.9	0.57	0.09	7.9	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.27284	0.33	# 13.9	12.9	1331	32	182.3	97.8	2.8	0.57	0.09	11.8	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.39248	0.33	# 11.8	12.9	1130	32	182.8	97.9	3.3	0.57	0.09	9.7	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.5117	0.29	# 12.2	13.0	1168	28	183.3	98.1	2.8	0.57	0.09	10.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.63302	0.3	9 9.3	13.0	891	29	183.8	98.2	4.1	0.57	0.09	7.2	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.75308	0.29	6 6.6	13.0	632	28	184.4	98.4	6.2	0.57	0.09	4.5	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.87398	0.27	8 8.7	13.1	833	26	184.9	98.6	4.0	0.57	0.09	6.6	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.9953	0.27	6 7.2	13.1	689	26	185.4	98.7	5.1	0.57	0.09	5.1	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.1162	0.26	# 11.8	13.1	1130	25	185.9	98.9	2.6	0.57	0.09	9.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.23879	0.27	8 8.3	13.2	795	26	186.5	99.0	4.3	0.57	0.09	6.1	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.36179	0.26	9 9.8	13.2	938	25	187.0	99.2	3.3	0.57	0.09	7.6	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.48354	0.28	9 9.5	13.3	910	27	187.5	99.4	3.7	0.57	0.09	7.3	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.60654	0.25	6 6.7	13.3	642	24	188.0	99.5	5.3	0.57	0.09	4.6	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.72997	0.27	7 7.9	13.3	757	26	188.6	99.7	4.6	0.57	0.09	5.7	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.83192	0.28	5 6	13.4	575	27	189.0	99.8	7.0	0.57	0.09	3.9	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.9663	0.25	# 14.8	13.4	1417	24	189.6	100.0	2.0	0.57	0.09	12.3	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.09184	0.27	9 9.9	13.4	948	26	190.1	100.2	3.4	0.57	0.09	7.6	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.21821	0.27	# 14.2	13.5	1360	26	190.7	100.3	2.2	0.57	0.09	11.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.34291	0.28	6 6.5	13.5	622	27	191.2	100.5	6.2	0.57	0.09	4.3	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.46971	0.24	# 11.4	13.6	1092	23	191.8	100.7	2.6	0.57	0.09	8.9	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.59692	0.29	# 11.1	13.6	1063	28	192.3	100.8	3.2	0.57	0.09	8.6	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.72162	0.26	9 9.8	13.6	938	25	192.9	101.0	3.3	0.57	0.09	7.4	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.84757	0.25	# 12.2	13.7	1168	24	193.4	101.2	2.5	0.57	0.09	9.6	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.97479	0.26	6 6.7	13.7	642	25	193.9	101.3	5.6	0.57	0.09	4.4	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.09991	0.26	# 11.4	13.7	1092	25	194.5	101.5	2.8	0.57	0.09	8.8	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.22713	0.29	6 6.7	13.8	642	28	195.0	101.7	6.2	0.57	0.09	4.4	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.35393	0.29	# 12.9	13.8	1235	28	195.6	101.8	2.7	0.57	0.09	10.2	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.47862	0.27	8 8.9	13.9	852	26	196.1	102.0	3.9	0.57	0.09	6.4	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.60415	0.25	# 13.8	13.9	1321	24	196.7	102.2	2.1	0.57	0.09	11.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.72842	0.29	# 19.6	13.9	1877	28	197.2	102.3	1.7	0.57	0.09	16.4	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.85312	0.26	# 20.9	14.0	2001	25	197.7	102.5	1.4	0.57	0.09	17.6	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
45.97613	0.3 #	18	14.0	1724	29	198.3	102.7	1.9	0.57	0.09	14.9	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.09913	0.27 #	18.9	14.1	1810	26	198.8	102.8	1.6	0.57	0.09	15.7	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.22214	0.28 #	17.3	14.1	1657	27	199.3	103.0	1.8	0.57	0.09	14.2	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.34515	0.32 #	13	14.1	1245	31	199.9	103.1	2.9	0.57	0.09	10.1	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.46857	0.3 #	13.6	14.2	1302	29	200.4	103.3	2.6	0.57	0.09	10.7	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.59201	0.3 8	8.1	14.2	776	29	200.9	103.5	5.0	0.57	0.09	5.6	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.71501	0.26 9	9.8	14.2	938	25	201.4	103.6	3.4	0.57	0.09	7.1	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.83802	0.25 9	9.5	14.3	910	24	202.0	103.8	3.4	0.57	0.09	6.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.96061	0.25 6	6.9	14.3	661	24	202.5	104.0	5.2	0.57	0.09	4.4	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.24622	0.23 #	10.6	14.4	1015	22	203.7	104.3	2.7	0.57	0.09	7.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.37007	0.26 7	7.8	14.4	747	25	204.3	104.5	4.6	0.57	0.09	5.2	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.49476	0.25 9	10.2	14.5	977	24	204.8	104.7	3.1	0.57	0.09	7.4	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.61819	0.27 7	8	14.5	766	26	205.3	104.8	4.6	0.57	0.09	5.3	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.74457	0.24 #	11.3	14.6	1082	23	205.9	105.0	2.6	0.57	0.09	8.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.86715	0.25 #	12.6	14.6	1207	24	206.4	105.2	2.4	0.57	0.09	9.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.99227	0.24 7	7.3	14.6	699	23	207.0	105.3	4.7	0.57	0.09	4.7	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.11822	0.23 #	10.4	14.7	996	22	207.5	105.5	2.8	0.57	0.09	7.5	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.24291	0.26 5	5.9	14.7	565	25	208.0	105.7	7.0	0.57	0.09	3.4	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.36845	0.26 #	10.5	14.7	1005	25	208.6	105.8	3.1	0.57	0.09	7.5	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.49651	0.24 8	8.3	14.8	795	23	209.1	106.0	3.9	0.57	0.09	5.5	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.62078	0.21 #	11.7	14.8	1120	20	209.7	106.2	2.2	0.57	0.09	8.6	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.74716	0.24 5	5.4	14.9	517	23	210.2	106.3	7.5	0.57	0.09	2.9	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.87354	0.24 #	11.5	14.9	1101	23	210.8	106.5	2.6	0.57	0.09	8.4	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.0016	0.24 7	8.1	14.9	776	23	211.3	106.7	4.1	0.57	0.09	5.3	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.1284	0.22 #	11.6	15.0	1111	21	211.9	106.8	2.3	0.57	0.09	8.4	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.25478	0.22 5	6.2	15.0	594	21	212.4	107.0	5.5	0.57	0.09	3.6	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.38284	0.22 #	10.5	15.1	1005	21	213.0	107.2	2.7	0.57	0.09	7.4	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.50838	0.25 7	7.9	15.1	757	24	213.5	107.3	4.4	0.57	0.09	5.1	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.63686	0.23 9	9.7	15.1	929	22	214.0	107.5	3.1	0.57	0.09	6.6	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.76366	0.24 9	9.7	15.2	929	23	214.6	107.7	3.2	0.57	0.09	6.6	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.89004	0.26 6	6.9	15.2	661	25	215.1	107.8	5.6	0.57	0.09	4.1	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.01683	0.24 9	9.6	15.2	919	23	215.7	108.0	3.3	0.57	0.09	6.5	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.14321	0.23 6	6.8	15.3	651	22	216.2	108.2	5.1	0.57	0.09	4.0	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.27043	0.25 7	7.8	15.3	747	24	216.8	108.3	4.5	0.57	0.09	4.9	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.39976	0.21 9	10.2	15.4	977	20	217.3	108.5	2.6	0.57	0.09	7.0	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.52908	0.25 9	10.3	15.4	986	24	217.9	108.7	3.1	0.57	0.09	7.1	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.65546	0.26 8	8.7	15.4	833	25	218.4	108.8	4.1	0.57	0.09	5.6	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.78437	0.23 #	16.3	15.5	1561	22	219.0	109.0	1.6	0.57	0.09	12.3	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.91285	0.27 #	14.1	15.5	1350	26	219.6	109.2	2.3	0.57	0.09	10.4	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.03923	0.28 #	14.5	15.6	1389	27	220.1	109.4	2.3	0.57	0.09	10.7	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.16771	0.29 9	9.8	15.6	938	28	220.7	109.5	3.9	0.57	0.09	6.6	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.29746	0.31 #	12.4	15.6	1187	30	221.2	109.7	3.1	0.57	0.09	8.8	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.42342	0.29 9	9.7	15.7	929	28	221.8	109.9	3.9	0.57	0.09	6.4	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.55148	0.27 #	18.7	15.7	1791	26	222.3	110.0	1.6	0.57	0.09	14.3	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.67954	0.27 #	19.9	15.8	1906	26	222.9	110.2	1.5	0.57	0.09	15.3	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.80465	0.25 #	15.2	15.8	1456	24	223.4	110.4	1.9	0.57	0.09	11.2	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.92977	0.26 #	11.7	15.8	1120	25	223.9	110.5	2.8	0.57	0.09	8.1	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.05488	0.28 #	13.3	15.9	1274	27	224.5	110.7	2.6	0.57	0.09	9.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
52.18126	0.31	#	15.9	15.9	1523	30	225.0	110.9	2.3	0.57	0.09	11.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.30553	0.34	#	17.7	15.9	1695	33	225.6	111.0	2.2	0.57	0.09	13.2	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.43022	0.34	#	12.6	16.0	1207	33	226.1	111.2	3.3	0.57	0.09	8.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.55576	0.3	#	13	16.0	1245	29	226.6	111.4	2.8	0.57	0.09	9.1	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.67961	0.32	9	9.4	16.1	900	31	227.2	111.5	4.6	0.57	0.09	6.0	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.80556	0.32	#	12.3	16.1	1178	31	227.7	111.7	3.2	0.57	0.09	8.5	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.93025	0.33	8	8.2	16.1	785	32	228.3	111.9	5.7	0.57	0.09	5.0	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.05495	0.32	#	11.7	16.2	1120	31	228.8	112.0	3.4	0.57	0.09	8.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.18048	0.28	7	8	16.2	766	27	229.3	112.2	5.0	0.57	0.09	4.8	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.30518	0.29	#	11.6	16.2	1111	28	229.9	112.4	3.2	0.57	0.09	7.8	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.37721	0.28	5	5.9	16.3	565	27	230.2	112.4	8.0	0.57	0.09	3.0	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.40839	0.28	9	9.8	16.3	938	27	230.3	112.5	3.8	0.57	0.09	6.3	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.5356	0.3	#	12.1	16.3	1159	29	230.9	112.7	3.1	0.57	0.09	8.2	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.66493	0.3	#	11.4	16.4	1092	29	231.4	112.8	3.3	0.57	0.09	7.6	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.79257	0.3	#	10.4	16.4	996	29	232.0	113.0	3.8	0.57	0.09	6.8	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.92147	0.29	#	11.7	16.4	1120	28	232.5	113.2	3.1	0.57	0.09	7.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.05038	0.29	6	6.7	16.5	642	28	233.1	113.3	6.8	0.57	0.09	3.6	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.18055	0.3	#	13.3	16.5	1274	29	233.6	113.5	2.8	0.57	0.09	9.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.30946	0.33	7	7.4	16.6	709	32	234.2	113.7	6.7	0.57	0.09	4.2	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.43962	0.28	#	12.5	16.6	1197	27	234.8	113.9	2.8	0.57	0.09	8.5	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.56937	0.3	8	8.3	16.6	795	29	235.3	114.0	5.1	0.57	0.09	4.9	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.69828	0.32	#	18.7	16.7	1791	31	235.9	114.2	2.0	0.57	0.09	13.6	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.82844	0.3	#	26.2	16.7	2509	29	236.4	114.4	1.3	0.57	0.09	19.9	2.54	0.94	21.1	2.52	23.3	n/a	n/a	n/a	2.52	23.31	2.87	66.93	0.108	23.31	28	0.80	0.98	0.11	1.19
54.95693	0.31	#	35.5	16.8	3399	30	237.0	114.5	0.9	0.57	0.09	27.6	2.35	0.94	29.4	2.33	31.6	n/a	n/a	n/a	2.33	31.56	2.05	64.71	0.105	31.56	32	0.80	0.98	0.11	1.16
55.08331	0.62	#	36.8	16.8	3524	59	237.5	114.7	1.8	0.57	0.09	28.7	2.50	0.94	30.5	2.47	32.7	n/a	n/a	n/a	2.47	32.69	2.64	86.45	0.140	32.69	33	0.80	0.98	0.15	1.54
55.20884	0.27	#	52.7	16.8	5047	26	238.1	114.9	0.5	0.57	0.09	41.9	2.08	0.94	44.6	2.05	46.8	n/a	n/a	n/a	2.05	46.78	1.38	64.43	0.105	46.78	39	0.80	0.98	0.11	1.16
55.3171	0.37	#	61.5	16.9	5889	35	238.5	115.0	0.6	0.57	0.09	49.1	2.05	0.94	52.3	2.03	54.6	n/a	n/a	n/a	2.03	54.55	1.33	72.79	0.116	54.55	42	0.79	0.97	0.12	1.27
55.35375	0.48	#	71.4	16.9	6837	46	238.7	115.1	0.7	0.57	0.09	57.3	2.01	0.94	61.1	1.99	63.3	n/a	n/a	n/a	1.99	63.32	1.29	81.61	0.131	63.32	46	0.77	0.97	0.14	1.43
55.47171	0.62	#	74.8	16.9	7163	59	239.2	115.2	0.9	0.57	0.09	60.1	2.05	0.94	64.1	2.02	66.3	n/a	n/a	n/a	2.02	66.29	1.33	88.34	0.144	66.29	47	0.77	0.97	0.15	1.58
55.58966	0.66	#	83	16.9	7948	63	239.7	115.4	0.8	0.57	0.10	66.8	2.00	0.94	71.3	1.97	73.5	n/a	n/a	n/a	1.97	73.51	1.27	93.25	0.155	73.51	49	0.75	0.97	0.16	1.70
55.70592	0.56	#	62.7	17.0	6004	54	240.2	115.5	0.9	0.57	0.10	49.9	2.13	0.94	53.3	2.11	55.5	n/a	n/a	n/a	2.11	55.49	1.47	81.77	0.131	55.49	43	0.79	0.97	0.14	1.43
55.82304	0.52	#	71	17.0	6799	50	240.7	115.7	0.8	0.57	0.10	56.7	2.04	0.94	60.6	2.01	62.8	n/a	n/a	n/a	2.01	62.80	1.32	82.88	0.133	62.80	45	0.77	0.97	0.14	1.45
55.94057	0.75	#	77.4	17.1	7412	72	241.2	115.8	1.0	0.57	0.10	61.9	2.08	0.94	66.2	2.05	68.4	n/a	n/a	n/a	2.05	68.41	1.37	93.99	0.157	68.41	47	0.76	0.97	0.16	1.71
56.06063	0.59	#	38.2	17.1	3658	56	241.8	116.0	1.7	0.57	0.10	29.5	2.46	0.93	31.5	2.44	33.7	n/a	n/a	n/a	2.44	33.74	2.49	83.86	0.135	33.74	33	0.80	0.97	0.14	1.48
56.18447	0.64	#	30.5	17.1	2921	61	242.3	116.2	2.3	0.57	0.10	23.1	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.30959	0.63	#	22.8	17.2	2183	60	242.8	116.3	3.1	0.57	0.10	16.7	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.43512	0.49	#	11.8	17.2	1130	47	243.4	116.5	5.3	0.57	0.10	7.6	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.55181	0.44	#	11.5	17.2	1101	42	243.9	116.6	4.9	0.57	0.10	7.4	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.67945	0.45	9	9.5	17.3	910	43	244.4	116.8	6.5	0.57	0.10	5.7	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.80583	0.42	6	6.9	17.3	661	40	245.0	117.0	9.7	0.57	0.10	3.6	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.93263	0.46	#	10.5	17.4	1005	44	245.5	117.1	5.8	0.57	0.10	6.5	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.06027	0.44	7	7.3	17.4	699	42	246.1	117.3	9.3	0.57	0.10	3.9	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.18834	0.49	#	10.3	17.4	986	47	246.6	117.5	6.3	0.57	0.10	6.3	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.31555	0.48	8	9.1	17.5	871	46	247.2	117.7	7.4	0.57	0.10	5.3	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.44109	0.48	#	10.7	17.5	1025	46	247.7	117.8	5.9	0.57	0.10	6.6	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.56831	0.47	#	12.3	17.5	1178	45	248.3	118.0	4.8	0.57	0.10	7.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.69553	0.52	#	13.7	17.6	1312	50	248.8	118.2	4.7	0.57	0.10	9.0	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.82022	0.57	#	17.8	17.6	1705	55	249.3	118.3	3.8	0.57	0.10	12.3	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.9466	0.58	#	16.8	17.7	1609	56	249.9	118.5	4.1	0.57	0.10	11.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.0734	0.63	#	19.1	17.7	1829	60	250.4	118.7	3.8	0.57	0.10	13.3	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.19598	0.67	#	22	17.7	2107	64	251.0	118.8	3.5	0.57	0.10	15.6	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.31899	0.72	#	23.5	17.8	2250	69	251.5	119.0	3.4	0.57	0.10	16.8	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.44284	0.72	#	26.4	17.8	2528	69	252.0	119.1	3.0	0.57	0.10	19.1	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.56627	0.74	#	25.2	17.9	2413	71	252.6	119.3	3.3	0.57	0.10	18.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.68843	0.75	#	29.1	17.9	2787	72	253.1	119.5	2.8	0.57	0.10	21.2	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.81102	0.76	#	24.8	17.9	2375	73	253.6	119.6	3.4	0.57	0.10	17.7	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.93402	0.79	#	28.6	18.0	2739	76	254.1	119.8	3.0	0.57	0.10	20.7	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.05492	0.88	#	25.8	18.0	2471	84	254.7	120.0	3.8	0.57	0.10	18.5	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.17667	1.03	#	28.2	18.0	2700	99	255.2	120.1	4.0	0.57	0.10	20.4	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.29673	1.28	#	30.7	18.1	2940	123	255.7	120.3	4.6	0.57	0.10	22.3	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-7)
GW Depth: 14.0 ft
GW Depth: 4.3 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
59.41047	1.71 #	47.7	18.1	4568	164	256.2	120.4	3.8	0.57	0.10	35.8	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.52084	1.68 #	63.9	18.1	6119	161	256.7	120.6	2.7	0.57	0.10	48.6	2.44	0.92	53.0	2.41	55.4	n/a	n/a	n/a	2.41	55.36	2.34	129.76	0.283	55.36	43	0.79	0.96	0.29	3.02
59.627	1.84 #	68.8	18.2	6588	176	257.1	120.7	2.8	0.57	0.10	52.4	2.42	0.92	57.2	2.39	59.6	n/a	n/a	n/a	2.39	59.57	2.26	134.87	0.308	59.57	44	0.78	0.96	0.32	3.28
59.70535	2.01 #	59.6	18.2	5707	192	257.5	120.8	3.5	0.57	0.10	45.1	2.53	0.92	49.3	2.51	51.6	n/a	n/a	n/a	2.51	51.58	2.80	144.67	0.362	51.58	41	0.79	0.96	0.37	3.86
59.83299	2.35 #	73.8	18.2	7067	225	258.0	121.0	3.3	0.57	0.10	56.3	2.45	0.92	61.5	2.42	63.8	n/a	n/a	n/a	2.42	63.83	2.39	152.62	0.411	63.83	46	0.77	0.96	0.42	4.36
59.93662	2.62 #	77.9	18.3	7460	251	258.5	121.1	3.5	0.57	0.10	59.5	2.45	0.91	65.0	2.42	67.3	n/a	n/a	n/a	2.42	67.34	2.39	~~161.00~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.03983	2.6 #	67	18.3	6416	249	258.9	121.3	4.0	0.57	0.10	50.8	2.54	0.91	55.5	2.51	57.9	n/a	n/a	n/a	2.51	57.88	2.83	~~164.03~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.14177	2.33 #	60	18.3	5746	223	259.3	121.4	4.1	0.57	0.10	45.2	2.58	0.91	49.5	2.55	51.8	n/a	n/a	n/a	2.55	51.81	3.03	157.01	0.440	51.81	41	0.79	0.96	0.45	4.68
60.24414	2.3 #	52.4	18.4	5018	220	259.8	121.5	4.6	0.57	0.10	39.2	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.34566	2.1 #	48.2	18.4	4616	201	260.2	121.7	4.6	0.57	0.10	35.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.44761	1.95 #	38.2	18.4	3658	187	260.7	121.8	5.5	0.57	0.10	27.9	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.54913	1.62 #	33.6	18.5	3218	155	261.1	121.9	5.2	0.57	0.10	24.2	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.64855	1.43 #	27.8	18.5	2662	137	261.5	122.1	5.7	0.57	0.10	19.7	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.74839	1.42 #	28.7	18.5	2748	136	262.0	122.2	5.5	0.57	0.10	20.3	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.84949	1.62 #	30.3	18.5	2902	155	262.4	122.3	5.9	0.57	0.10	21.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
60.94722	1.8 #	36.2	18.6	3467	172	262.8	122.5	5.4	0.57	0.10	26.2	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.04622	1.71 #	38.2	18.6	3658	164	263.3	122.6	4.8	0.57	0.10	27.7	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.14732	1.54 #	32.8	18.6	3141	147	263.7	122.7	5.1	0.57	0.10	23.4	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.24547	1.4 #	36.9	18.7	3534	134	264.1	122.9	4.1	0.57	0.10	26.6	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.34404	1.24 #	33.9	18.7	3246	119	264.5	123.0	4.0	0.57	0.10	24.2	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.41776	1.2 #	36.1	18.7	3457	115	264.9	123.1	3.6	0.57	0.10	25.9	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.49738	1.22 #	36.1	18.7	3457	117	265.2	123.2	3.7	0.57	0.10	25.9	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.57953	1.27 #	36.1	18.8	3457	122	265.6	123.3	3.8	0.57	0.10	25.9	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.65367	1.28 #	35.7	18.8	3419	123	265.9	123.4	3.9	0.57	0.10	25.6	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.7573	1.19 #	35.3	18.8	3380	114	266.3	123.5	3.7	0.57	0.10	25.2	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.85587	1.18 #	37	18.9	3543	113	266.7	123.7	3.4	0.57	0.10	26.5	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
61.95403	1.17 #	37.4	18.9	3581	112	267.2	123.8	3.4	0.57	0.10	26.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.03491	1.18 #	37.7	18.9	3610	113	267.5	123.9	3.4	0.57	0.10	27.0	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.13812	1.24 #	40	18.9	3830	119	268.0	124.0	3.3	0.57	0.10	28.7	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.23543	1.3 #	37.6	19.0	3601	124	268.4	124.2	3.7	0.57	0.10	26.8	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.33274	1.29 #	40.8	19.0	3907	124	268.8	124.3	3.4	0.57	0.10	29.3	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.43258	1.29 #	37.7	19.0	3610	124	269.2	124.4	3.7	0.57	0.10	26.9	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.53157	1.35 #	40.2	19.1	3850	129	269.7	124.6	3.6	0.57	0.10	28.7	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
62.62972	1.3 #	40.3	19.1	3859	124	270.1	124.7	3.5	0.57	0.10	28.8	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.24262	0.16 #	10.3	0.1	986	15	1.0	1.0	1.6	0.57	0.07	941.7	1.50	9.84	95.7	2.05	16.5	n/a	n/a	n/a	2.05	16.55	1.37	22.74	0.069	95.80	56	0.72	1.00	0.07	1.00
0.38042	0.13 #	13.6	0.1	1302	12	1.6	1.6	1.0	0.57	0.07	792.9	1.33	7.86	100.9	1.90	21.9	n/a	n/a	n/a	1.90	21.85	1.18	25.88	0.072	101.01	58	0.71	1.00	0.08	1.03
0.51822	0.15 #	11.8	0.2	1130	14	2.2	2.2	1.3	0.57	0.07	504.6	1.53	6.73	74.9	2.07	19.0	n/a	n/a	n/a	2.07	18.96	1.41	26.72	0.072	75.09	50	0.75	1.00	0.08	1.04
0.6539	0.15 #	16.6	0.2	1590	14	2.8	2.8	0.9	0.57	0.07	562.7	1.38	5.99	93.9	1.90	26.7	n/a	n/a	n/a	1.90	26.67	1.19	31.82	0.077	94.04	56	0.72	1.00	0.08	1.11
0.79212	0.2 #	15.9	0.2	1523	19	3.4	3.4	1.3	0.57	0.07	444.7	1.56	5.45	81.7	2.04	25.5	n/a	n/a	n/a	2.04	25.55	1.36	34.73	0.079	81.84	52	0.74	1.00	0.08	1.14
0.92907	0.2 #	16.4	0.3	1570	19	4.0	4.0	1.2	0.57	0.07	391.0	1.57	5.03	77.7	2.05	26.3	n/a	n/a	n/a	2.05	26.35	1.37	36.13	0.080	77.95	51	0.75	1.00	0.09	1.16
1.06306	0.16 #	23	0.3	2202	15	4.6	4.6	0.7	0.57	0.07	479.4	1.32	4.70	102.0	1.81	37.0	n/a	n/a	n/a	1.81	36.95	1.11	41.09	0.084	102.19	58	0.71	1.00	0.09	1.22
1.19917	0.27 #	19.6	0.4	1877	26	5.2	5.2	1.4	0.57	0.07	362.0	1.64	4.43	81.8	2.07	31.5	n/a	n/a	n/a	2.07	31.49	1.40	44.07	0.087	81.99	52	0.74	1.00	0.09	1.25
1.33527	0.22 #	19.3	0.4	1848	21	5.8	5.8	1.1	0.57	0.07	320.0	1.60	4.19	76.3	2.04	31.0	n/a	n/a	n/a	2.04	31.01	1.35	41.96	0.085	76.51	50	0.75	1.00	0.09	1.23
1.46758	0.19 #	23.5	0.4	2250	18	6.3	6.3	0.8	0.57	0.07	354.6	1.46	4.00	88.6	1.90	37.8	n/a	n/a	n/a	1.90	37.76	1.18	44.72	0.087	88.87	54	0.73	1.00	0.09	1.26
1.60115	0.23 #	23.8	0.5	2279	22	6.9	6.9	1.0	0.57	0.07	329.1	1.54	3.83	85.9	1.95	38.2	n/a	n/a	n/a	1.95	38.24	1.24	47.54	0.090	86.17	53	0.73	1.00	0.10	1.30
1.73303	0.24 #	22.8	0.5	2183	23	7.5	7.5	1.1	0.57	0.07	291.1	1.60	3.68	79.1	2.00	36.6	n/a	n/a	n/a	2.00	36.63	1.31	47.84	0.090	79.34	51	0.74	1.00	0.10	1.30
1.86406	0.3 #	23.4	0.6	2241	29	8.0	8.0	1.3	0.57	0.07	277.8	1.68	3.55	78.2	2.06	37.6	n/a	n/a	n/a	2.06	37.60	1.39	52.27	0.093	78.52	51	0.75	1.00	0.10	1.35
1.99298	0.27 #	32.4	0.6	3103	26	8.6	8.6	0.8	0.57	0.07	360.0	1.46	3.43	104.8	1.85	52.1	n/a	n/a	n/a	1.85	52.05	1.14	59.41	0.099	105.14	59	0.71	1.00	0.11	1.44
2.11936	0.32 #	35.3	0.6	3380	31	9.1	9.1	0.9	0.57	0.07	368.9	1.48	3.33	110.8	1.85	56.7	n/a	n/a	n/a	1.85	56.71	1.14	64.93	0.105	111.08	60	0.70	1.00	0.11	1.52
2.16839	0.3 #	36.3	0.7	3476	29	9.4	9.4	0.8	0.57	0.07	370.7	1.45	3.29	112.6	1.82	58.3	n/a	n/a	n/a	1.82	58.32	1.12	65.35	0.106	112.93	61	0.70	1.00	0.11	1.53
2.269	0.34 #	45.3	0.7	4338	33	9.8	9.8	0.8	0.57	0.07	442.3	1.37	3.22	137.5	1.73	72.8	n/a	n/a	n/a	1.73	72.78	1.05	76.76	0.122	137.77	67	0.66	1.00	0.13	1.76
2.38862	0.42 #	49.8	0.7	4769	40	10.3	10.3	0.8	0.57	0.07	462.0	1.40	3.14	147.3	1.74	80.0	n/a	n/a	n/a	1.74	80.01	1.06	84.93	0.137	147.61	70	0.65	1.00	0.15	1.98
2.5057	0.46 #	52.2	0.8	4999	44	10.8	10.8	0.9	0.57	0.07	461.6	1.42	3.06	150.7	1.74	83.9	n/a	n/a	n/a	1.74	83.87	1.06	89.31	0.146	151.07	70	0.65	1.00	0.16	2.11
2.6211	0.45 #	53.8	0.8	5152	43	11.3	11.3	0.8	0.57	0.07	454.8	1.40	2.99	151.9	1.72	86.4	n/a	n/a	n/a	1.72	86.44	1.05	91.03	0.150	152.23	71	0.65	1.00	0.16	2.17
2.7348	0.48 #	50.5	0.8	4836	46	11.8	11.8	1.0	0.57	0.07	409.1	1.47	2.93	139.6	1.79	81.1	n/a	n/a	n/a	1.79	81.13	1.10	89.04	0.146	139.89	68	0.66	1.00	0.16	2.11
2.84808	0.5 #	48.9	0.9	4683	48	12.3	12.3	1.0	0.57	0.07	380.3	1.52	2.87	132.4	1.83	78.6	n/a	n/a	n/a	1.83	78.56	1.13	88.44	0.144	132.74	66	0.67	1.00	0.15	2.09
2.95967	0.47 #	53.4	0.9	5114	45	12.8	12.8	0.9	0.57	0.07	399.7	1.45	2.82	141.8	1.76	85.8	n/a	n/a	n/a	1.76	85.79	1.08	92.50	0.154	142.20	68	0.66	1.00	0.16	2.22
3.06915	0.47 #	49.2	0.9	4711	45	13.2	13.2	1.0	0.57	0.07	355.0	1.51	2.77	128.3	1.82	79.0	n/a	n/a	n/a	1.82	79.05	1.12	88.41	0.144	128.66	65	0.68	1.00	0.15	2.09
3.17947	0.53 #	45.2	1.0	4328	51	13.7	13.7	1.2	0.57	0.07	314.7	1.62	2.72	115.8	1.91	72.6	n/a	n/a	n/a	1.91	72.62	1.20	86.94	0.141	116.13	62	0.69	1.00	0.15	2.04
3.28852	0.54 #	55.9	1.0	5353	52	14.2	14.2	1.0	0.57	0.07	376.5	1.50	2.67	140.8	1.79	89.8	n/a	n/a	n/a	1.79	89.81	1.10	98.68	0.169	141.22	68	0.66	1.00	0.18	2.45
3.39546	0.56 #	50.4	1.0	4826	54	14.6	14.6	1.1	0.57	0.07	328.6	1.59	2.63	124.9	1.87	81.0	n/a	n/a	n/a	1.87	80.97	1.16	93.98	0.157	125.30	64	0.68	1.00	0.17	2.27
3.50198	0.57 #	51.4	1.1	4922	55	15.1	15.1	1.1	0.57	0.07	324.9	1.59	2.59	125.4	1.87	82.6	n/a	n/a	n/a	1.87	82.58	1.16	95.71	0.162	125.83	64	0.68	1.00	0.17	2.34
3.60892	0.54 #	54.5	1.1	5219	52	15.6	15.6	1.0	0.57	0.07	334.3	1.54	2.55	131.0	1.82	87.6	n/a	n/a	n/a	1.82	87.56	1.12	98.18	0.168	131.43	66	0.67	1.00	0.18	2.43
3.71459	0.49 #	64.3	1.1	6157	47	16.0	16.0	0.8	0.57	0.07	383.4	1.42	2.52	152.4	1.69	103.3	n/a	n/a	n/a	1.69	103.31	1.03	106.87	0.194	152.84	71	0.65	1.00	0.21	2.80
3.81773	0.48 #	56.7	1.2	5430	46	16.5	16.5	0.8	0.57	0.07	328.8	1.49	2.48	132.5	1.77	91.1	n/a	n/a	n/a	1.77	91.10	1.09	98.93	0.170	132.94	66	0.67	1.00	0.18	2.46
3.92298	0.55 #	50.4	1.2	4826	53	16.9	16.9	1.1	0.57	0.07	284.3	1.62	2.45	116.2	1.89	81.0	n/a	n/a	n/a	1.89	80.97	1.18	95.28	0.160	116.57	62	0.69	1.00	0.17	2.32
4.02696	0.51 #	50.3	1.2	4817	49	17.4	17.4	1.0	0.57	0.07	276.4	1.60	2.42	114.4	1.87	80.8	n/a	n/a	n/a	1.87	80.81	1.16	93.94	0.157	114.83	61	0.69	1.00	0.17	2.27
4.13221	0.44 #	53.8	1.3	5152	42	17.8	17.8	0.8	0.57	0.07	288.1	1.52	2.38	120.8	1.79	86.4	n/a	n/a	n/a	1.79	86.44	1.10	95.18	0.160	121.24	63	0.68	1.00	0.17	2.32
4.23577	0.46 #	51.4	1.3	4922	44	18.3	18.3	0.9	0.57	0.07	268.5	1.57	2.36	114.0	1.84	82.6	n/a	n/a	n/a	1.84	82.58	1.13	93.69	0.156	114.41	61	0.69	1.00	0.17	2.26
4.33891	0.47 #	48.2	1.3	4616	45	18.7	18.7	1.0	0.57	0.07	245.7	1.62	2.33	105.6	1.89	77.4	n/a	n/a	n/a	1.89	77.44	1.18	91.09	0.150	106.01	59	0.71	1.00	0.16	2.17
4.44246	0.36 #	45.3	1.4	4338	34	19.2	19.2	0.8	0.57	0.07	225.4	1.58	2.30	98.0	1.86	72.8	n/a	n/a	n/a	1.86	72.78	1.15	83.71	0.135	98.46	57	0.72	1.00	0.14	1.95
4.5456	0.47 #	42.6	1.4	4079	45	19.6	19.6	1.1	0.57	0.07	207.1	1.71	2.27	91.1	1.97	68.4	n/a	n/a	n/a	1.97	68.44	1.26	86.43	0.140	91.53	55	0.73	1.00	0.15	2.02
4.64831	0.46 #	39.4	1.4	3773	44	20.0	20.0	1.2	0.57	0.07	187.2	1.76	2.25	83.3	2.02	63.3	n/a	n/a	n/a	2.02	63.30	1.32	83.64	0.134	83.72	52	0.74	1.00	0.14	1.94
4.72989	0.41 #	39	1.4	3735	39	20.4	20.4	1.1	0.57	0.07	182.1	1.74	2.23	81.7	1.99	62.7	n/a	n/a	n/a	1.99	62.66	1.29	80.94	0.129	82.15	52	0.74	1.00	0.14	1.87
4.83388	0.44 #	38.3	1.5	3668	42	20.8	20.8	1.2	0.57	0.07	174.9	1.78	2.20	79.3	2.03	61.5	n/a	n/a	n/a	2.03	61.53	1.34	82.33	0.132	79.80	51	0.74	1.00	0.14	1.91
4.93786	0.46 #	35.2	1.5	3371	44	21.3	21.3	1.3	0.57	0.07	157.3	1.85	2.18	72.1	2.10	56.6	n/a	n/a	n/a	2.10	56.55	1.45	81.82	0.131	72.57	49	0.76	1.00	0.14	1.89
5.04015	0.43 #	39.5	1.5	3783	41	21.7	21.7	1.1	0.57	0.07	173.0	1.76	2.16	80.1	2.01	63.5	n/a	n/a	n/a	2.01	63.46	1.31	83.32	0.134	80.60	51	0.74	1.00	0.14	1.93
5.14328	0.39 #	42.7	1.6	4089	37	22.2	22.2	0.9	0.57	0.07	183.4	1.69	2.14	85.8	1.94	68.6	n/a	n/a	n/a	1.94	68.60	1.23	84.26	0.136	86.25	53	0.73	1.00	0.15	1.96
5.24557	0.36 #	43	1.6	4118	34	22.6	22.6	0.8	0.57	0.07	181.0	1.67	2.12	85.5	1.92	69.1	n/a	n/a	n/a	1.92	69.09	1.21	83.30	0.134	86.01	53	0.73	1.00	0.14	1.93
5.51567	0.38 #	29	1.7	2777	36	23.8	23.8	1.3	0.57	0.07	115.8	1.94	2.06	56.1	2.18	46.6	n/a	n/a	n/a	2.18	46.59	1.62	75.65	0.120	56.57	43	0.78	1.00	0.13	1.74
5.62135	0.34 #	31.7	1.7	3036	33	24.2	24.2	1.1	0.57	0.07	124.2	1.86	2.04	60.8	2.10	50.9	n/a	n/a	n/a	2.10	50.93	1.46	74.23	0.118	61.25	45	0.78	1.00	0.13	1.71
5.72659	0.41 #	30.8	1.7	2949	39	24.7	24.7	1.3	0.57	0.07	118.4	1.94	2.03	58.5	2.17	49.5	n/a	n/a	n/a	2.17	49.48	1.60	79.21	0.126	58.96	44	0.78	1.00	0.14	1.82

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
5.83311	0.36 #	28.4	1.8	2720	34	25.2	25.2	1.3	0.57	0.07	107.1	1.96	2.01	53.4	2.19	45.6	n/a	n/a	n/a	2.19	45.63	1.64	75.00	0.119	53.87	42	0.79	1.00	0.13	1.72
5.93751	0.32 #	33.5	1.8	3208	31	25.6	25.6	1.0	0.57	0.07	124.3	1.83	1.99	62.5	2.06	53.8	n/a	n/a	n/a	2.06	53.82	1.39	74.81	0.119	62.98	45	0.77	1.00	0.13	1.72
6.04361	0.3 #	32.2	1.8	3083	29	26.1	26.1	0.9	0.57	0.07	117.3	1.84	1.97	59.5	2.07	51.7	n/a	n/a	n/a	2.07	51.73	1.41	72.85	0.116	60.00	44	0.78	1.00	0.12	1.68
6.15055	0.31 #	28.7	1.9	2748	30	26.5	26.5	1.1	0.57	0.07	102.6	1.93	1.95	52.5	2.15	46.1	n/a	n/a	n/a	2.15	46.11	1.56	72.08	0.115	53.01	42	0.79	1.00	0.12	1.66
6.25665	0.33 #	31.9	1.9	3055	32	27.0	27.0	1.0	0.57	0.07	112.2	1.88	1.94	57.9	2.11	51.3	n/a	n/a	n/a	2.11	51.25	1.47	75.43	0.120	58.42	44	0.78	1.00	0.13	1.73
6.36232	0.27 #	40.9	1.9	3917	26	27.4	27.4	0.7	0.57	0.07	141.8	1.68	1.92	73.8	1.91	65.7	n/a	n/a	n/a	1.91	65.71	1.20	78.85	0.126	74.28	49	0.75	1.00	0.13	1.82
6.44432	0.33 #	47.2	2.0	4520	32	27.8	27.8	0.7	0.57	0.07	161.6	1.65	1.91	84.7	1.88	75.8	n/a	n/a	n/a	1.88	75.83	1.17	88.47	0.144	85.18	53	0.74	1.00	0.15	2.09
6.55084	0.38 #	43.6	2.0	4175	36	28.2	28.2	0.9	0.57	0.07	146.8	1.75	1.89	77.5	1.96	70.0	n/a	n/a	n/a	1.96	70.05	1.25	87.84	0.143	78.04	51	0.75	1.00	0.15	2.07
6.65862	0.35 #	36.4	2.0	3486	34	28.7	28.7	1.0	0.57	0.07	120.4	1.84	1.88	64.1	2.05	58.5	n/a	n/a	n/a	2.05	58.48	1.38	80.61	0.129	64.62	46	0.77	1.00	0.14	1.86
6.76514	0.4 #	36.6	2.1	3505	38	29.2	29.2	1.1	0.57	0.07	119.1	1.88	1.86	63.9	2.09	58.8	n/a	n/a	n/a	2.09	58.80	1.43	84.37	0.136	64.46	46	0.77	1.00	0.15	1.96
6.87124	0.42 #	34	2.1	3256	40	29.6	29.6	1.2	0.57	0.07	108.9	1.95	1.85	58.9	2.15	54.6	n/a	n/a	n/a	2.15	54.63	1.55	84.79	0.137	59.42	44	0.78	1.00	0.15	1.98
6.9786	0.37 #	43.3	2.1	4146	35	30.1	30.1	0.9	0.57	0.07	136.8	1.76	1.83	74.5	1.97	69.6	n/a	n/a	n/a	1.97	69.57	1.26	87.95	0.143	75.09	50	0.75	1.00	0.15	2.07
7.08723	0.35 #	41.2	2.2	3945	34	30.6	30.6	0.9	0.57	0.07	128.1	1.78	1.82	70.3	1.99	66.2	n/a	n/a	n/a	1.99	66.19	1.29	85.23	0.138	70.90	48	0.76	1.00	0.15	1.99
7.19544	0.39 #	33	2.2	3160	37	31.0	31.0	1.2	0.57	0.07	100.8	1.96	1.81	55.8	2.16	53.0	n/a	n/a	n/a	2.16	53.02	1.57	83.09	0.133	56.36	43	0.79	1.00	0.14	1.93
7.30196	0.36 #	33.6	2.2	3218	34	31.5	31.5	1.1	0.57	0.07	101.2	1.93	1.79	56.4	2.13	54.0	n/a	n/a	n/a	2.13	53.98	1.51	81.36	0.130	56.96	43	0.78	1.00	0.14	1.88
7.40974	0.33 #	31.5	2.3	3016	32	32.0	32.0	1.1	0.57	0.07	93.4	1.95	1.78	52.5	2.15	50.6	n/a	n/a	n/a	2.15	50.61	1.55	78.35	0.125	53.01	42	0.79	1.00	0.13	1.80
7.51837	0.36 #	27.4	2.3	2624	34	32.4	32.4	1.3	0.57	0.07	79.9	2.06	1.77	45.2	2.26	44.0	n/a	n/a	n/a	2.26	44.02	1.82	80.19	0.128	45.78	39	0.80	1.00	0.14	1.85
7.62616	0.39 #	28.6	2.3	2739	37	32.9	32.9	1.4	0.57	0.07	82.3	2.07	1.76	46.9	2.26	45.9	n/a	n/a	n/a	2.26	45.95	1.81	83.31	0.134	47.44	39	0.80	1.00	0.14	1.93
7.73564	0.39 #	28.9	2.4	2767	37	33.4	33.4	1.4	0.57	0.07	82.0	2.06	1.74	47.0	2.25	46.4	n/a	n/a	n/a	2.25	46.43	1.80	83.68	0.134	47.60	40	0.80	1.00	0.14	1.94
7.8709	0.37 #	29.6	2.4	2834	35	33.9	33.9	1.3	0.57	0.07	82.5	2.04	1.73	47.8	2.23	47.6	n/a	n/a	n/a	2.23	47.56	1.73	82.43	0.132	48.33	40	0.80	1.00	0.14	1.91
7.9791	0.36 #	29.9	2.4	2863	34	34.4	34.4	1.2	0.57	0.07	82.2	2.03	1.72	47.9	2.22	48.0	n/a	n/a	n/a	2.22	48.04	1.71	81.92	0.131	48.49	40	0.80	1.00	0.14	1.90
8.08689	0.24 #	23.9	2.5	2289	23	34.9	34.9	1.0	0.57	0.07	64.6	2.06	1.70	37.9	2.26	38.4	n/a	n/a	n/a	2.26	38.40	1.81	69.61	0.111	38.50	36	0.80	1.00	0.12	1.61
8.20144	0.31 #	23.3	2.5	2231	30	35.4	35.4	1.4	0.57	0.07	62.1	2.15	1.69	36.7	2.34	37.3	n/a	n/a	n/a	2.34	37.27	2.07	77.12	0.123	37.27	35	0.80	1.00	0.13	1.77
8.30077	0.31 #	17.4	2.5	1666	30	35.8	35.8	1.8	0.57	0.07	45.5	2.34	1.68	27.1	2.52	27.7	n/a	n/a	n/a	2.52	27.67	2.86	79.22	0.126	27.67	30	0.80	1.00	0.14	1.82
8.33585	0.32 #	20.4	2.5	1954	31	35.9	35.9	1.6	0.57	0.07	53.3	2.25	1.68	31.8	2.43	32.4	n/a	n/a	n/a	2.43	32.37	2.43	78.79	0.125	32.37	33	0.80	1.00	0.13	1.81
8.4466	0.27 #	24.5	2.6	2346	26	36.4	36.4	1.1	0.57	0.07	63.4	2.10	1.67	38.0	2.28	38.6	n/a	n/a	n/a	2.28	38.62	1.88	72.43	0.115	38.62	36	0.80	1.00	0.12	1.67
8.55904	0.3 #	24.2	2.6	2317	29	36.9	36.9	1.3	0.57	0.07	61.8	2.14	1.66	37.3	2.31	37.9	n/a	n/a	n/a	2.31	37.89	1.99	75.37	0.120	37.89	35	0.80	1.00	0.13	1.73
8.67062	0.35 #	20.3	2.6	1944	34	37.4	37.4	1.8	0.57	0.07	51.0	2.29	1.65	31.0	2.46	31.6	n/a	n/a	n/a	2.46	31.58	2.58	81.63	0.131	31.58	32	0.80	1.00	0.14	1.89
8.78137	0.29 #	21.6	2.7	2068	28	37.9	37.9	1.4	0.57	0.07	53.6	2.21	1.64	32.8	2.38	33.4	n/a	n/a	n/a	2.38	33.39	2.23	74.38	0.118	33.39	33	0.80	1.00	0.13	1.71
8.89211	0.25 #	22.2	2.7	2126	24	38.3	38.3	1.1	0.57	0.07	54.4	2.16	1.63	33.5	2.33	34.1	n/a	n/a	n/a	2.33	34.11	2.04	69.66	0.111	34.11	33	0.80	1.00	0.12	1.61
9.00328	0.27 #	24.4	2.7	2337	26	38.8	38.8	1.1	0.57	0.07	59.2	2.12	1.62	36.6	2.29	37.3	n/a	n/a	n/a	2.29	37.25	1.92	71.55	0.114	37.25	35	0.80	1.00	0.12	1.65
9.11614	0.31 #	23.7	2.8	2270	30	39.3	39.3	1.3	0.57	0.07	56.7	2.18	1.61	35.3	2.35	36.0	n/a	n/a	n/a	2.35	35.96	2.10	75.60	0.120	35.96	34	0.80	1.00	0.13	1.74
9.22646	0.27 #	25	2.8	2394	26	39.8	39.8	1.1	0.57	0.07	59.2	2.11	1.60	37.1	2.28	37.7	n/a	n/a	n/a	2.28	37.70	1.89	71.23	0.114	37.70	35	0.80	1.00	0.12	1.64
9.33678	0.29 #	24.6	2.8	2356	28	40.3	40.3	1.2	0.57	0.07	57.5	2.15	1.59	36.3	2.31	36.9	n/a	n/a	n/a	2.31	36.88	1.98	73.12	0.116	36.88	35	0.80	1.00	0.12	1.68
9.44922	0.33 #	19.8	2.9	1896	32	40.7	40.7	1.7	0.57	0.07	45.5	2.32	1.58	28.9	2.48	29.5	n/a	n/a	n/a	2.48	29.51	2.66	78.59	0.125	29.51	31	0.80	1.00	0.13	1.81
9.56208	0.27 #	25.4	2.9	2432	26	41.2	41.2	1.1	0.57	0.07	58.0	2.12	1.57	37.0	2.28	37.6	n/a	n/a	n/a	2.28	37.63	1.88	70.76	0.113	37.63	35	0.80	1.00	0.12	1.63
9.67409	0.26 #	23.7	2.9	2270	25	41.7	41.7	1.1	0.57	0.07	53.4	2.16	1.56	34.3	2.31	34.9	n/a	n/a	n/a	2.31	34.91	1.99	69.59	0.111	34.91	34	0.80	1.00	0.12	1.61
9.78821	0.29 #	25.4	3.0	2432	28	42.2	42.2	1.2	0.57	0.07	56.6	2.14	1.55	36.5	2.30	37.2	n/a	n/a	n/a	2.30	37.19	1.95	72.45	0.115	37.19	35	0.80	1.00	0.12	1.67
9.90361	0.31 #	23.5	3.0	2250	30	42.7	42.7	1.3	0.57	0.07	51.7	2.21	1.54	33.6	2.37	34.2	n/a	n/a	n/a	2.37	34.21	2.18	74.56	0.119	34.21	33	0.80	1.00	0.13	1.71
10.01731	0.31 #	25.5	3.1	2442	30	43.2	43.2	1.2	0.57	0.07	55.5	2.17	1.53	36.3	2.32	36.9	n/a	n/a	n/a	2.32	36.91	2.01	74.11	0.118	36.91	35	0.80	1.00	0.13	1.70
10.13186	0.27 #	24	3.1	2298	26	43.7	43.7	1.1	0.57	0.07	51.6	2.17	1.52	33.9	2.32	34.5	n/a	n/a	n/a	2.32	34.54	2.03	70.05	0.112	34.54	34	0.80	1.00	0.12	1.62
10.24599	0.26 #	19.4	3.1	1858	25	44.2	44.2	1.4	0.57	0.07	41.0	2.30	1.51	27.1	2.45	27.8	n/a	n/a	n/a	2.45	27.76	2.52	69.93	0.112	27.76	30	0.80	1.00	0.12	1.62
10.36096	0.28 #	27.8	3.2	2662	27	44.7	44.7	1.0	0.57	0.07	58.6	2.10	1.51	38.9	2.25	39.6	n/a	n/a	n/a	2.25	39.57	1.79	70.81	0.113	39.57	36	0.80	1.00	0.12	1.63
10.4772	0.3 #	27.3	3.2	2614	29	45.2	45.2	1.1	0.57	0.07	56.9	2.13	1.50	38.0	2.28	38.6	n/a	n/a	n/a	2.28	38.64	1.88	72.49	0.115	38.64	36	0.80	1.00	0.12	1.67
10.5909	0.31 #	22.5	3.2	2155	30	45.7	45.7	1.4	0.57	0.07	46.2	2.27	1.49	31.0	2.41	31.7	n/a	n/a	n/a	2.41	31.67	2.34	73.99	0.118	31.67	32	0.80	1.00	0.13	1.70
10.70587	0.31 #	14.6	3.3	1398	30	46.2	46.2	2.2	0.57	0.07	29.3	2.54	1.48	19.8	2.68	20.4	1.7	23.5	2.62	2.62	23.46	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.82338	0.28 #	18.7	3.3	1791	27	46.7	46.7	1.5	0.57	0.07	37.4	2.36	1.47	25.4	2.50	26.0	n/a	n/a	n/a	2.50	26.04	2.77	72.00	0.115	26.04	29	0.80	1.00	0.12	1.66
10.94004	0.25 #	22.2	3.3	2126	24	47.2	47.2	1.2	0.57	0.07	44.1	2.23	1.47	30.1	2.37	30.7	n/a	n/a	n/a	2.37	30.75	2.19	67.28	0.108	30.75	32	0.80	1.00	0.12	1.57

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
11.05797	0.28 #	20.4	3.4	1954	27	47.7	47.7	1.4	0.57	0.07	40.0	2.32	1.46	27.4	2.45	28.1	n/a	n/a	n/a	2.45	28.10	2.53	71.01	0.113	28.10	30	0.80	1.00	0.12	1.64
11.17463	0.29 #	25.1	3.4	2404	28	48.2	48.2	1.2	0.57	0.07	48.9	2.20	1.45	33.7	2.33	34.4	n/a	n/a	n/a	2.33	34.40	2.06	70.77	0.113	34.40	34	0.80	1.00	0.12	1.63
11.29088	0.24 #	23.8	3.4	2279	23	48.7	48.7	1.0	0.57	0.07	45.8	2.19	1.44	31.8	2.32	32.4	n/a	n/a	n/a	2.32	32.45	2.02	65.65	0.106	32.45	33	0.80	1.00	0.11	1.54
11.40711	0.2 #	18.3	3.5	1752	19	49.2	49.2	1.1	0.57	0.07	34.6	2.31	1.44	24.1	2.44	24.8	n/a	n/a	n/a	2.44	24.82	2.50	62.08	0.102	24.82	29	0.80	1.00	0.11	1.48
11.52335	0.18 #	13.5	3.5	1293	17	49.7	49.7	1.4	0.57	0.07	25.0	2.48	1.43	17.5	2.61	18.2	1.6	21.0	2.54	2.54	21.01	3.00	62.94	0.103	18.22	24	0.80	1.00	0.11	1.49
11.79683	0.26 #	20.4	3.6	1954	25	50.9	50.9	1.3	0.57	0.07	37.4	2.32	1.41	26.5	2.44	27.2	n/a	n/a	n/a	2.44	27.21	2.50	68.13	0.109	27.21	30	0.80	1.00	0.12	1.58
11.91688	0.29 #	25	3.6	2394	28	51.4	51.4	1.2	0.57	0.07	45.6	2.23	1.40	32.5	2.35	33.2	n/a	n/a	n/a	2.35	33.18	2.11	70.01	0.112	33.18	33	0.80	1.00	0.12	1.62
12.03354	0.31 #	26.4	3.7	2528	30	51.9	51.9	1.2	0.57	0.07	47.7	2.21	1.40	34.1	2.33	34.9	n/a	n/a	n/a	2.33	34.86	2.06	71.65	0.114	34.86	34	0.80	1.00	0.12	1.65
12.15105	0.29 #	32.2	3.7	3083	28	52.4	52.4	0.9	0.57	0.07	57.8	2.08	1.39	41.6	2.20	42.3	n/a	n/a	n/a	2.20	42.32	1.66	70.14	0.112	42.32	37	0.80	1.00	0.12	1.62
12.26728	0.29 #	28	3.7	2681	28	52.9	52.9	1.1	0.57	0.07	49.7	2.17	1.38	35.9	2.28	36.6	n/a	n/a	n/a	2.28	36.62	1.90	69.46	0.111	36.62	35	0.80	1.00	0.12	1.61
12.38522	0.25 #	17.6	3.8	1685	24	53.4	53.4	1.5	0.57	0.07	30.6	2.42	1.38	22.2	2.54	22.9	n/a	n/a	n/a	2.54	22.91	2.96	67.80	0.109	22.91	27	0.80	1.00	0.12	1.58
12.50103	0.23 #	19.9	3.8	1906	22	53.9	53.9	1.2	0.57	0.07	34.3	2.33	1.37	25.1	2.44	25.8	n/a	n/a	n/a	2.44	25.78	2.50	64.35	0.105	25.78	29	0.80	1.00	0.11	1.51
12.61939	0.26 #	15.9	3.8	1523	25	54.4	54.4	1.7	0.57	0.07	27.0	2.50	1.36	19.8	2.61	20.5	1.5	23.2	2.56	2.56	23.22	3.06	71.11	0.113	20.50	26	0.80	1.00	0.12	1.64
12.74197	0.25 #	13.4	3.9	1283	24	54.9	54.9	1.9	0.57	0.07	22.4	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.86201	0.25 #	10.9	3.9	1044	24	55.5	55.5	2.4	0.57	0.07	17.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.9829	0.23 8	7.6	4.0	728	22	56.0	56.0	3.3	0.57	0.07	12.0	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.10421	0.24 #	16.5	4.0	1580	23	56.5	56.5	1.5	0.57	0.07	27.0	2.47	1.34	20.1	2.58	20.9	n/a	n/a	n/a	2.58	20.88	3.20	66.75	0.108	20.88	26	0.80	1.00	0.12	1.56
13.2251	0.31 #	14.2	4.0	1360	30	57.0	57.0	2.3	0.57	0.07	22.8	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.34472	0.33 #	16.3	4.1	1561	32	57.5	57.5	2.1	0.57	0.07	26.1	2.57	1.33	19.7	2.67	20.4	1.5	22.9	2.61	2.61	22.89	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.46603	0.39 #	37.2	4.1	3562	37	58.1	58.1	1.1	0.57	0.07	60.3	2.10	1.32	45.7	2.20	46.4	n/a	n/a	n/a	2.20	46.44	1.66	77.24	0.123	46.44	39	0.80	1.00	0.13	1.78
13.58185	0.44 #	46.9	4.1	4491	42	58.6	58.6	1.0	0.57	0.07	75.7	1.99	1.32	57.5	2.09	58.3	n/a	n/a	n/a	2.09	58.30	1.43	83.56	0.134	58.30	44	0.78	1.00	0.14	1.94
13.6964	0.42 #	48.2	4.2	4616	40	59.1	59.1	0.9	0.57	0.07	77.1	1.97	1.31	58.9	2.06	59.7	n/a	n/a	n/a	2.06	59.66	1.39	82.86	0.133	59.66	44	0.78	1.00	0.14	1.92
13.81052	0.38 #	38.1	4.2	3648	36	59.6	59.6	1.0	0.57	0.07	60.3	2.09	1.30	46.2	2.18	47.0	n/a	n/a	n/a	2.18	46.97	1.62	76.30	0.121	46.97	39	0.80	1.00	0.13	1.75
13.92592	0.37 #	24.1	4.2	2308	35	60.1	60.1	1.6	0.57	0.07	37.4	2.37	1.30	28.8	2.46	29.6	n/a	n/a	n/a	2.46	29.59	2.57	76.15	0.121	29.59	31	0.80	1.00	0.13	1.75
14.04385	0.38 #	25.4	4.3	2432	36	60.6	60.6	1.5	0.57	0.07	39.2	2.35	1.29	30.3	2.44	31.0	n/a	n/a	n/a	2.44	31.05	2.46	76.50	0.122	31.05	32	0.80	1.00	0.13	1.76
14.1622	0.37 #	21.1	4.3	2021	35	61.1	61.1	1.8	0.57	0.07	32.1	2.46	1.29	24.9	2.55	25.7	n/a	n/a	n/a	2.55	25.69	3.01	77.37	0.123	25.69	29	0.80	1.00	0.13	1.78
14.2814	0.3 #	15.4	4.4	1475	29	61.6	61.6	2.0	0.57	0.07	22.9	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.40398	0.3 #	23.5	4.4	2250	29	62.1	62.1	1.3	0.57	0.07	35.2	2.34	1.28	27.6	2.43	28.4	n/a	n/a	n/a	2.43	28.37	2.44	69.29	0.111	28.37	30	0.80	1.00	0.12	1.60
14.5198	0.35 #	21.5	4.4	2059	34	62.6	62.6	1.7	0.57	0.07	31.9	2.44	1.27	25.1	2.53	25.8	n/a	n/a	n/a	2.53	25.85	2.90	74.95	0.119	25.85	29	0.80	1.00	0.13	1.72
14.63477	0.27 #	30	4.5	2873	26	63.1	63.1	0.9	0.57	0.07	44.5	2.17	1.27	35.1	2.26	35.9	n/a	n/a	n/a	2.26	35.93	1.82	65.55	0.106	35.93	34	0.80	1.00	0.11	1.54
14.74932	0.25 #	27	4.5	2586	24	63.6	63.6	0.9	0.57	0.07	39.7	2.22	1.26	31.4	2.31	32.2	n/a	n/a	n/a	2.31	32.21	1.97	63.58	0.104	32.21	32	0.80	1.00	0.11	1.50
14.81568	0.25 #	25.7	4.5	2461	24	63.9	63.9	1.0	0.57	0.07	37.5	2.25	1.26	29.8	2.34	30.6	n/a	n/a	n/a	2.34	30.59	2.08	63.62	0.104	30.59	32	0.80	1.00	0.11	1.50
14.9391	0.28 #	22.2	4.6	2126	27	64.4	64.4	1.3	0.57	0.07	32.0	2.38	1.25	25.5	2.46	26.3	n/a	n/a	n/a	2.46	26.31	2.56	67.37	0.108	26.31	29	0.80	1.00	0.12	1.57
15.05703	0.31 #	25.8	4.6	2471	30	64.9	64.9	1.2	0.57	0.07	37.0	2.31	1.25	29.7	2.39	30.5	n/a	n/a	n/a	2.39	30.46	2.27	69.17	0.111	30.46	32	0.80	1.00	0.12	1.60
15.17412	0.28 #	19.3	4.6	1848	27	65.4	65.4	1.5	0.57	0.07	27.2	2.47	1.24	21.9	2.55	22.7	n/a	n/a	n/a	2.55	22.70	3.02	68.51	0.110	22.70	27	0.80	1.00	0.12	1.59
15.29205	0.27 #	24.8	4.7	2375	26	65.9	65.9	1.1	0.57	0.07	35.0	2.31	1.24	28.2	2.38	29.1	n/a	n/a	n/a	2.38	29.05	2.25	65.41	0.106	29.05	31	0.80	1.00	0.11	1.53
15.40913	0.27 #	18.6	4.7	1781	26	66.4	66.4	1.5	0.57	0.07	25.8	2.49	1.23	20.9	2.56	21.7	n/a	n/a	n/a	2.56	21.71	3.12	67.67	0.109	21.71	27	0.80	1.00	0.12	1.57
15.52664	0.27 #	18.9	4.7	1810	26	67.0	67.0	1.5	0.57	0.07	26.0	2.48	1.23	21.2	2.56	22.0	n/a	n/a	n/a	2.56	21.97	3.07	67.44	0.109	21.97	27	0.80	1.00	0.12	1.57
15.64246	0.27 9	9.4	4.8	900	26	67.5	67.5	3.1	0.57	0.07	12.3	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.75828	0.26 #	15.2	4.8	1456	25	68.0	68.0	1.8	0.57	0.07	20.4	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.87409	0.29 #	18	4.8	1724	28	68.5	68.5	1.7	0.57	0.07	24.2	2.54	1.22	19.9	2.61	20.7	1.3	22.4	2.57	2.57	22.39	3.12	69.89	0.112	20.70	26	0.80	1.00	0.12	1.62
15.98864	0.32 #	14.5	4.9	1389	31	68.9	68.9	2.3	0.57	0.07	19.1	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.10319	0.29 #	22	4.9	2107	28	69.4	69.4	1.4	0.57	0.07	29.3	2.42	1.21	24.3	2.49	25.1	n/a	n/a	n/a	2.49	25.12	2.70	67.78	0.109	25.12	29	0.80	1.00	0.12	1.58
16.21858	0.26 #	22.2	4.9	2126	25	69.9	69.9	1.2	0.57	0.07	29.4	2.39	1.20	24.4	2.46	25.3	n/a	n/a	n/a	2.46	25.25	2.56	64.58	0.105	25.25	29	0.80	1.00	0.11	1.52
16.3344	0.29 #	28.6	5.0	2739	28	70.4	70.4	1.0	0.57	0.07	37.9	2.26	1.20	31.6	2.33	32.4	n/a	n/a	n/a	2.33	32.42	2.04	66.06	0.107	32.42	33	0.80	1.00	0.11	1.54
16.44979	0.32 #	37.7	5.0	3610	31	70.9	70.9	0.9	0.57	0.07	49.9	2.12	1.20	41.7	2.18	42.6	n/a	n/a	n/a	2.18	42.58	1.62	69.12	0.111	42.58	37	0.80	1.00	0.12	1.60
16.56265	0.33 #	49.1	5.0	4702	32	71.4	71.4	0.7	0.57	0.07	64.8	1.96	1.19	54.4	2.03	55.3	n/a	n/a	n/a	2.03	55.27	1.34	74.08	0.118	55.27	43	0.79	1.00	0.13	1.70
16.67636	0.35 #	47.5	5.1	4549	34	71.9	71.9	0.7	0.57	0.07	62.3	2.00	1.19	52.4	2.06	53.3	n/a	n/a	n/a	2.06	53.29	1.39	74.26	0.118	53.29	42	0.79	1.00	0.13	1.71

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
16.78837	0.29 #	45	5.1	4309	28	72.4	72.4	0.7	0.57	0.07	58.5	1.99	1.18	49.5	2.06	50.3	n/a	n/a	n/a	2.06	50.31	1.38	69.46	0.111	50.31	41	0.80	1.00	0.12	1.61
16.90038	0.29 #	54.2	5.2	5190	28	72.9	72.9	0.5	0.57	0.07	70.2	1.88	1.18	59.5	1.95	60.4	n/a	n/a	n/a	1.95	60.40	1.23	74.58	0.119	60.40	45	0.78	1.00	0.13	1.71
17.01113	0.33 #	55.3	5.2	5296	32	73.4	73.4	0.6	0.57	0.07	71.2	1.90	1.18	60.6	1.96	61.4	n/a	n/a	n/a	1.96	61.42	1.25	77.04	0.123	61.42	45	0.78	1.00	0.13	1.77
17.12314	0.28 #	61.7	5.2	5908	27	73.8	73.8	0.5	0.57	0.07	79.0	1.80	1.17	67.5	1.86	68.3	n/a	n/a	n/a	1.86	68.31	1.16	78.96	0.126	68.31	47	0.76	1.00	0.13	1.82
17.23431	0.27 #	68	5.3	6512	26	74.3	74.3	0.4	0.57	0.07	86.6	1.74	1.17	74.2	1.80	75.0	n/a	n/a	n/a	1.80	75.04	1.11	83.01	0.133	75.04	50	0.75	1.00	0.14	1.93
17.34336	0.35 #	64.4	5.3	6167	34	74.8	74.8	0.6	0.57	0.07	81.5	1.83	1.16	70.0	1.89	70.8	n/a	n/a	n/a	1.89	70.84	1.18	83.41	0.134	70.84	48	0.76	1.00	0.14	1.94
17.45326	0.36 #	65.9	5.3	6311	34	75.3	75.3	0.6	0.57	0.07	82.8	1.83	1.16	71.4	1.88	72.3	n/a	n/a	n/a	1.88	72.26	1.17	84.67	0.136	72.26	49	0.76	1.00	0.15	1.97
17.56316	0.35 #	60.8	5.4	5822	34	75.7	75.7	0.6	0.57	0.07	75.9	1.87	1.16	65.6	1.92	66.5	n/a	n/a	n/a	1.92	66.46	1.21	80.62	0.129	66.46	47	0.77	1.00	0.14	1.86
17.67179	0.37 #	62.1	5.4	5947	35	76.2	76.2	0.6	0.57	0.07	77.0	1.87	1.15	66.8	1.93	67.7	n/a	n/a	n/a	1.93	67.67	1.21	82.15	0.132	67.67	47	0.76	1.00	0.14	1.90
17.78084	0.38 #	53.4	5.4	5114	36	76.7	76.7	0.7	0.57	0.07	65.7	1.97	1.15	57.1	2.02	58.0	n/a	n/a	n/a	2.02	58.01	1.33	77.35	0.123	58.01	44	0.78	1.00	0.13	1.78
17.88863	0.38 #	56	5.5	5363	36	77.1	77.1	0.7	0.57	0.07	68.5	1.95	1.15	59.8	2.00	60.7	n/a	n/a	n/a	2.00	60.66	1.30	78.59	0.125	60.66	45	0.78	1.00	0.13	1.81
17.98585	0.39 #	54.9	5.5	5257	37	77.6	77.6	0.7	0.57	0.07	66.8	1.97	1.14	58.4	2.02	59.3	n/a	n/a	n/a	2.02	59.30	1.32	78.35	0.125	59.30	44	0.78	1.00	0.13	1.80
18.02473	0.39 #	61.8	5.5	5918	37	77.7	77.7	0.6	0.57	0.07	75.1	1.90	1.14	65.8	1.94	66.7	n/a	n/a	n/a	1.94	66.68	1.23	82.27	0.132	66.68	47	0.77	1.00	0.14	1.91
18.1321	0.37 #	66.2	5.5	6339	35	78.2	78.2	0.6	0.57	0.07	80.1	1.84	1.14	70.3	1.89	71.2	n/a	n/a	n/a	1.89	71.22	1.18	84.14	0.135	71.22	48	0.76	1.00	0.15	1.96
18.2403	0.34 #	56.4	5.6	5401	33	78.7	78.7	0.6	0.57	0.07	67.7	1.92	1.13	59.6	1.97	60.5	n/a	n/a	n/a	1.97	60.50	1.26	76.47	0.122	60.50	45	0.78	1.00	0.13	1.76
18.34851	0.3 #	48.9	5.6	4683	29	79.1	79.1	0.6	0.57	0.07	58.2	1.98	1.13	51.4	2.03	52.3	n/a	n/a	n/a	2.03	52.30	1.34	70.21	0.112	52.30	41	0.79	1.00	0.12	1.62
18.45545	0.32 #	38	5.6	3639	31	79.6	79.6	0.9	0.57	0.07	44.7	2.16	1.13	39.6	2.20	40.5	n/a	n/a	n/a	2.20	40.52	1.67	67.50	0.109	40.52	36	0.80	1.00	0.12	1.57
18.5624	0.34 #	31.7	5.7	3036	33	80.0	80.0	1.1	0.57	0.07	36.9	2.28	1.13	32.8	2.33	33.7	n/a	n/a	n/a	2.33	33.71	2.04	68.59	0.110	33.71	33	0.80	1.00	0.12	1.59
18.66934	0.31 #	28.3	5.7	2710	30	80.5	80.5	1.1	0.57	0.07	32.7	2.33	1.12	29.1	2.38	30.0	n/a	n/a	n/a	2.38	30.00	2.22	66.47	0.107	30.00	31	0.80	1.00	0.11	1.55
18.77712	0.33 #	25.3	5.7	2423	32	81.0	81.0	1.3	0.57	0.07	28.9	2.42	1.12	25.9	2.46	26.7	n/a	n/a	n/a	2.46	26.75	2.58	68.97	0.111	26.75	30	0.80	1.00	0.12	1.60
18.88321	0.36 #	24.2	5.8	2317	34	81.4	81.4	1.5	0.57	0.07	27.5	2.47	1.12	24.6	2.51	25.5	n/a	n/a	n/a	2.51	25.51	2.82	72.03	0.115	25.51	29	0.80	1.00	0.12	1.66
18.98762	0.38 #	36.3	5.8	3476	36	81.9	81.9	1.1	0.57	0.07	41.5	2.23	1.11	37.3	2.27	38.2	n/a	n/a	n/a	2.27	38.16	1.87	71.22	0.114	38.16	35	0.80	1.00	0.12	1.64
19.09329	0.39 #	37.6	5.8	3601	37	82.3	82.3	1.1	0.57	0.07	42.7	2.22	1.11	38.5	2.26	39.4	n/a	n/a	n/a	2.26	39.42	1.82	71.90	0.115	39.42	36	0.80	1.00	0.12	1.66
19.19854	0.45 #	34.2	5.9	3275	43	82.8	82.8	1.3	0.57	0.07	38.6	2.32	1.11	34.9	2.35	35.8	n/a	n/a	n/a	2.35	35.76	2.13	76.27	0.121	35.76	34	0.80	1.00	0.13	1.75
19.30252	0.45 #	34.1	5.9	3265	43	83.2	83.2	1.4	0.57	0.07	38.2	2.32	1.10	34.7	2.36	35.6	n/a	n/a	n/a	2.36	35.56	2.14	76.21	0.121	35.56	34	0.80	1.00	0.13	1.75
19.40693	0.43 #	49	5.9	4692	41	83.7	83.7	0.9	0.57	0.07	55.1	2.09	1.10	50.0	2.12	51.0	n/a	n/a	n/a	2.12	50.96	1.50	76.32	0.121	50.96	41	0.80	1.00	0.13	1.75
19.51133	0.42 #	50.8	5.9	4865	40	84.1	84.1	0.8	0.57	0.07	56.8	2.06	1.10	51.8	2.10	52.7	n/a	n/a	n/a	2.10	52.69	1.45	76.28	0.121	52.69	42	0.79	1.00	0.13	1.75
19.61658	0.44 #	51.4	6.0	4922	42	84.6	84.6	0.9	0.57	0.07	57.2	2.07	1.09	52.3	2.10	53.2	n/a	n/a	n/a	2.10	53.16	1.46	77.45	0.123	53.16	42	0.79	1.00	0.13	1.78
19.71972	0.41 #	54.3	6.0	5200	39	85.0	85.0	0.8	0.57	0.07	60.1	2.02	1.09	55.1	2.05	56.0	n/a	n/a	n/a	2.05	56.02	1.37	76.97	0.122	56.02	43	0.79	1.00	0.13	1.77
19.82412	0.32 #	54.9	6.0	5257	31	85.5	85.5	0.6	0.57	0.07	60.5	1.96	1.09	55.6	1.99	56.5	n/a	n/a	n/a	1.99	56.49	1.29	72.74	0.116	56.49	43	0.78	1.00	0.12	1.67
19.9281	0.31 #	47.9	6.1	4587	30	85.9	85.9	0.7	0.57	0.07	52.4	2.04	1.09	48.2	2.07	49.2	n/a	n/a	n/a	2.07	49.16	1.40	68.71	0.110	49.16	40	0.80	1.00	0.12	1.59
20.03504	0.33 #	34	6.1	3256	32	86.4	86.4	1.0	0.57	0.07	36.7	2.26	1.08	33.9	2.29	34.8	n/a	n/a	n/a	2.29	34.80	1.92	66.83	0.108	34.80	34	0.80	1.00	0.12	1.56
20.14072	0.29 #	31.5	6.1	3016	28	86.9	86.9	0.9	0.57	0.07	33.7	2.28	1.08	31.2	2.31	32.2	n/a	n/a	n/a	2.31	32.15	1.98	63.67	0.104	32.15	32	0.80	1.00	0.11	1.50
20.24681	0.27 #	24.3	6.2	2327	26	87.3	87.3	1.2	0.57	0.07	25.7	2.43	1.08	23.8	2.45	24.7	n/a	n/a	n/a	2.45	24.74	2.55	63.09	0.103	24.74	28	0.80	1.00	0.11	1.49
20.35502	0.36 #	18.3	6.2	1752	34	87.8	87.8	2.1	0.57	0.07	19.0	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.46407	0.36 #	14.3	6.2	1369	34	88.2	88.2	2.7	0.57	0.07	14.5	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.57101	0.35 #	19.9	6.3	1906	34	88.7	88.7	1.8	0.57	0.07	20.5	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.68049	0.34 #	18.7	6.3	1791	33	89.2	89.2	1.9	0.57	0.07	19.1	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.78912	0.34 #	20.3	6.3	1944	33	89.6	89.6	1.8	0.57	0.07	20.7	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.89775	0.33 #	33.2	6.4	3179	32	90.1	90.1	1.0	0.57	0.07	34.3	2.29	1.06	32.3	2.31	33.3	n/a	n/a	n/a	2.31	33.27	2.00	66.39	0.107	33.27	33	0.80	1.00	0.11	1.55
21.00512	0.29 #	25.9	6.4	2480	28	90.6	90.6	1.2	0.57	0.07	26.4	2.42	1.06	24.9	2.44	25.9	n/a	n/a	n/a	2.44	25.89	2.48	64.19	0.105	25.89	29	0.80	1.00	0.11	1.51
21.11374	0.29 #	20.5	6.4	1963	28	91.0	91.0	1.5	0.57	0.07	20.6	2.57	1.05	19.5	2.59	20.4	n/a	n/a	n/a	2.59	20.44	3.24	66.30	0.107	20.44	26	0.80	1.00	0.11	1.55
21.22238	0.35 #	20.6	6.5	1973	34	91.5	91.5	1.8	0.57	0.07	20.6	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.28409	0.35 #	22.4	6.5	2145	34	91.8	91.8	1.6	0.57	0.07	22.4	2.56	1.05	21.3	2.58	22.2	n/a	n/a	n/a	2.58	22.24	3.19	70.91	0.113	22.24	27	0.80	1.00	0.12	1.64
21.39991	0.33 #	21.6	6.5	2068	32	92.3	92.3	1.6	0.57	0.07	21.4	2.57	1.05	20.4	2.59	21.4	n/a	n/a	n/a	2.59	21.39	3.25	69.45	0.111	21.39	26	0.80	1.00	0.12	1.61
21.51488	0.35 #	15.9	6.6	1523	34	92.8	92.8	2.3	0.57	0.07	15.4	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.629	0.37 #	11.2	6.6	1073	35	93.3	93.3	3.6	0.57	0.07	10.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.74313	0.41 #	12.8	6.6	1226	39	93.8	93.8	3.5	0.57	0.07	12.1	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
21.85683	0.43	# 14.1	6.7	1350	41	94.3	94.3	3.3	0.57	0.07	13.3	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.96842	0.4	# 25	6.7	2394	38	94.7	94.7	1.7	0.57	0.07	24.3	2.53	1.03	23.5	2.55	24.4	n/a	n/a	n/a	2.55	24.43	3.02	73.71	0.117	24.43	28	0.80	1.00	0.13	1.70
22.0779	0.4	# 27.8	6.7	2662	38	95.2	95.2	1.5	0.57	0.07	27.0	2.47	1.03	26.1	2.48	27.1	n/a	n/a	n/a	2.48	27.10	2.68	72.52	0.115	27.10	30	0.80	1.00	0.12	1.67
22.18738	0.42	# 22.7	6.8	2174	40	95.7	95.7	1.9	0.57	0.07	21.7	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.2977	0.4	# 22.1	6.8	2116	38	96.2	96.2	1.9	0.57	0.07	21.0	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.41013	0.41	# 20.4	6.8	1954	39	96.6	96.6	2.1	0.57	0.07	19.2	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.52172	0.41	# 16.3	6.9	1561	39	97.1	97.1	2.7	0.57	0.07	15.1	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.63627	0.42	# 18.3	6.9	1752	40	97.6	97.6	2.4	0.57	0.07	17.0	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.75082	0.41	# 17.4	6.9	1666	39	98.1	98.1	2.5	0.57	0.07	16.0	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.86452	0.37	# 17.7	7.0	1695	35	98.6	98.6	2.2	0.57	0.07	16.2	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.97569	0.33	# 39.1	7.0	3744	32	99.1	99.1	0.9	0.57	0.07	36.8	2.23	1.01	36.4	2.23	37.4	n/a	n/a	n/a	2.23	37.37	1.75	65.44	0.106	37.37	35	0.80	1.00	0.11	1.53
23.08728	0.34	# 33	7.0	3160	33	99.6	99.6	1.1	0.57	0.07	30.7	2.34	1.01	30.5	2.35	31.5	n/a	n/a	n/a	2.35	31.46	2.10	66.13	0.107	31.46	32	0.80	1.00	0.11	1.55
23.19887	0.36	# 22.8	7.1	2183	34	100.0	100.0	1.7	0.57	0.07	20.8	2.59	1.01	20.7	2.59	21.7	n/a	n/a	n/a	2.59	21.69	3.27	70.89	0.113	21.69	27	0.80	1.00	0.12	1.64
23.31173	0.36	# 25.1	7.1	2404	34	100.5	100.5	1.5	0.57	0.07	22.9	2.53	1.00	22.8	2.53	23.8	n/a	n/a	n/a	2.53	23.82	2.93	69.78	0.112	23.82	28	0.80	1.00	0.12	1.62
23.42332	0.38	# 28.9	7.1	2767	36	101.0	101.0	1.4	0.57	0.07	26.4	2.46	1.00	26.4	2.46	27.4	n/a	n/a	n/a	2.46	27.36	2.56	69.99	0.112	27.36	30	0.80	1.00	0.12	1.62
23.53533	0.32	# 25.8	7.2	2471	31	101.5	101.5	1.3	0.57	0.07	23.3	2.49	1.00	23.4	2.49	24.4	n/a	n/a	n/a	2.49	24.36	2.71	65.98	0.107	24.36	28	0.80	1.00	0.11	1.54
23.64946	0.3	# 25.7	7.2	2461	29	102.0	102.0	1.2	0.57	0.07	23.1	2.48	1.00	23.2	2.48	24.2	n/a	n/a	n/a	2.48	24.21	2.65	64.21	0.105	24.21	28	0.80	1.00	0.11	1.51
23.76147	0.33	# 24	7.2	2298	32	102.5	102.5	1.4	0.57	0.07	21.4	2.54	0.99	21.5	2.54	22.6	n/a	n/a	n/a	2.54	22.56	2.99	67.50	0.109	22.56	27	0.80	1.00	0.12	1.57
23.87517	0.27	# 34.7	7.3	3323	26	103.0	103.0	0.8	0.57	0.07	31.3	2.27	0.99	31.5	2.27	32.5	n/a	n/a	n/a	2.27	32.53	1.85	60.35	0.100	32.53	33	0.80	1.00	0.11	1.45
23.98803	0.25	# 27.9	7.3	2672	24	103.4	103.4	0.9	0.57	0.07	24.8	2.39	0.99	25.1	2.39	26.1	n/a	n/a	n/a	2.39	26.10	2.26	59.07	0.099	26.10	29	0.80	1.00	0.11	1.43
24.10047	0.27	# 24.3	7.3	2327	26	103.9	103.9	1.2	0.57	0.07	21.4	2.50	0.99	21.7	2.49	22.7	n/a	n/a	n/a	2.49	22.68	2.73	61.82	0.102	22.68	27	0.80	0.99	0.11	1.47
24.21333	0.25	# 24.9	7.4	2384	24	104.4	104.4	1.0	0.57	0.07	21.8	2.47	0.99	22.2	2.46	23.2	n/a	n/a	n/a	2.46	23.18	2.58	59.71	0.100	23.18	28	0.80	0.99	0.11	1.43
24.32576	0.3	# 21.9	7.4	2097	29	104.9	104.9	1.4	0.57	0.07	19.0	2.59	0.98	19.3	2.58	20.3	n/a	n/a	n/a	2.58	20.34	3.22	65.56	0.106	20.34	26	0.80	0.99	0.11	1.52
24.43862	0.33	# 24.7	7.4	2365	32	105.4	105.4	1.4	0.57	0.07	21.4	2.54	0.98	21.9	2.53	22.9	n/a	n/a	n/a	2.53	22.89	2.93	66.98	0.108	22.89	27	0.80	0.99	0.11	1.55
24.48089	0.34	# 31.4	7.5	3007	33	105.6	105.6	1.1	0.57	0.07	27.5	2.40	0.98	28.1	2.39	29.1	n/a	n/a	n/a	2.39	29.07	2.26	65.80	0.106	29.07	31	0.80	0.99	0.11	1.53
24.59882	0.37	# 25.5	7.5	2442	35	106.1	106.1	1.5	0.57	0.07	22.0	2.55	0.98	22.5	2.54	23.6	n/a	n/a	n/a	2.54	23.55	2.97	70.01	0.112	23.55	28	0.80	0.99	0.12	1.60
24.71675	0.37	# 16.3	7.5	1561	35	106.6	106.6	2.4	0.57	0.07	13.6	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.83299	0.34	# 18	7.6	1724	33	107.1	107.1	2.0	0.57	0.07	15.1	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.94923	0.33	# 19.8	7.6	1896	32	107.6	107.6	1.8	0.57	0.07	16.6	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.06716	0.33	9 9.5	7.6	910	32	108.1	108.1	3.9	0.57	0.07	7.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.18509	0.31	# 14.1	7.7	1350	30	108.6	108.6	2.4	0.57	0.07	11.4	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.29964	0.33	# 28.3	7.7	2710	32	109.1	109.1	1.2	0.57	0.07	23.8	2.47	0.96	24.7	2.45	25.8	n/a	n/a	n/a	2.45	25.78	2.54	65.45	0.106	25.78	29	0.80	0.99	0.11	1.51
25.41249	0.37	# 17.1	7.7	1637	35	109.6	109.6	2.3	0.57	0.07	13.9	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.52789	0.35	# 12.3	7.8	1178	34	110.1	110.1	3.1	0.57	0.07	9.7	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.64497	0.31	# 9.7	7.8	929	30	110.6	110.6	3.6	0.57	0.07	7.4	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.76079	0.3	3 3.1	7.9	297	29	111.1	111.1	15.5	0.57	0.07	1.7	4.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.88083	0.27	8 8.3	7.9	795	26	111.6	111.6	3.8	0.57	0.07	6.1	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.00003	0.27	9 9	7.9	862	26	112.1	112.1	3.4	0.57	0.07	6.7	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.11796	0.32	4 4.5	8.0	431	31	112.6	112.3	9.6	0.57	0.07	2.8	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.23674	0.29	# 13.4	8.0	1283	28	113.1	112.4	2.4	0.57	0.07	10.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.35636	0.27	8 8.2	8.0	785	26	113.7	112.6	3.8	0.57	0.07	6.0	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.47683	0.3	1 1.4	8.1	134	29	114.2	112.8	144.5	0.57	0.07	0.2	5.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.59729	0.3	# 10.3	8.1	986	29	114.7	112.9	3.3	0.57	0.07	7.7	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.71818	0.3	6 6.8	8.1	651	29	115.2	113.1	5.4	0.57	0.07	4.7	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.84118	0.28	4 3.9	8.2	373	27	115.7	113.2	10.4	0.57	0.07	2.3	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.96377	0.25	7 7.6	8.2	728	24	116.3	113.4	3.9	0.57	0.07	5.4	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.08888	0.27	2 2.9	8.3	278	26	116.8	113.6	16.1	0.57	0.07	1.4	4.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.21315	0.22	8 8.3	8.3	795	21	117.4	113.7	3.1	0.57	0.07	6.0	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
27.33911	0.2	8 8.7	8.3	833	19	117.9	113.9	2.7	0.57	0.07	6.3	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.46465	0.19	6 6.5	8.4	622	18	118.4	114.1	3.6	0.57	0.07	4.4	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.59061	0.17	7 7.8	8.4	747	16	119.0	114.2	2.6	0.57	0.07	5.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.89368	0.18	8 8.2	8.5	785	17	120.3	114.6	2.6	0.57	0.08	5.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.02556	0.19	7 7.6	8.5	728	18	120.9	114.8	3.0	0.57	0.08	5.3	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.15617	0.2	6 6.2	8.6	594	19	121.4	115.0	4.1	0.57	0.08	4.1	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.28762	0.17	7 7.4	8.6	709	16	122.0	115.1	2.8	0.57	0.08	5.1	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.42162	0.18	7 7.3	8.7	699	17	122.6	115.3	3.0	0.57	0.08	5.0	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.55223	0.16	8 8.4	8.7	804	15	123.1	115.5	2.2	0.57	0.08	5.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.68496	0.16	7 7.2	8.7	689	15	123.7	115.7	2.7	0.57	0.08	4.9	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.8181	0.2	4 4.5	8.8	431	19	124.3	115.8	6.2	0.57	0.08	2.6	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.94914	0.2	4 4.9	8.8	469	19	124.8	116.0	5.6	0.57	0.08	3.0	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.08355	0.2	9 9.3	8.9	891	19	125.4	116.2	2.5	0.57	0.08	6.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.2167	0.23	8 8	8.9	766	22	126.0	116.4	3.4	0.57	0.08	5.5	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.34858	0.19	8 7.9	8.9	757	18	126.6	116.5	2.9	0.57	0.08	5.4	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.48088	0.24	8 8.8	9.0	843	23	127.1	116.7	3.2	0.57	0.08	6.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.61403	0.23	6 6.6	9.0	632	22	127.7	116.9	4.4	0.57	0.08	4.3	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.74675	0.23	# 12.9	9.1	1235	22	128.3	117.1	2.0	0.57	0.08	9.5	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.87736	0.25	# 16.6	9.1	1590	24	128.8	117.2	1.6	0.57	0.08	12.5	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.00924	0.31	# 16.8	9.1	1609	30	129.4	117.4	2.0	0.57	0.08	12.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.13901	0.29	# 21.8	9.2	2088	28	130.0	117.6	1.4	0.57	0.08	16.6	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.26835	0.27	# 36.6	9.2	3505	26	130.5	117.8	0.8	0.57	0.08	28.7	2.30	0.93	30.9	2.27	32.1	n/a	n/a	n/a	2.27	32.08	1.85	59.30	0.099	32.08	32	0.80	0.97	0.10	1.36
30.39389	0.31	# 46	9.3	4405	30	131.1	117.9	0.7	0.57	0.08	36.2	2.19	0.93	39.1	2.16	40.3	n/a	n/a	n/a	2.16	40.30	1.57	63.19	0.103	40.30	36	0.80	0.97	0.11	1.41
30.51942	0.31	# 23.2	9.3	2222	30	131.6	118.1	1.4	0.57	0.08	17.7	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.64623	0.27	# 16.9	9.3	1618	26	132.2	118.3	1.7	0.57	0.08	12.6	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.77388	0.36	# 13.9	9.4	1331	34	132.7	118.4	2.9	0.57	0.08	10.1	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.85715	0.34	8 7.9	9.4	757	33	133.1	118.5	5.2	0.57	0.08	5.3	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.91506	0.32	9 9.7	9.4	929	31	133.3	118.6	3.9	0.57	0.08	6.7	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.04229	0.31	# 21.1	9.5	2021	30	133.9	118.8	1.6	0.57	0.08	15.9	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.16741	0.31	# 14.8	9.5	1417	30	134.4	119.0	2.3	0.57	0.08	10.8	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.28999	0.29	# 20	9.5	1915	28	134.9	119.1	1.6	0.57	0.08	14.9	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.41257	0.28	# 17.5	9.6	1676	27	135.5	119.3	1.7	0.57	0.08	12.9	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.53261	0.29	# 14.3	9.6	1369	28	136.0	119.4	2.3	0.57	0.08	10.3	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.65434	0.28	# 16	9.6	1532	27	136.5	119.6	1.9	0.57	0.08	11.7	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.77227	0.32	# 11.5	9.7	1101	31	137.0	119.8	3.2	0.57	0.08	8.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.8919	0.3	9 9.3	9.7	891	29	137.5	119.9	3.8	0.57	0.08	6.3	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.01278	0.29	# 11.4	9.8	1092	28	138.0	120.1	2.9	0.57	0.08	7.9	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.13114	0.28	5 5.9	9.8	565	27	138.6	120.2	6.3	0.57	0.08	3.5	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.25034	0.25	8 8.3	9.8	795	24	139.1	120.4	3.7	0.57	0.08	5.4	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.36827	0.28	8 8.5	9.9	814	27	139.6	120.5	4.0	0.57	0.08	5.6	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.48577	0.3	8 8	9.9	766	29	140.1	120.7	4.6	0.57	0.08	5.2	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.60286	0.29	8 8	9.9	766	28	140.6	120.9	4.4	0.57	0.08	5.2	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.72079	0.3	9 9.9	10.0	948	29	141.1	121.0	3.6	0.57	0.08	6.7	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.83999	0.33	9 9	10.0	862	32	141.6	121.2	4.4	0.57	0.08	5.9	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.95876	0.33	9 9.4	10.0	900	32	142.1	121.3	4.2	0.57	0.08	6.2	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.07796	0.32	7 7	10.1	670	31	142.6	121.5	5.8	0.57	0.08	4.3	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.19843	0.32	# 12.9	10.1	1235	31	143.2	121.6	2.8	0.57	0.08	9.0	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.31974	0.37	# 11.6	10.2	1111	35	143.7	121.8	3.7	0.57	0.08	7.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
33.44021	0.32 9	9.5	10.2	910	31	144.2	122.0	4.0	0.57	0.08	6.3	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.56279	0.28 9	9.8	10.2	938	27	144.7	122.1	3.4	0.57	0.08	6.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.68537	0.29 4	5	10.3	479	28	145.3	122.3	8.3	0.57	0.08	2.7	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.8071	0.27 #	19.6	10.3	1877	26	145.8	122.4	1.5	0.57	0.08	14.1	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.92672	0.25 #	35.6	10.3	3409	24	146.3	122.6	0.7	0.57	0.08	26.6	2.32	0.91	29.3	2.28	30.6	n/a	n/a	n/a	2.28	30.59	1.88	57.57	0.098	30.59	32	0.80	0.96	0.10	1.29
34.04507	0.29 #	34.5	10.4	3304	28	146.8	122.8	0.9	0.57	0.08	25.7	2.37	0.91	28.3	2.33	29.6	n/a	n/a	n/a	2.33	29.62	2.05	60.68	0.101	29.62	31	0.80	0.96	0.10	1.33
34.13004	0.34 #	40.7	10.4	3897	33	147.2	122.9	0.9	0.57	0.08	30.5	2.30	0.91	33.6	2.26	34.9	n/a	n/a	n/a	2.26	34.93	1.83	64.08	0.104	34.93	34	0.80	0.96	0.11	1.38
34.25177	0.4 #	29.8	10.4	2854	38	147.7	123.0	1.4	0.57	0.08	22.0	2.53	0.91	24.2	2.50	25.6	n/a	n/a	n/a	2.50	25.56	2.75	70.21	0.112	25.56	29	0.80	0.96	0.12	1.48
34.37605	0.41 #	20.5	10.5	1963	39	148.2	123.2	2.2	0.57	0.08	14.7	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.49947	0.42 #	14.6	10.5	1398	40	148.8	123.4	3.2	0.57	0.08	10.1	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.62416	0.41 #	18.3	10.6	1752	39	149.3	123.5	2.4	0.57	0.08	13.0	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.74843	0.42 #	18.7	10.6	1791	40	149.8	123.7	2.5	0.57	0.08	13.3	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.87059	0.39 #	18.1	10.6	1733	37	150.4	123.9	2.4	0.57	0.08	12.8	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.98894	0.35 #	18.8	10.7	1800	34	150.9	124.0	2.0	0.57	0.08	13.3	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.10645	0.37 #	18.3	10.7	1752	35	151.4	124.2	2.2	0.57	0.08	12.9	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.22438	0.41 #	15.4	10.7	1475	39	151.9	124.3	3.0	0.57	0.08	10.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.33977	0.42 #	14.5	10.8	1389	40	152.4	124.5	3.3	0.57	0.08	9.9	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.45644	0.35 #	11.4	10.8	1092	34	152.9	124.6	3.6	0.57	0.08	7.5	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.57268	0.25 #	23.5	10.8	2250	24	153.4	124.8	1.1	0.57	0.08	16.8	2.58	0.90	18.6	2.54	20.0	n/a	n/a	n/a	2.54	20.01	3.00	60.00	0.100	20.01	26	0.80	0.96	0.10	1.30
35.6792	0.29 #	98	10.9	9384	28	153.9	124.9	0.3	0.57	0.08	73.9	1.75	0.90	82.0	1.71	83.4	n/a	n/a	n/a	1.71	83.41	1.04	86.88	0.141	83.41	52	0.74	0.95	0.14	1.81
35.78402	0.29 #	82.2	10.9	7871	28	154.3	125.1	0.4	0.57	0.08	61.7	1.85	0.90	68.6	1.81	69.9	n/a	n/a	n/a	1.81	69.93	1.11	77.84	0.124	69.93	48	0.76	0.95	0.13	1.60
35.89096	0.32 #	62	10.9	5937	31	154.8	125.2	0.5	0.57	0.08	46.2	2.04	0.90	51.3	2.00	52.7	n/a	n/a	n/a	2.00	52.71	1.30	68.31	0.110	52.71	42	0.79	0.96	0.11	1.42
35.99917	0.35 #	45.5	11.0	4357	34	155.2	125.3	0.8	0.57	0.08	33.5	2.25	0.90	37.3	2.21	38.7	n/a	n/a	n/a	2.21	38.66	1.68	64.93	0.105	38.66	36	0.80	0.96	0.11	1.37
36.10865	0.32 #	37.9	11.0	3629	31	155.7	125.5	0.9	0.57	0.08	27.7	2.34	0.90	30.8	2.30	32.2	n/a	n/a	n/a	2.30	32.19	1.94	62.60	0.103	32.19	32	0.80	0.96	0.11	1.33
36.21685	0.3 #	37.6	11.0	3601	29	156.2	125.6	0.8	0.57	0.08	27.4	2.33	0.90	30.5	2.29	31.9	n/a	n/a	n/a	2.29	31.91	1.92	61.17	0.101	31.91	32	0.80	0.96	0.10	1.31
36.32676	0.38 #	39.8	11.1	3811	36	156.7	125.8	1.0	0.57	0.08	29.1	2.35	0.90	32.4	2.31	33.8	n/a	n/a	n/a	2.31	33.76	1.97	66.61	0.107	33.76	33	0.80	0.96	0.11	1.39
36.4375	0.41 #	30	11.1	2873	39	157.1	125.9	1.4	0.57	0.08	21.6	2.54	0.90	24.0	2.50	25.4	n/a	n/a	n/a	2.50	25.43	2.79	70.89	0.113	25.43	29	0.80	0.96	0.12	1.46
36.54866	0.35 #	26.4	11.1	2528	34	157.6	126.1	1.4	0.57	0.08	18.8	2.59	0.90	21.0	2.55	22.4	n/a	n/a	n/a	2.55	22.37	3.02	67.65	0.109	22.37	27	0.80	0.96	0.11	1.41
36.6611	0.32 #	24.8	11.2	2375	31	158.1	126.2	1.4	0.57	0.08	17.6	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.77311	0.3 #	12.9	11.2	1235	29	158.6	126.4	2.7	0.57	0.08	8.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.88301	0.3 #	16.2	11.2	1551	29	159.1	126.5	2.1	0.57	0.08	11.0	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.96502	0.38 #	18.7	11.3	1791	36	159.4	126.6	2.2	0.57	0.08	12.9	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.07914	0.33 #	17.9	11.3	1714	32	159.9	126.8	2.0	0.57	0.08	12.3	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.1865	0.32 #	27.9	11.3	2672	31	160.4	126.9	1.2	0.57	0.08	19.8	2.54	0.89	22.1	2.49	23.6	n/a	n/a	n/a	2.49	23.56	2.74	64.54	0.105	23.56	28	0.80	0.96	0.11	1.35
37.25667	0.29 #	30.7	11.4	2940	28	160.7	127.0	1.0	0.57	0.08	21.9	2.45	0.89	24.5	2.41	25.9	n/a	n/a	n/a	2.41	25.92	2.36	61.21	0.101	25.92	29	0.80	0.96	0.10	1.30
37.29893	0.28 #	34.8	11.4	3332	27	160.8	127.1	0.8	0.57	0.08	25.0	2.37	0.89	28.0	2.33	29.4	n/a	n/a	n/a	2.33	29.37	2.04	59.77	0.100	29.37	31	0.80	0.96	0.10	1.28
37.40926	0.31 #	32.3	11.4	3093	30	161.3	127.2	1.0	0.57	0.08	23.0	2.44	0.89	25.8	2.40	27.2	n/a	n/a	n/a	2.40	27.24	2.29	62.47	0.103	27.24	30	0.80	0.96	0.11	1.32
37.51789	0.33 #	21.3	11.4	2040	32	161.8	127.4	1.7	0.57	0.08	14.7	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.62737	0.37 #	18.7	11.5	1791	35	162.3	127.5	2.2	0.57	0.08	12.8	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.73642	0.38 #	10.5	11.5	1005	36	162.7	127.6	4.3	0.57	0.08	6.6	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.84632	0.38 #	13.4	11.5	1283	36	163.2	127.8	3.2	0.57	0.08	8.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.95621	0.39 #	16.4	11.6	1570	37	163.7	127.9	2.7	0.57	0.08	11.0	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.064	0.34 #	18.7	11.6	1791	33	164.1	128.1	2.0	0.57	0.08	12.7	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.17306	0.33 #	17.4	11.6	1666	32	164.6	128.2	2.1	0.57	0.08	11.7	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.28085	0.33 #	26	11.7	2490	32	165.1	128.4	1.4	0.57	0.08	18.1	2.59	0.89	20.4	2.55	21.8	n/a	n/a	n/a	2.55	21.83	3.03	66.19	0.107	21.83	27	0.80	0.95	0.11	1.36
38.38948	0.3 #	23.1	11.7	2212	29	165.5	128.5	1.4	0.57	0.08	15.9	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.49684	0.31 #	27.2	11.7	2605	30	166.0	128.6	1.2	0.57	0.08	19.0	2.55	0.89	21.4	2.51	22.8	n/a	n/a	n/a	2.51	22.81	2.80	63.98	0.104	22.81	27	0.80	0.95	0.11	1.33
38.60547	0.32 #	27.4	11.8	2624	31	166.5	128.8	1.2	0.57	0.08	19.1	2.55	0.89	21.5	2.51	23.0	n/a	n/a	n/a	2.51	22.97	2.82	64.75	0.105	22.97	27	0.80	0.95	0.11	1.34

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
38.71579	0.38 #	32.2	11.8	3083	36	167.0	128.9	1.2	0.57	0.08	22.6	2.49	0.89	25.5	2.45	27.0	n/a	n/a	n/a	2.45	26.98	2.52	67.86	0.109	26.98	30	0.80	0.95	0.11	1.39
38.82611	0.37 #	30.2	11.8	2892	35	167.4	129.1	1.3	0.57	0.08	21.1	2.53	0.89	23.8	2.48	25.3	n/a	n/a	n/a	2.48	25.29	2.68	67.75	0.109	25.29	29	0.80	0.95	0.11	1.38
38.93644	0.32 #	34.4	11.9	3294	31	167.9	129.2	1.0	0.57	0.08	24.2	2.41	0.89	27.3	2.37	28.8	n/a	n/a	n/a	2.37	28.79	2.18	62.83	0.103	28.79	31	0.80	0.95	0.11	1.31
39.04591	0.32 #	46.2	11.9	4424	31	168.4	129.4	0.7	0.57	0.08	32.9	2.23	0.88	37.2	2.18	38.6	n/a	n/a	n/a	2.18	38.64	1.63	62.93	0.103	38.64	36	0.80	0.95	0.11	1.31
39.15539	0.35 #	43	11.9	4118	34	168.9	129.5	0.8	0.57	0.08	30.5	2.29	0.88	34.5	2.25	35.9	n/a	n/a	n/a	2.25	35.94	1.79	64.46	0.105	35.94	34	0.80	0.95	0.11	1.33
39.2674	0.37 #	41.5	12.0	3974	35	169.3	129.7	0.9	0.57	0.08	29.3	2.33	0.88	33.2	2.28	34.7	n/a	n/a	n/a	2.28	34.67	1.90	65.72	0.106	34.67	34	0.80	0.95	0.11	1.35
39.37772	0.37 #	27.2	12.0	2605	35	169.8	129.8	1.5	0.57	0.08	18.8	2.60	0.88	21.2	2.55	22.7	n/a	n/a	n/a	2.55	22.71	3.04	68.97	0.111	22.71	27	0.80	0.95	0.11	1.40
39.48804	0.36 #	20.7	12.0	1982	34	170.3	130.0	1.9	0.57	0.08	13.9	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.60175	0.39 #	16.7	12.1	1599	37	170.8	130.1	2.6	0.57	0.08	11.0	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.71122	0.41 #	29	12.1	2777	39	171.2	130.3	1.5	0.57	0.08	20.0	2.58	0.88	22.7	2.53	24.2	n/a	n/a	n/a	2.53	24.17	2.95	71.32	0.114	24.17	28	0.80	0.95	0.12	1.43
39.82112	0.37 #	22.6	12.1	2164	35	171.7	130.4	1.8	0.57	0.08	15.3	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.93229	0.38 #	27.6	12.2	2643	36	172.2	130.5	1.5	0.57	0.08	18.9	2.60	0.88	21.5	2.55	23.0	n/a	n/a	n/a	2.55	22.98	3.03	69.60	0.111	22.98	27	0.80	0.95	0.11	1.40
40.04177	0.36 #	32.2	12.2	3083	34	172.7	130.7	1.2	0.57	0.08	22.3	2.49	0.88	25.3	2.44	26.8	n/a	n/a	n/a	2.44	26.80	2.48	66.34	0.107	26.80	30	0.80	0.95	0.11	1.35
40.15125	0.33 #	23.3	12.2	2231	32	173.1	130.8	1.5	0.57	0.08	15.7	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.25945	0.31 #	28.4	12.3	2720	30	173.6	131.0	1.2	0.57	0.08	19.4	2.53	0.88	22.1	2.48	23.6	n/a	n/a	n/a	2.48	23.61	2.69	63.56	0.104	23.61	28	0.80	0.95	0.11	1.30
40.36766	0.29 #	24.4	12.3	2337	28	174.1	131.1	1.3	0.57	0.08	16.5	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.65509	0.34 #	15.8	12.4	1513	33	175.3	131.5	2.4	0.57	0.08	10.2	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.76921	0.37 #	12.4	12.4	1187	35	175.8	131.7	3.5	0.57	0.08	7.7	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.88165	0.33 7	7.2	12.5	689	32	176.3	131.8	6.2	0.57	0.08	3.9	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.99282	0.35 #	10.3	12.5	986	34	176.8	131.9	4.1	0.57	0.08	6.1	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.10526	0.38 #	20.1	12.5	1925	36	177.3	132.1	2.1	0.57	0.08	13.2	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.21558	0.43 #	38.1	12.6	3648	41	177.7	132.2	1.2	0.57	0.08	26.2	2.43	0.88	30.0	2.38	31.5	n/a	n/a	n/a	2.38	31.52	2.22	69.93	0.112	31.52	32	0.80	0.95	0.11	1.39
41.32336	0.36 #	65.6	12.6	6282	34	178.2	132.4	0.6	0.57	0.08	46.1	2.05	0.87	52.7	2.00	54.2	n/a	n/a	n/a	2.00	54.24	1.30	70.52	0.113	54.24	42	0.79	0.95	0.11	1.40
41.42692	0.35 #	81.5	12.6	7804	34	178.6	132.5	0.4	0.57	0.08	57.5	1.92	0.87	65.8	1.86	67.4	n/a	n/a	n/a	1.86	67.35	1.16	77.88	0.124	67.35	47	0.77	0.94	0.12	1.53
41.53259	0.32 #	77.9	12.7	7460	31	179.1	132.7	0.4	0.57	0.08	54.9	1.93	0.87	62.8	1.87	64.3	n/a	n/a	n/a	1.87	64.34	1.16	74.93	0.119	64.34	46	0.77	0.94	0.12	1.47
41.63869	0.3 #	69.3	12.7	6636	29	179.6	132.8	0.4	0.57	0.08	48.6	1.98	0.87	55.7	1.93	57.2	n/a	n/a	n/a	1.93	57.21	1.22	69.75	0.112	57.21	43	0.78	0.94	0.11	1.38
41.74563	0.3 #	64.3	12.7	6157	29	180.0	132.9	0.5	0.57	0.08	45.0	2.03	0.87	51.5	1.98	53.1	n/a	n/a	n/a	1.98	53.05	1.27	67.37	0.108	53.05	42	0.79	0.94	0.11	1.34
41.85341	0.27 #	65.6	12.8	6282	26	180.5	133.1	0.4	0.57	0.08	45.8	2.00	0.87	52.5	1.94	54.1	n/a	n/a	n/a	1.94	54.10	1.23	66.70	0.108	54.10	42	0.79	0.94	0.11	1.33
41.96162	0.27 #	72.2	12.8	6914	26	181.0	133.2	0.4	0.57	0.08	50.5	1.94	0.87	57.9	1.89	59.5	n/a	n/a	n/a	1.89	59.51	1.18	70.03	0.112	59.51	44	0.78	0.94	0.11	1.38
42.07025	0.27 #	90.8	12.8	8695	26	181.4	133.4	0.3	0.57	0.08	63.8	1.81	0.87	73.2	1.75	74.8	n/a	n/a	n/a	1.75	74.80	1.07	80.27	0.128	74.80	50	0.75	0.93	0.13	1.57
42.17466	0.25 #	85.4	12.9	8178	24	181.9	133.5	0.3	0.57	0.08	59.9	1.83	0.87	68.7	1.77	70.3	n/a	n/a	n/a	1.77	70.31	1.09	76.56	0.122	70.31	48	0.76	0.94	0.12	1.49
42.28075	0.25 #	91.6	12.9	8772	24	182.3	133.7	0.3	0.57	0.08	64.3	1.79	0.87	73.8	1.73	75.4	n/a	n/a	n/a	1.73	75.38	1.06	79.98	0.128	75.38	50	0.75	0.93	0.13	1.56
42.38558	0.29 #	87.3	12.9	8360	28	182.8	133.8	0.3	0.57	0.08	61.1	1.84	0.87	70.2	1.79	71.8	n/a	n/a	n/a	1.79	71.80	1.10	78.88	0.126	71.80	49	0.76	0.93	0.13	1.53
42.49125	0.4 #	77.9	13.0	7460	38	183.2	133.9	0.5	0.57	0.08	54.3	1.97	0.87	62.5	1.92	64.0	n/a	n/a	n/a	1.92	64.04	1.21	77.43	0.123	64.04	46	0.77	0.94	0.12	1.51
42.5965	0.41 #	64.4	13.0	6167	39	183.7	134.1	0.7	0.57	0.08	44.6	2.10	0.87	51.3	2.04	52.9	n/a	n/a	n/a	2.04	52.91	1.36	71.94	0.115	52.91	42	0.79	0.94	0.12	1.41
42.70302	0.39 #	56.7	13.0	5430	37	184.1	134.2	0.7	0.57	0.08	39.1	2.16	0.87	45.0	2.11	46.6	n/a	n/a	n/a	2.11	46.56	1.47	68.58	0.110	46.56	39	0.80	0.95	0.11	1.36
42.80869	0.35 #	61	13.0	5841	34	184.6	134.3	0.6	0.57	0.08	42.1	2.10	0.87	48.5	2.04	50.1	n/a	n/a	n/a	2.04	50.07	1.36	68.03	0.109	50.07	41	0.80	0.94	0.11	1.35
42.91267	0.35 #	77.2	13.1	7393	34	185.1	134.5	0.5	0.57	0.08	53.6	1.95	0.87	61.7	1.90	63.3	n/a	n/a	n/a	1.90	63.33	1.19	75.26	0.120	63.33	46	0.77	0.94	0.12	1.46
43.01538	0.33 #	64.3	13.1	6157	32	185.5	134.6	0.5	0.57	0.08	44.4	2.05	0.87	51.1	2.00	52.7	n/a	n/a	n/a	2.00	52.72	1.30	68.41	0.110	52.72	42	0.79	0.94	0.11	1.35
43.11979	0.38 #	65	13.1	6224	36	185.9	134.8	0.6	0.57	0.08	44.8	2.08	0.87	51.7	2.02	53.3	n/a	n/a	n/a	2.02	53.27	1.33	70.79	0.113	53.27	42	0.79	0.94	0.11	1.38
43.2225	0.33 #	55.9	13.2	5353	32	186.4	134.9	0.6	0.57	0.08	38.3	2.14	0.87	44.2	2.08	45.8	n/a	n/a	n/a	2.08	45.79	1.43	65.30	0.106	45.79	39	0.80	0.94	0.11	1.30
43.32606	0.34 #	50.1	13.2	4798	33	186.8	135.0	0.7	0.57	0.08	34.1	2.21	0.87	39.4	2.16	41.0	n/a	n/a	n/a	2.16	41.02	1.57	64.36	0.105	41.02	37	0.80	0.94	0.11	1.29
43.42582	0.29 #	52.2	13.2	4999	28	187.3	135.2	0.6	0.57	0.08	35.6	2.15	0.87	41.1	2.10	42.7	n/a	n/a	n/a	2.10	42.71	1.45	62.10	0.102	42.71	37	0.80	0.94	0.10	1.25
43.52811	0.23 #	44.4	13.3	4252	22	187.7	135.3	0.5	0.57	0.08	30.0	2.21	0.87	34.7	2.15	36.3	n/a	n/a	n/a	2.15	36.31	1.56	56.58	0.097	36.31	35	0.80	0.94	0.10	1.19
43.62786	0.2 #	36.4	13.3	3486	19	188.1	135.4	0.6	0.57	0.08	24.3	2.30	0.86	28.1	2.25	29.8	n/a	n/a	n/a	2.25	29.76	1.79	53.29	0.094	29.76	31	0.80	0.94	0.10	1.15
43.89077	0.2 #	22.5	13.4	2155	19	189.3	135.8	1.0	0.57	0.08	14.5	2.61	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.99645	0.2 #	26.4	13.4	2528	19	189.7	135.9	0.8	0.57	0.08	17.2	2.51	0.86	19.9	2.45	21.5	n/a	n/a	n/a	2.45	21.54	2.52	54.33	0.095	21.54	27	0.80	0.94	0.10	1.16
44.09958	0.16 #	34.4	13.4	3294	15	190.2	136.1	0.5	0.57	0.08	22.8	2.30	0.86	26.4	2.24	28.1	n/a	n/a	n/a	2.24	28.06	1.78	49.85	0.092	28.06	30	0.80	0.94	0.09	1.12

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-8)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{cIN} n=.5	C_Q n=.7	q_{cIN} n=.7	I_c n=.7	I_c[5]	q_{cIN}	K_c[5]	$(q_{cIN})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
44.20272	0.21 #	43.6	13.5	4175	20	190.6	136.2	0.5	0.57	0.08	29.3	2.21	0.86	33.9	2.15	35.5	n/a	n/a	n/a	2.15	35.54	1.55	55.04	0.096	35.54	34	0.80	0.94	0.10	1.16
44.30754	0.25 #	37.3	13.5	3572	24	191.1	136.3	0.7	0.57	0.08	24.8	2.34	0.86	28.8	2.28	30.4	n/a	n/a	n/a	2.28	30.39	1.88	57.15	0.097	30.39	32	0.80	0.94	0.10	1.19
44.41195	0.35 #	33.9	13.5	3246	34	191.5	136.5	1.1	0.57	0.08	22.4	2.47	0.86	26.0	2.41	27.6	n/a	n/a	n/a	2.41	27.61	2.36	65.09	0.106	27.61	30	0.80	0.94	0.11	1.29
44.51635	0.34 #	23.4	13.6	2241	33	192.0	136.6	1.6	0.57	0.08	15.0	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.62118	0.27 #	22	13.6	2107	26	192.4	136.7	1.4	0.57	0.08	14.0	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.72516	0.28 #	36	13.6	3447	27	192.9	136.9	0.8	0.57	0.08	23.8	2.38	0.86	27.6	2.32	29.3	n/a	n/a	n/a	2.32	29.27	2.03	59.46	0.100	29.27	31	0.80	0.94	0.10	1.21
44.83126	0.26 #	41.1	13.7	3936	25	193.3	137.0	0.7	0.57	0.08	27.3	2.29	0.86	31.8	2.23	33.4	n/a	n/a	n/a	2.23	33.40	1.74	58.00	0.098	33.40	33	0.80	0.94	0.10	1.19
44.93608	0.29 #	33.1	13.7	3170	28	193.8	137.2	0.9	0.57	0.08	21.7	2.44	0.86	25.2	2.39	26.9	n/a	n/a	n/a	2.39	26.89	2.26	60.64	0.101	26.89	30	0.80	0.94	0.10	1.22
45.04176	0.26 #	26.6	13.7	2547	25	194.2	137.3	1.1	0.57	0.08	17.1	2.56	0.86	19.9	2.50	21.6	n/a	n/a	n/a	2.50	21.60	2.78	59.96	0.100	21.60	27	0.80	0.94	0.10	1.21
45.14954	0.28 #	28	13.8	2681	27	194.7	137.4	1.1	0.57	0.08	18.1	2.54	0.86	21.1	2.49	22.7	n/a	n/a	n/a	2.49	22.72	2.69	61.22	0.101	22.72	27	0.80	0.94	0.10	1.23
45.25817	0.26 #	22.3	13.8	2135	25	195.2	137.6	1.3	0.57	0.08	14.1	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.36511	0.26 #	21.1	13.8	2021	25	195.6	137.7	1.4	0.57	0.08	13.2	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.47332	0.29 #	18.9	13.9	1810	28	196.1	137.9	1.7	0.57	0.08	11.7	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.58153	0.27 #	14.3	13.9	1369	26	196.6	138.0	2.2	0.57	0.08	8.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.69312	0.29 #	15.7	13.9	1503	28	197.0	138.2	2.1	0.57	0.08	9.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.80429	0.3 9	9.8	14.0	938	29	197.5	138.3	3.9	0.57	0.08	5.4	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.91504	0.31 #	11	14.0	1053	30	198.0	138.5	3.5	0.57	0.08	6.2	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.0262	0.3 8	8.2	14.0	785	29	198.5	138.6	4.9	0.57	0.08	4.2	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.13821	0.29 #	22.9	14.1	2193	28	199.0	138.8	1.4	0.57	0.08	14.4	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.24811	0.28 #	23.6	14.1	2260	27	199.4	138.9	1.3	0.57	0.08	14.8	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.3597	0.32 #	19.7	14.1	1886	31	199.9	139.0	1.8	0.57	0.08	12.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.4696	0.35 #	13.8	14.2	1321	34	200.4	139.2	3.0	0.57	0.08	8.1	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.58204	0.34 9	9.1	14.2	871	33	200.9	139.3	4.9	0.57	0.08	4.8	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.69405	0.26 #	10.8	14.2	1034	25	201.4	139.5	3.0	0.57	0.08	6.0	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.80648	0.23 8	8.6	14.3	824	22	201.8	139.6	3.5	0.57	0.08	4.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.91089	0.25 #	10.4	14.3	996	24	202.3	139.8	3.0	0.57	0.08	5.7	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.96626	0.26 #	13	14.3	1245	25	202.5	139.8	2.4	0.57	0.08	7.5	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.08673	0.29 #	16.7	14.4	1599	28	203.1	140.0	2.0	0.57	0.08	10.0	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.20677	0.28 #	15	14.4	1436	27	203.6	140.2	2.2	0.57	0.08	8.8	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.32513	0.25 #	20.7	14.4	1982	24	204.1	140.3	1.3	0.57	0.08	12.7	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.44305	0.3 #	35.5	14.5	3399	29	204.6	140.5	0.9	0.57	0.08	22.7	2.42	0.85	26.8	2.36	28.5	n/a	n/a	n/a	2.36	28.49	2.14	60.97	0.101	28.49	31	0.80	0.94	0.10	1.20
47.56141	0.38 #	22.8	14.5	2183	36	205.1	140.6	1.8	0.57	0.08	14.1	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.6823	0.33 #	12.3	14.5	1178	32	205.6	140.8	3.3	0.57	0.08	6.9	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.80318	0.31 #	11.5	14.6	1101	30	206.1	141.0	3.3	0.57	0.08	6.4	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.92746	0.33 7	7.8	14.6	747	32	206.7	141.1	5.8	0.57	0.08	3.8	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.05257	0.3 6	6.8	14.6	651	29	207.2	141.3	6.5	0.57	0.08	3.1	3.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.17684	0.3 6	6.7	14.7	642	29	207.8	141.4	6.6	0.57	0.08	3.1	3.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.30281	0.28 8	9.1	14.7	871	27	208.3	141.6	4.0	0.57	0.08	4.7	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.42707	0.29 5	5.4	14.8	517	28	208.8	141.8	9.0	0.57	0.08	2.2	3.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.55008	0.29 8	8.2	14.8	785	28	209.4	141.9	4.8	0.57	0.08	4.1	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.67266	0.31 4	4.7	14.8	450	30	209.9	142.1	12.4	0.57	0.08	1.7	3.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.79608	0.33 9	9.6	14.9	919	32	210.4	142.3	4.5	0.57	0.08	5.0	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.91993	0.36 #	10.3	14.9	986	34	211.0	142.4	4.4	0.57	0.08	5.4	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.04335	0.31 #	15	14.9	1436	30	211.5	142.6	2.4	0.57	0.09	8.6	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.1672	0.33 #	16.3	15.0	1561	32	212.0	142.8	2.3	0.57	0.09	9.4	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.29063	0.31 #	11	15.0	1053	30	212.6	142.9	3.5	0.57	0.09	5.9	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.41405	0.33 #	12.1	15.1	1159	32	213.1	143.1	3.3	0.57	0.09	6.6	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.5396	0.32 #	13.2	15.1	1264	31	213.6	143.2	2.9	0.57	0.09	7.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-9)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_O n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_O n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.23921	0.21 6	6.1	0.1	584	20	1.0	1.0	3.4	0.57	0.07	565.3	1.90	9.91	57.0	2.45	9.8	n/a	n/a	n/a	2.45	9.80	2.55	25.00	0.071	57.14	43	0.78	1.00	0.08	1.02
0.37663	0.24 6	5.9	0.1	565	23	1.6	1.6	4.1	0.57	0.07	346.9	2.05	7.90	43.9	2.59	9.5	n/a	n/a	n/a	2.59	9.48	3.25	30.77	0.076	44.04	38	0.80	1.00	0.08	1.09
0.51448	0.26 #	12.9	0.2	1235	25	2.2	2.2	2.0	0.57	0.07	555.8	1.69	6.76	82.2	2.18	20.7	n/a	n/a	n/a	2.18	20.73	1.61	33.46	0.078	82.39	52	0.74	1.00	0.08	1.13
0.65105	0.29 9	8.6	0.2	824	28	2.8	2.8	3.4	0.57	0.07	292.3	2.02	6.01	48.7	2.50	13.8	n/a	n/a	n/a	2.50	13.82	2.76	38.10	0.082	48.83	40	0.80	1.00	0.09	1.18
0.78889	0.26 8	8	0.2	766	25	3.4	3.4	3.3	0.57	0.07	224.2	2.06	5.46	41.1	2.54	12.9	n/a	n/a	n/a	2.54	12.85	2.98	38.30	0.082	41.26	37	0.80	1.00	0.09	1.18
0.92546	0.26 7	7.2	0.3	689	25	4.0	4.0	3.6	0.57	0.07	171.8	2.17	5.04	34.1	2.63	11.6	9.6	11.6	2.99	2.99	11.57	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.06203	0.3 8	8.4	0.3	804	29	4.6	4.6	3.6	0.57	0.07	174.6	2.16	4.70	37.1	2.60	13.5	8.7	13.5	2.94	2.94	13.50	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.19479	0.33 #	15	0.4	1436	32	5.2	5.2	2.2	0.57	0.07	277.8	1.87	4.43	62.6	2.29	24.1	n/a	n/a	n/a	2.29	24.10	1.92	46.22	0.089	62.87	45	0.77	1.00	0.09	1.28
1.33178	0.32 #	10.1	0.4	967	31	5.7	5.7	3.2	0.57	0.07	167.4	2.13	4.20	39.9	2.54	16.2	n/a	n/a	n/a	2.54	16.23	2.99	48.58	0.090	40.09	36	0.80	1.00	0.10	1.31
1.46666	0.33 #	9.8	0.4	938	32	6.3	6.3	3.4	0.57	0.07	147.4	2.18	4.00	36.8	2.59	15.7	n/a	n/a	n/a	2.59	15.74	3.24	51.06	0.092	37.07	35	0.80	1.00	0.10	1.34
1.59984	0.31 #	15.6	0.5	1494	30	6.9	6.9	2.0	0.57	0.07	215.5	1.90	3.83	56.2	2.30	25.1	n/a	n/a	n/a	2.30	25.06	1.93	48.48	0.090	56.50	43	0.78	1.00	0.10	1.31
1.73386	0.28 #	10.7	0.5	1025	27	7.5	7.5	2.6	0.57	0.07	136.0	2.12	3.68	37.0	2.51	17.2	n/a	n/a	n/a	2.51	17.19	2.83	48.67	0.091	37.23	35	0.80	1.00	0.10	1.31
1.86704	0.28 #	11.4	0.6	1092	27	8.1	8.1	2.5	0.57	0.07	134.6	2.10	3.55	37.9	2.49	18.3	n/a	n/a	n/a	2.49	18.32	2.70	49.40	0.091	38.22	35	0.80	1.00	0.10	1.32
1.9998	0.26 6	6.1	0.6	584	25	8.6	8.6	4.3	0.57	0.07	66.7	2.48	3.43	19.5	2.86	9.8	5.6	9.8	3.10	3.10	9.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.13043	0.24 7	7.3	0.6	699	23	9.2	9.2	3.3	0.57	0.07	75.1	2.36	3.32	22.6	2.74	11.7	5.4	11.7	2.97	2.97	11.73	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.21823	0.23 1	0.7	0.7	67	22	9.6	9.6	38.3	0.57	0.07	6.0	3.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.35861	0.17 7	6.7	0.7	642	16	10.2	10.2	2.6	0.57	0.07	62.1	2.34	3.16	19.7	2.72	10.8	5.0	10.8	2.93	2.93	10.76	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.49179	0.18 2	2.4	0.8	230	17	10.7	10.7	7.9	0.57	0.07	20.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.622	0.26 5	5.3	0.8	508	25	11.3	11.3	5.0	0.57	0.07	43.9	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.75348	0.23 6	6.2	0.8	594	22	11.9	11.9	3.8	0.57	0.07	49.0	2.53	2.92	16.8	2.88	10.0	4.5	10.0	3.06	3.06	9.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.88454	0.24 4	4.4	0.9	421	23	12.4	12.4	5.6	0.57	0.07	32.9	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.01475	0.26 3	3.4	0.9	326	25	13.0	13.0	8.0	0.57	0.07	24.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.14369	0.21 9	8.8	1.0	843	20	13.6	13.6	2.4	0.57	0.07	61.2	2.33	2.73	22.4	2.66	14.1	4.1	14.1	2.82	2.82	14.14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.2756	0.17 5	4.6	1.0	440	16	14.1	14.1	3.8	0.57	0.07	30.2	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.40538	0.19 6	6.2	1.0	594	18	14.7	14.7	3.1	0.57	0.07	39.4	2.54	2.63	15.0	2.87	10.0	3.9	10.0	3.01	3.01	9.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.53601	0.17 3	3.3	1.1	316	16	15.2	15.2	5.4	0.57	0.07	19.7	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.66834	0.2 3	2.5	1.1	239	19	15.8	15.8	8.6	0.57	0.07	14.1	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.79855	0.17 3	2.8	1.2	268	16	16.4	16.4	6.5	0.57	0.07	15.4	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.92834	0.16 4	3.9	1.2	373	15	16.9	16.9	4.3	0.57	0.07	21.0	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.05982	0.18 4	3.8	1.2	364	17	17.5	17.5	5.0	0.57	0.07	19.8	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.19258	0.09 1	0.9	1.3	86	9	18.1	18.1	12.7	0.57	0.07	3.8	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.25673	0.04 3	2.9	1.6	278	4	22.7	22.7	1.5	0.57	0.07	11.3	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.47177	0.02 1	0.7	1.7	67	2	23.6	23.6	4.4	0.57	0.07	1.8	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.87681	0.05 2	2.1	1.8	201	5	25.3	25.3	2.7	0.57	0.07	6.9	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.28483	0.15 6	5.6	1.9	536	14	27.1	27.1	2.8	0.57	0.07	18.8	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.42056	0.15 1	1.5	2.0	144	14	27.7	27.7	12.4	0.57	0.07	4.2	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.55628	0.18 1	0.8	2.0	77	17	28.3	28.3	35.7	0.57	0.07	1.7	4.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.69243	0.18 6	5.9	2.0	565	17	28.9	28.9	3.2	0.57	0.07	18.6	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.82942	0.17 3	2.6	2.1	249	16	29.5	29.5	7.4	0.57	0.07	7.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.96515	0.16 5	4.9	2.1	469	15	30.0	30.0	3.5	0.57	0.07	14.6	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.10044	0.17 5	4.5	2.2	431	16	30.6	30.6	4.1	0.57	0.07	13.1	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.23489	0.17 3	3.2	2.2	306	16	31.2	31.2	5.9	0.57	0.07	8.8	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.37189	0.18 3	2.9	2.2	278	17	31.8	31.8	7.0	0.57	0.07	7.7	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.47538	0.2 6	6.5	2.3	622	19	32.2	32.2	3.2	0.57	0.07	18.3	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.61153	0.18 2	2	2.3	192	17	32.8	32.8	10.9	0.57	0.07	4.8	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.7481	0.19 5	4.9	2.4	469	18	33.4	33.4	4.2	0.57	0.07	13.0	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.88043	0.22 #	11.2	2.4	1073	21	34.0	34.0	2.0	0.57	0.07	30.6	2.50	1.73	17.7	2.70	18.0	2.1	18.0	2.69	2.69	17.99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.01573	0.23 #	13.1	2.4	1254	22	34.6	34.6	1.8	0.57	0.07	35.3	2.42	1.71	20.6	2.61	21.0	2.1	21.0	2.61	2.61	21.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-9)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
8.14891	0.31 #	17.1	2.5	1637	30	35.1	35.1	1.9	0.57	0.07	45.6	2.34	1.70	26.9	2.53	27.4	n/a	n/a	n/a	2.53	27.44	2.90	79.63	0.127	27.44	30	0.80	1.00	0.14	1.84
8.28039	0.35 #	20.5	2.5	1963	34	35.7	35.7	1.7	0.57	0.07	54.0	2.27	1.68	32.0	2.45	32.6	n/a	n/a	n/a	2.45	32.64	2.52	82.16	0.132	32.64	33	0.80	1.00	0.14	1.90
8.41187	0.42 #	27.9	2.6	2672	40	36.3	36.3	1.5	0.57	0.07	72.7	2.13	1.67	43.5	2.31	44.1	n/a	n/a	n/a	2.31	44.07	1.97	86.98	0.141	44.07	38	0.80	1.00	0.15	2.04
8.54038	0.49 #	29.5	2.6	2825	47	36.8	36.8	1.7	0.57	0.07	75.7	2.15	1.66	45.6	2.32	46.2	n/a	n/a	n/a	2.32	46.24	2.01	92.73	0.154	46.24	39	0.80	1.00	0.17	2.23
8.62691	0.54 #	27.6	2.6	2643	52	37.2	37.2	2.0	0.57	0.07	70.0	2.22	1.65	42.4	2.39	43.0	n/a	n/a	n/a	2.39	43.05	2.26	97.26	0.166	43.05	38	0.80	1.00	0.18	2.39
8.75711	0.59 #	23	2.7	2202	56	37.8	37.8	2.6	0.57	0.07	57.3	2.37	1.64	35.0	2.53	35.6	n/a	n/a	n/a	2.53	35.61	2.91	103.65	0.184	35.61	34	0.80	1.00	0.20	2.65
8.88733	0.53 #	21.6	2.7	2068	51	38.3	38.3	2.5	0.57	0.07	53.0	2.38	1.63	32.6	2.54	33.2	n/a	n/a	n/a	2.54	33.19	2.98	98.75	0.170	33.19	33	0.80	1.00	0.18	2.45
9.01669	0.43 #	19.7	2.7	1886	41	38.9	38.9	2.2	0.57	0.07	47.5	2.38	1.61	29.4	2.54	30.1	n/a	n/a	n/a	2.54	30.05	2.99	89.91	0.148	30.05	31	0.80	1.00	0.16	2.13
9.14605	0.34 #	20.7	2.8	1982	33	39.4	39.4	1.7	0.57	0.07	49.3	2.29	1.60	30.7	2.45	31.4	n/a	n/a	n/a	2.45	31.36	2.54	79.66	0.127	31.36	32	0.80	1.00	0.14	1.84
9.27541	0.28 #	19.7	2.8	1886	27	40.0	40.0	1.5	0.57	0.07	46.2	2.27	1.59	29.0	2.44	29.6	n/a	n/a	n/a	2.44	29.63	2.47	73.22	0.117	29.63	31	0.80	1.00	0.12	1.68
9.40053	0.22 #	20.9	2.9	2001	21	40.5	40.5	1.1	0.57	0.07	48.4	2.18	1.58	30.6	2.35	31.2	n/a	n/a	n/a	2.35	31.23	2.10	65.72	0.106	31.23	32	0.80	1.00	0.11	1.54
9.52607	0.17 #	16.9	2.9	1618	16	41.1	41.1	1.0	0.57	0.07	38.4	2.25	1.57	24.4	2.42	25.1	n/a	n/a	n/a	2.42	25.08	2.40	60.09	0.100	25.08	29	0.80	1.00	0.11	1.45
9.65204	0.15 #	15.6	2.9	1494	14	41.6	41.6	1.0	0.57	0.07	34.9	2.28	1.56	22.4	2.44	23.0	n/a	n/a	n/a	2.44	23.00	2.50	57.53	0.098	23.00	27	0.80	1.00	0.10	1.41
9.77589	0.19 8	8.4	3.0	804	18	42.2	42.2	2.4	0.57	0.07	18.1	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.90186	0.17 8	8.4	3.0	804	16	42.7	42.7	2.1	0.57	0.07	17.8	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.02782	0.16 2	1.8	3.1	172	15	43.2	43.2	11.9	0.57	0.07	3.0	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.15294	0.17 1	0.9	3.1	86	16	43.8	43.8	38.4	0.57	0.07	1.0	4.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.40361	0.18 4	4.3	3.2	412	17	44.9	44.9	4.7	0.57	0.07	8.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.5317	0.17 5	5.3	3.2	508	16	45.4	45.4	3.5	0.57	0.07	10.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.77939	0.2 1	1.1	3.3	105	19	46.5	46.5	32.5	0.57	0.07	1.3	4.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.90578	0.18 6	6.4	3.3	613	17	47.0	47.0	3.0	0.57	0.07	12.0	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.03006	0.21 #	13	3.4	1245	20	47.6	47.5	1.7	0.57	0.07	25.2	2.52	1.46	17.3	2.66	17.9	1.7	20.9	2.59	2.59	20.89	3.27	68.30	0.110	17.95	24	0.80	1.00	0.12	1.58
11.15687	0.25 8	8.1	3.4	776	24	48.1	47.6	3.3	0.57	0.07	15.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.28157	0.27 #	11.1	3.4	1063	26	48.6	47.8	2.5	0.57	0.07	21.2	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.40754	0.29 8	8.2	3.5	785	28	49.2	48.0	3.8	0.57	0.07	15.3	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.53477	0.25 #	12.1	3.5	1159	24	49.7	48.1	2.2	0.57	0.07	23.0	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.66117	0.26 #	9.7	3.6	929	25	50.3	48.3	2.8	0.57	0.07	18.2	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.70019	0.25 8	8.4	3.6	804	24	50.5	48.4	3.2	0.57	0.07	15.6	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.82785	0.24 8	8.2	3.6	785	23	51.0	48.5	3.1	0.57	0.07	15.1	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.95806	0.25 2	1.8	3.6	172	24	51.6	48.7	19.8	0.57	0.07	2.5	3.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.08743	0.23 6	6.1	3.7	584	22	52.1	48.9	4.1	0.57	0.07	10.9	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.34572	0.17 1	1.1	3.8	105	16	53.2	49.2	31.2	0.57	0.07	1.1	4.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.47636	0.19 2	1.7	3.8	163	18	53.8	49.4	16.7	0.57	0.07	2.2	3.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.60444	0.23 6	6.5	3.8	622	22	54.4	49.6	3.9	0.57	0.08	11.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.73126	0.24 #	15.5	3.9	1484	23	54.9	49.7	1.6	0.57	0.08	28.7	2.47	1.43	20.1	2.59	20.9	n/a	n/a	n/a	2.59	20.91	3.29	68.72	0.110	20.91	26	0.80	1.00	0.12	1.57
12.85893	0.24 #	12	3.9	1149	23	55.5	49.9	2.1	0.57	0.08	21.9	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.98617	0.27 #	14.9	4.0	1427	26	56.0	50.1	1.9	0.57	0.08	27.4	2.52	1.42	19.2	2.65	20.0	1.6	23.1	2.58	2.58	23.07	3.23	74.49	0.118	20.03	26	0.80	1.00	0.13	1.69
13.11213	0.26 #	14	4.0	1341	25	56.5	50.2	1.9	0.57	0.08	25.6	2.55	1.42	18.0	2.68	18.8	1.6	21.6	2.61	2.61	21.62	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.23895	0.25 #	18.2	4.0	1743	24	57.1	50.4	1.4	0.57	0.08	33.4	2.38	1.42	23.6	2.51	24.4	n/a	n/a	n/a	2.51	24.39	2.80	68.31	0.110	24.39	28	0.80	1.00	0.12	1.56
13.36407	0.3 #	14.9	4.1	1427	29	57.6	50.6	2.1	0.57	0.08	27.1	2.56	1.42	19.1	2.68	19.9	1.6	22.9	2.61	2.61	22.91	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.48961	0.3 #	12.8	4.1	1226	29	58.2	50.7	2.5	0.57	0.08	23.0	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.61516	0.24 8	7.9	4.1	757	23	58.7	50.9	3.3	0.57	0.08	13.7	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.74113	0.21 8	8.2	4.2	785	20	59.3	51.1	2.8	0.57	0.08	14.2	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.86752	0.23 9	8.7	4.2	833	22	59.8	51.2	2.8	0.57	0.08	15.1	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.99179	0.25 #	10.4	4.3	996	24	60.3	51.4	2.6	0.57	0.08	18.2	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.11691	0.23 6	6.4	4.3	613	22	60.9	51.6	4.0	0.57	0.08	10.7	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.24118	0.22 7	7.4	4.3	709	21	61.4	51.7	3.3	0.57	0.08	12.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.36715	0.24 7	7.5	4.4	718	23	62.0	51.9	3.5	0.57	0.08	12.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-9)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
14.49057	0.23 #	11.9	4.4	1140	22	62.5	52.1	2.0	0.57	0.08	20.7	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.61697	0.22 4	3.8	4.5	364	21	63.0	52.2	7.0	0.57	0.08	5.8	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.74124	0.18 4	4.5	4.5	431	17	63.6	52.4	4.7	0.57	0.08	7.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.86593	0.16 3	3.3	4.5	316	15	64.1	52.5	6.1	0.57	0.08	4.8	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.93591	0.16 4	4.4	4.6	421	15	64.4	52.6	4.3	0.57	0.08	6.8	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.0763	0.18 1	1.2	4.6	115	17	65.0	52.8	34.5	0.57	0.08	0.9	4.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.20694	0.22 3	2.7	4.6	259	21	65.6	53.0	10.9	0.57	0.08	3.6	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.33715	0.18 2	2.4	4.7	230	17	66.1	53.2	10.5	0.57	0.08	3.1	3.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.46778	0.28 5	5.4	4.7	517	27	66.7	53.3	6.0	0.57	0.08	8.4	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.59841	0.38 8	8.6	4.8	824	36	67.3	53.5	4.8	0.57	0.08	14.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.73032	0.48 9	9.5	4.8	910	46	67.8	53.7	5.5	0.57	0.08	15.7	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.86095	0.58 #	12.1	4.8	1159	56	68.4	53.9	5.1	0.57	0.08	20.2	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.99158	0.68 6	5.7	4.9	546	65	69.0	54.0	13.7	0.57	0.08	8.8	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.12476	0.83 #	12	4.9	1149	79	69.5	54.2	7.4	0.57	0.08	19.9	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.25243	0.97 #	12.5	5.0	1197	93	70.1	54.4	8.2	0.57	0.08	20.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.35719	1.09 #	15.1	5.0	1446	104	70.5	54.5	7.6	0.57	0.08	25.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.4891	1.22 #	19.1	5.0	1829	117	71.1	54.7	6.6	0.57	0.08	32.1	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.58283	1.24 #	17	5.1	1628	119	71.5	54.8	7.6	0.57	0.08	28.4	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.74273	1.27 #	18.4	5.1	1762	122	72.2	55.0	7.2	0.57	0.08	30.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.83943	1.25 #	19.3	5.1	1848	120	72.6	55.2	6.7	0.57	0.08	32.2	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.93316	1.23 #	19.1	5.2	1829	118	73.0	55.3	6.7	0.57	0.08	31.8	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.0638	1.23 #	14.7	5.2	1408	118	73.6	55.5	8.8	0.57	0.08	24.1	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.16559	1.2 #	15.2	5.2	1456	115	74.0	55.6	8.3	0.57	0.08	24.9	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.28774	1.13 #	13.5	5.3	1293	108	74.6	55.8	8.9	0.57	0.08	21.9	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.40777	1.09 #	12.7	5.3	1216	104	75.1	55.9	9.1	0.57	0.08	20.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.52738	1.04 #	11.1	5.3	1063	100	75.6	56.1	10.1	0.57	0.08	17.6	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.64741	1.01 #	12.3	5.4	1178	97	76.1	56.2	8.8	0.57	0.08	19.6	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.76744	0.96 #	12.7	5.4	1216	92	76.6	56.4	8.1	0.57	0.08	20.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.88577	0.9 #	10.2	5.5	977	86	77.1	56.5	9.6	0.57	0.08	15.9	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.00453	0.91 #	14.2	5.5	1360	87	77.6	56.7	6.8	0.57	0.08	22.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.12159	0.94 #	10.2	5.5	977	90	78.1	56.9	10.0	0.57	0.08	15.8	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.22296	0.93 #	12.9	5.6	1235	89	78.6	57.0	7.7	0.57	0.08	20.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.34002	0.92 #	14.5	5.6	1389	88	79.1	57.1	6.7	0.57	0.08	22.9	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.45835	0.92 #	11.1	5.6	1063	88	79.6	57.3	9.0	0.57	0.08	17.2	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.57287	0.94 #	10.3	5.7	986	90	80.1	57.5	9.9	0.57	0.08	15.8	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.68739	0.98 #	13.2	5.7	1264	94	80.6	57.6	7.9	0.57	0.08	20.5	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.80275	1.02 #	14.1	5.7	1350	98	81.1	57.8	7.7	0.57	0.08	22.0	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.91769	1.07 #	11.2	5.8	1073	102	81.6	57.9	10.3	0.57	0.08	17.1	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.03051	1.13 #	13	5.8	1245	108	82.1	58.1	9.3	0.57	0.08	20.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.14291	1.19 #	15.6	5.8	1494	114	82.6	58.2	8.1	0.57	0.08	24.2	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.257	1.25 #	12.7	5.9	1216	120	83.0	58.4	10.6	0.57	0.08	19.4	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.36982	1.3 #	12	5.9	1149	124	83.5	58.5	11.7	0.57	0.08	18.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.48052	1.34 #	14.3	5.9	1369	128	84.0	58.7	10.0	0.57	0.08	21.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.59292	1.36 #	15.4	6.0	1475	130	84.5	58.8	9.4	0.57	0.08	23.6	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.70489	1.37 #	17.3	6.0	1657	131	85.0	58.9	8.3	0.57	0.08	26.7	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.81389	1.39 #	13.1	6.0	1254	133	85.4	59.1	11.4	0.57	0.08	19.8	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.92374	1.38 #	14.1	6.1	1350	132	85.9	59.2	10.5	0.57	0.08	21.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.03274	1.4 #	17.1	6.1	1637	134	86.4	59.4	8.6	0.57	0.08	26.1	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: RR(CPT-9)
GW Depth: 11.0 ft
GW Depth: 3.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_O n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_O n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{cl}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
20.1426	1.41 #	15.6	6.1	1494	135	86.9	59.5	9.6	0.57	0.08	23.6	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.2516	1.41 #	14.1	6.2	1350	135	87.3	59.7	10.7	0.57	0.08	21.2	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.35848	1.42 #	18.1	6.2	1733	136	87.8	59.8	8.3	0.57	0.08	27.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.46621	1.43 #	14.8	6.2	1417	137	88.3	60.0	10.3	0.57	0.08	22.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.57309	1.41 #	13.6	6.3	1302	135	88.7	60.1	11.1	0.57	0.08	20.2	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.25607	0.24 #	12.7	0.1	1216	23	1.1	1.1	1.9	0.57	0.07	1100.3	1.56	9.58	114.9	2.06	20.4	n/a	n/a	n/a	2.06	20.40	1.38	28.17	0.073	114.97	61	0.69	1.00	0.08	1.06
0.39747	0.46 #	19.5	0.1	1867	44	1.7	1.7	2.4	0.57	0.07	1088.4	1.65	7.69	141.6	2.07	31.3	n/a	n/a	n/a	2.07	31.33	1.40	43.87	0.087	141.69	68	0.66	1.00	0.09	1.25
0.53421	0.66 #	36.7	0.2	3514	63	2.3	2.3	1.8	0.57	0.07	1524.6	1.50	6.63	229.9	1.85	59.0	n/a	n/a	n/a	1.85	58.96	1.14	67.29	0.108	230.03	87	0.60	1.00	0.12	1.57
0.6701	0.97 #	49.9	0.2	4778	93	2.9	2.9	1.9	0.57	0.07	1652.6	1.53	5.92	279.1	1.82	80.2	n/a	n/a	n/a	1.82	80.17	1.12	90.14	0.148	279.26	96	0.60	1.00	0.16	2.14
0.80344	1.11 #	52	0.2	4980	106	3.5	3.5	2.1	0.57	0.07	1436.2	1.58	5.41	265.6	1.87	83.5	n/a	n/a	n/a	1.87	83.54	1.16	97.03	0.165	265.76	93	0.60	1.00	0.18	2.38
0.93423	1.24 #	59.8	0.3	5726	119	4.0	4.0	2.1	0.57	0.07	1420.4	1.57	5.02	283.2	1.84	96.1	n/a	n/a	n/a	1.84	96.08	1.14	109.51	0.202	283.43	96	0.60	1.00	0.22	2.92
1.06503	1.32 #	56	0.3	5363	126	4.6	4.6	2.4	0.57	0.07	1166.6	1.64	4.70	248.4	1.92	90.0	n/a	n/a	n/a	1.92	89.97	1.21	108.85	0.200	248.59	90	0.60	1.00	0.21	2.89
1.19327	1.33 #	54.1	0.4	5181	127	5.1	5.1	2.5	0.57	0.07	1005.8	1.68	4.44	226.7	1.96	86.9	n/a	n/a	n/a	1.96	86.92	1.25	108.65	0.199	226.88	86	0.60	1.00	0.21	2.88
1.31939	1.23 #	42.8	0.4	4099	118	5.7	5.7	2.9	0.57	0.07	719.4	1.79	4.22	170.5	2.09	68.8	n/a	n/a	n/a	2.09	68.76	1.43	98.37	0.169	170.70	75	0.63	1.00	0.18	2.44
1.44594	1.11 #	36	0.4	3447	106	6.2	6.2	3.1	0.57	0.07	551.9	1.86	4.03	136.9	2.17	57.8	n/a	n/a	n/a	2.17	57.84	1.59	92.12	0.153	137.15	67	0.66	1.00	0.16	2.21
1.57333	0.96 #	25.3	0.5	2423	92	6.8	6.8	3.8	0.57	0.07	356.1	2.02	3.86	92.1	2.35	40.6	n/a	n/a	n/a	2.35	40.65	2.11	85.70	0.139	92.40	55	0.72	1.00	0.15	2.00
1.69691	0.78 #	24.9	0.5	2384	75	7.3	7.3	3.1	0.57	0.07	324.8	1.97	3.72	87.3	2.30	40.0	n/a	n/a	n/a	2.30	40.01	1.95	77.87	0.124	87.57	54	0.73	1.00	0.13	1.79
1.82048	0.61 #	21.8	0.6	2088	58	7.9	7.9	2.8	0.57	0.07	264.9	1.97	3.59	73.7	2.31	35.0	n/a	n/a	n/a	2.31	35.02	1.99	69.77	0.112	74.02	49	0.75	1.00	0.12	1.61
1.94363	0.48 #	16.2	0.6	1551	46	8.4	8.4	3.0	0.57	0.07	184.1	2.08	3.48	52.9	2.43	26.0	n/a	n/a	n/a	2.43	26.03	2.45	63.81	0.104	53.23	42	0.79	1.00	0.11	1.51
2.06508	0.44 #	11.1	0.6	1063	42	8.9	8.9	4.0	0.57	0.07	118.4	2.30	3.37	35.1	2.65	17.8	5.5	17.8	2.87	2.87	17.83	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.18483	0.39 #	9.6	0.7	919	37	9.4	9.4	4.1	0.57	0.07	96.6	2.36	3.28	29.4	2.71	15.4	5.3	15.4	2.93	2.93	15.42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.30204	0.35 #	14.5	0.7	1389	34	9.9	9.9	2.4	0.57	0.07	138.9	2.08	3.19	43.5	2.44	23.3	n/a	n/a	n/a	2.44	23.30	2.47	57.44	0.098	43.78	38	0.80	1.00	0.10	1.41
2.56574	0.32 #	18.9	0.8	1810	31	11.1	11.1	1.7	0.57	0.07	162.6	1.92	3.03	53.7	2.27	30.4	n/a	n/a	n/a	2.27	30.37	1.84	55.98	0.096	54.05	42	0.79	1.00	0.10	1.39
2.68465	0.3 #	18.6	0.8	1781	29	11.6	11.6	1.6	0.57	0.07	152.9	1.92	2.96	51.7	2.27	29.9	n/a	n/a	n/a	2.27	29.88	1.84	55.07	0.096	52.00	41	0.79	1.00	0.10	1.38
2.801	0.28 #	16.2	0.9	1551	27	12.1	12.1	1.7	0.57	0.07	127.4	2.00	2.90	44.0	2.34	26.0	n/a	n/a	n/a	2.34	26.03	2.08	54.14	0.095	44.34	38	0.80	1.00	0.10	1.37
2.91736	0.27 #	22.5	0.9	2155	26	12.6	12.6	1.2	0.57	0.07	170.3	1.80	2.84	60.0	2.13	36.1	n/a	n/a	n/a	2.13	36.15	1.52	54.99	0.095	60.35	44	0.78	1.00	0.10	1.38
3.03371	0.27 #	21.4	0.9	2049	26	13.1	13.1	1.3	0.57	0.07	155.6	1.84	2.78	55.9	2.17	34.4	n/a	n/a	n/a	2.17	34.38	1.60	55.06	0.096	56.29	43	0.79	1.00	0.10	1.38
3.15134	0.33 #	18.3	1.0	1752	32	13.6	13.6	1.8	0.57	0.07	128.0	2.01	2.73	46.9	2.33	29.4	n/a	n/a	n/a	2.33	29.40	2.05	60.17	0.100	47.23	39	0.80	1.00	0.11	1.45
3.26812	0.38 #	12.5	1.0	1197	36	14.1	14.1	3.1	0.57	0.07	83.9	2.30	2.68	31.3	2.61	20.1	4.0	20.1	2.76	2.76	20.08	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.3849	0.38 #	15	1.0	1436	36	14.6	14.6	2.6	0.57	0.07	97.4	2.20	2.63	37.0	2.50	24.1	n/a	n/a	n/a	2.50	24.10	2.79	67.18	0.108	37.35	35	0.80	1.00	0.12	1.56
3.50422	0.38 #	17.1	1.1	1637	36	15.1	15.1	2.2	0.57	0.07	107.4	2.13	2.59	41.5	2.43	27.5	n/a	n/a	n/a	2.43	27.47	2.43	66.85	0.108	41.85	37	0.80	1.00	0.12	1.56
3.6227	0.39 #	17.3	1.1	1657	37	15.6	15.6	2.3	0.57	0.07	105.0	2.14	2.55	41.2	2.43	27.8	n/a	n/a	n/a	2.43	27.79	2.46	68.34	0.110	41.64	37	0.80	1.00	0.12	1.59
3.74245	0.39 #	19.1	1.1	1829	37	16.1	16.1	2.1	0.57	0.07	112.3	2.09	2.51	44.8	2.38	30.7	n/a	n/a	n/a	2.38	30.69	2.23	68.39	0.110	45.23	39	0.80	1.00	0.12	1.59
3.86433	0.41 #	21.2	1.2	2030	39	16.7	16.7	1.9	0.57	0.07	120.8	2.05	2.47	49.0	2.33	34.1	n/a	n/a	n/a	2.33	34.06	2.06	70.26	0.112	49.40	40	0.80	1.00	0.12	1.62
3.98748	0.42 #	20.2	1.2	1934	40	17.2	17.2	2.1	0.57	0.07	111.5	2.10	2.43	45.9	2.38	32.5	n/a	n/a	n/a	2.38	32.45	2.22	71.96	0.115	46.34	39	0.80	1.00	0.12	1.66
4.11105	0.38 #	10.9	1.3	1044	36	17.7	17.7	3.5	0.57	0.07	57.9	2.46	2.39	24.2	2.74	17.5	3.4	17.5	2.84	2.84	17.51	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.23632	0.34 #	11.1	1.3	1063	33	18.3	18.3	3.1	0.57	0.07	57.2	2.42	2.36	24.3	2.70	17.8	3.3	17.8	2.80	2.80	17.83	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.36414	0.28 6	5.8	1.3	555	27	18.8	18.8	5.0	0.57	0.07	28.5	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.49281	0.28 #	11.6	1.4	1111	27	19.4	19.4	2.5	0.57	0.07	54.3	2.36	2.29	24.6	2.63	18.6	3.2	18.6	2.73	2.73	18.64	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.61851	0.32 #	11.5	1.4	1101	31	19.9	19.9	2.8	0.57	0.07	77.6	2.41	2.26	24.1	2.68	18.5	3.1	18.5	2.77	2.77	18.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.74633	0.36 #	16.8	1.4	1609	34	20.5	20.5	2.2	0.57	0.07	60.1	2.22	2.22	34.9	2.48	27.0	n/a	n/a	n/a	2.48	26.99	2.66	71.72	0.114	35.33	34	0.80	1.00	0.12	1.65
4.8733	0.4 #	13.4	1.5	1283	38	21.0	21.0	3.0	0.57	0.07	90.9	2.40	2.20	27.4	2.65	21.5	3.0	21.5	2.73	2.73	21.53	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.99985	0.4 #	20.7	1.5	1982	38	21.6	21.6	2.0	0.57	0.07	45.8	2.14	2.17	41.9	2.39	33.3	n/a	n/a	n/a	2.39	33.26	2.26	75.09	0.119	42.41	37	0.80	1.00	0.13	1.73
5.12639	0.41 #	10.8	1.6	1034	39	22.1	22.1	3.9	0.57	0.07	64.9	2.56	2.14	21.4	2.80	17.4	2.9	17.4	2.87	2.87	17.35	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.25336	0.41 #	15.6	1.6	1494	39	22.7	22.7	2.7	0.57	0.07	53.1	2.34	2.11	30.7	2.58	25.1	n/a	n/a	n/a	2.58	25.06	3.19	79.94	0.128	31.18	32	0.80	1.00	0.14	1.84
5.37948	0.32 #	13.1	1.6	1254	31	23.2	23.2	2.5	0.57	0.07	27.2	2.38	2.09	25.4	2.62	21.0	2.8	21.0	2.69	2.69	21.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.50561	0.26 7	7	1.7	670	25	23.7	23.7	3.9	0.57	0.07	43.4	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.74723	0.27 #	11.5	1.8	1101	26	24.8	24.8	2.4	0.57	0.07	71.9	2.43	2.02	21.5	2.67	18.5	2.7	18.5	2.72	2.72	18.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.8759	0.33 #	19.3	1.8	1848	32	25.3	25.3	1.7	0.57	0.07	81.8	2.17	2.00	36.0	2.41	31.0	n/a	n/a	n/a	2.41	31.01	2.34	72.55	0.116	36.47	35	0.80	1.00	0.12	1.67
6.00669	0.4 #	22.4	1.8	2145	38	25.9	25.9	1.8	0.57	0.07	74.3	2.21	1.96	38.0	2.43	33.4	n/a	n/a	n/a	2.37	35.99	2.19	78.96	0.126	41.87	37	0.80	1.00	0.13	1.82
6.13579	0.42 #	20.8	1.9	1992	40	26.5	26.5	2.0	0.57	0.07	78.4	2.14	1.94	40.5	2.36	36.0	n/a	n/a	n/a	2.43	33.42	2.45	81.92	0.131	38.47	36	0.80	1.00	0.14	1.90
6.26361	0.38 #	22.4	1.9	2145	36	27.0	27.0	1.7	0.57	0.07	64.3	2.15	1.92	33.5	2.38	30.2	n/a	n/a	n/a	2.36	35.99	2.17	78.09	0.124	41.00	37	0.80	1.00	0.13	1.80
6.38973	0.26 #	18.8	1.9	1800	25	27.6	27.6	1.4	0.57	0.07										2.38	30.20	2.22	67.09	0.108	34.07	33	0.80	1.00	0.12	1.56

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.51797	0.28 #	18.8	2.0	1800	27	28.1	28.1	1.5	0.57	0.07	63.1	2.18	1.90	33.2	2.40	30.2	n/a	n/a	n/a	2.40	30.20	2.31	69.77	0.112	33.73	33	0.80	1.00	0.12	1.61
6.64707	0.29 #	18.1	2.0	1733	28	28.7	28.7	1.6	0.57	0.07	59.5	2.22	1.88	31.6	2.44	29.1	n/a	n/a	n/a	2.44	29.08	2.46	71.61	0.114	32.16	32	0.80	1.00	0.12	1.65
6.77446	0.3 #	20	2.1	1915	29	29.2	29.2	1.5	0.57	0.07	64.6	2.17	1.86	34.7	2.39	32.1	n/a	n/a	n/a	2.39	32.13	2.26	72.50	0.115	35.20	34	0.80	1.00	0.12	1.67
6.90228	0.26 #	15.8	2.1	1513	25	29.8	29.8	1.7	0.57	0.07	49.8	2.29	1.85	27.0	2.50	25.4	n/a	n/a	n/a	2.50	25.38	2.76	70.11	0.112	27.55	30	0.80	1.00	0.12	1.62
7.03053	0.24 #	17.2	2.1	1647	23	30.3	30.3	1.4	0.57	0.07	53.3	2.22	1.83	29.2	2.43	27.6	n/a	n/a	n/a	2.43	27.63	2.44	67.40	0.108	29.72	31	0.80	1.00	0.12	1.57
7.15708	0.23 #	20.2	2.2	1934	22	30.9	30.9	1.2	0.57	0.07	61.7	2.11	1.81	34.0	2.32	32.5	n/a	n/a	n/a	2.32	32.45	2.03	65.87	0.107	34.59	34	0.80	1.00	0.11	1.54
7.28489	0.25 #	18.6	2.2	1781	24	31.4	31.4	1.4	0.57	0.07	55.7	2.19	1.80	31.0	2.40	29.9	n/a	n/a	n/a	2.40	29.88	2.31	68.94	0.110	31.57	32	0.80	1.00	0.12	1.60
7.41356	0.21 #	20	2.3	1915	20	32.0	32.0	1.1	0.57	0.07	58.9	2.11	1.78	33.1	2.32	32.1	n/a	n/a	n/a	2.32	32.13	2.00	64.27	0.105	33.65	33	0.80	1.00	0.11	1.51
7.54096	0.27 #	16.6	2.3	1590	26	32.5	32.5	1.7	0.57	0.07	47.9	2.30	1.77	27.1	2.49	26.7	n/a	n/a	n/a	2.49	26.67	2.74	73.08	0.116	27.69	30	0.80	1.00	0.12	1.68
7.66836	0.37 #	21.9	2.3	2097	35	33.1	33.1	1.7	0.57	0.07	62.4	2.22	1.75	35.7	2.41	35.2	n/a	n/a	n/a	2.41	35.19	2.34	82.39	0.132	36.23	34	0.80	1.00	0.14	1.91
7.79575	0.4 #	16.2	2.4	1551	38	33.6	33.6	2.5	0.57	0.07	45.1	2.43	1.74	26.0	2.62	26.0	2.2	26.0	2.62	2.62	26.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.92442	0.35 #	13	2.4	1245	34	34.2	34.2	2.8	0.57	0.07	35.4	2.54	1.72	20.6	2.72	20.9	2.1	20.9	2.72	2.72	20.89	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.05139	0.3 #	11.6	2.5	1111	29	34.7	34.7	2.7	0.57	0.07	31.0	2.57	1.71	18.1	2.76	18.6	2.1	18.6	2.75	2.75	18.64	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.17964	0.32 #	11.4	2.5	1092	31	35.3	35.3	2.9	0.57	0.07	29.9	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.30746	0.39 #	20.2	2.5	1934	37	35.8	35.8	2.0	0.57	0.07	53.0	2.31	1.68	31.5	2.49	32.1	n/a	n/a	n/a	2.49	32.11	2.70	86.59	0.140	32.11	32	0.80	1.00	0.15	2.03
8.43358	0.44 #	25.5	2.6	2442	42	36.4	36.4	1.8	0.57	0.07	66.1	2.21	1.67	39.6	2.38	40.2	n/a	n/a	n/a	2.38	40.23	2.22	89.21	0.146	40.23	36	0.80	1.00	0.16	2.11
8.55927	0.36 #	26.4	2.6	2528	34	36.9	36.9	1.4	0.57	0.07	67.5	2.13	1.66	40.7	2.30	41.3	n/a	n/a	n/a	2.30	41.34	1.96	81.20	0.130	41.34	37	0.80	1.00	0.14	1.88
8.66714	0.37 #	19.5	2.6	1867	35	37.4	37.4	1.9	0.57	0.07	49.0	2.33	1.65	29.7	2.50	30.3	n/a	n/a	n/a	2.50	30.34	2.78	84.24	0.136	30.34	32	0.80	1.00	0.15	1.96
8.80982	0.38 #	22.5	2.7	2155	36	38.0	38.0	1.7	0.57	0.07	55.7	2.26	1.63	34.1	2.42	34.7	n/a	n/a	n/a	2.42	34.73	2.41	83.62	0.134	34.73	34	0.80	1.00	0.14	1.94
8.93764	0.3 #	25.6	2.7	2451	29	38.5	38.5	1.2	0.57	0.07	62.6	2.12	1.62	38.6	2.29	39.2	n/a	n/a	n/a	2.29	39.23	1.90	74.71	0.119	39.23	36	0.80	1.00	0.13	1.72
9.06716	0.29 #	15.1	2.8	1446	28	39.1	39.1	2.0	0.57	0.07	36.0	2.44	1.61	22.4	2.61	23.0	1.9	24.3	2.58	2.58	24.26	3.19	77.44	0.123	22.97	27	0.80	1.00	0.13	1.78
9.19583	0.3 #	15.2	2.8	1456	29	39.7	39.7	2.0	0.57	0.07	35.7	2.45	1.60	22.3	2.61	23.0	1.9	24.4	2.58	2.58	24.42	3.22	78.64	0.125	22.96	27	0.80	1.00	0.13	1.81
9.32322	0.29 #	13.8	2.8	1321	28	40.2	40.2	2.2	0.57	0.07	31.9	2.51	1.59	20.1	2.67	20.7	1.9	22.2	2.63	2.63	22.17	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.45317	0.27 #	20.2	2.9	1934	26	40.8	40.8	1.4	0.57	0.07	46.5	2.26	1.58	29.5	2.42	30.1	n/a	n/a	n/a	2.42	30.10	2.38	71.67	0.114	30.10	31	0.80	1.00	0.12	1.65
9.58141	0.32 #	23.5	2.9	2250	31	41.3	41.3	1.4	0.57	0.07	53.5	2.21	1.57	34.1	2.37	34.8	n/a	n/a	n/a	2.37	34.78	2.19	76.01	0.121	34.78	34	0.80	1.00	0.13	1.75
9.70498	0.37 #	26.4	3.0	2528	35	41.9	41.9	1.4	0.57	0.07	59.4	2.18	1.56	38.2	2.34	38.8	n/a	n/a	n/a	2.34	38.82	2.07	80.22	0.128	38.82	36	0.80	1.00	0.14	1.85
9.82983	0.38 #	21.7	3.0	2078	36	42.4	42.4	1.8	0.57	0.07	48.0	2.32	1.55	31.1	2.47	31.7	n/a	n/a	n/a	2.47	31.71	2.60	82.46	0.132	31.71	32	0.80	1.00	0.14	1.91
9.95595	0.38 #	21.9	3.0	2097	36	42.9	42.9	1.8	0.57	0.07	47.8	2.32	1.54	31.1	2.46	31.8	n/a	n/a	n/a	2.46	31.80	2.59	82.19	0.132	31.80	32	0.80	1.00	0.14	1.90
10.07995	0.39 #	20.1	3.1	1925	37	43.5	43.5	2.0	0.57	0.07	43.3	2.38	1.53	28.3	2.52	29.0	n/a	n/a	n/a	2.52	29.00	2.90	84.00	0.135	29.00	31	0.80	1.00	0.14	1.95
10.20522	0.41 #	22.1	3.1	2116	39	44.0	44.0	1.9	0.57	0.07	47.1	2.34	1.52	31.0	2.48	31.7	n/a	n/a	n/a	2.48	31.69	2.67	84.76	0.137	31.69	32	0.80	1.00	0.15	1.98
10.33007	0.44 #	28.6	3.1	2739	42	44.5	44.5	1.6	0.57	0.07	60.5	2.20	1.51	40.1	2.34	40.8	n/a	n/a	n/a	2.34	40.76	2.09	85.24	0.138	40.76	37	0.80	1.00	0.15	1.99
10.45237	0.49 #	36.6	3.2	3505	47	45.1	45.1	1.4	0.57	0.07	76.8	2.08	1.50	51.2	2.22	51.9	n/a	n/a	n/a	2.22	51.86	1.72	89.08	0.146	51.86	41	0.79	1.00	0.16	2.11
10.57424	0.49 #	34.1	3.2	3265	47	45.6	45.6	1.5	0.57	0.07	70.6	2.13	1.49	47.4	2.27	48.0	n/a	n/a	n/a	2.27	48.04	1.84	88.59	0.145	48.04	40	0.80	1.00	0.15	2.09
10.69527	0.45 #	34.1	3.3	3265	43	46.1	46.1	1.3	0.57	0.07	69.8	2.11	1.48	47.1	2.25	47.8	n/a	n/a	n/a	2.25	47.77	1.79	85.31	0.138	47.77	40	0.80	1.00	0.15	1.99
10.81715	0.41 #	37.8	3.3	3620	39	46.6	46.6	1.1	0.57	0.07	76.6	2.03	1.47	52.0	2.16	52.7	n/a	n/a	n/a	2.16	52.65	1.58	82.93	0.133	52.65	42	0.79	1.00	0.14	1.92
10.93732	0.33 #	32	3.3	3064	32	47.2	47.2	1.0	0.57	0.07	64.0	2.08	1.47	43.6	2.21	44.3	n/a	n/a	n/a	2.21	44.33	1.69	75.06	0.119	44.33	38	0.80	1.00	0.13	1.73
11.05707	0.28 #	33.1	3.4	3170	27	47.7	47.7	0.9	0.57	0.07	65.5	2.02	1.46	44.9	2.15	45.6	n/a	n/a	n/a	2.15	45.60	1.56	71.10	0.113	45.60	39	0.80	1.00	0.12	1.64
11.18022	0.29 #	24.7	3.4	2365	28	48.2	48.2	1.2	0.57	0.07	48.1	2.21	1.45	33.2	2.34	33.8	n/a	n/a	n/a	2.34	33.84	2.09	70.81	0.113	33.84	33	0.80	1.00	0.12	1.63
11.29912	0.31 #	24	3.4	2298	30	48.7	48.7	1.3	0.57	0.07	46.2	2.25	1.44	32.0	2.38	32.7	n/a	n/a	n/a	2.38	32.71	2.23	72.82	0.116	32.71	33	0.80	1.00	0.12	1.68
11.42058	0.28 #	21	3.5	2011	27	49.2	49.2	1.4	0.57	0.07	39.8	2.31	1.43	27.8	2.44	28.5	n/a	n/a	n/a	2.44	28.47	2.47	70.45	0.113	28.47	31	0.80	1.00	0.12	1.63
11.54118	0.29 #	21.5	3.5	2059	28	49.8	49.8	1.4	0.57	0.07	40.4	2.31	1.43	28.3	2.43	29.0	n/a	n/a	n/a	2.43	28.99	2.46	71.24	0.114	28.99	31	0.80	1.00	0.12	1.64
11.6622	0.26 #	14.6	3.6	1398	25	50.3	50.3	1.8	0.57	0.07	26.8	2.53	1.42	18.9	2.65	19.6	1.6	22.5	2.59	2.59	22.53	3.25	73.18	0.116	19.59	25	0.80	1.00	0.12	1.68
11.78323	0.22 #	14.9	3.6	1427	21	50.8	50.8	1.5	0.57	0.07	27.1	2.47	1.41	19.2	2.60	19.9	n/a	n/a	n/a	2.60	19.88	3.32	66.10	0.107	19.88	26	0.80	1.00	0.11	1.54
11.90213	0.22 #	19.2	3.6	1839	21	51.3	51.3	1.2	0.57	0.07	34.8	2.32	1.41	24.8	2.44	25.5	n/a	n/a	n/a	2.44	25.50	2.50	63.85	0.104	25.50	29	0.80	1.00	0.11	1.51
11.97729	0.2 #	11.1	3.7	1063	19	51.6	51.6	1.9	0.57	0.07	19.6	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.01042	0.2 #	15.7	3.7	1503	19	51.8	51.8	1.3	0.57	0.07	28.0	2.43	1.40	20.0	2.55	20.8	n/a	n/a	n/a	2.55	20.75	3.03	62.85	0.103	20.75	26	0.80	1.00	0.11	1.49
12.13441	0.21 #	17.3	3.7	1657	20	52.3	52.3	1.3	0.57	0.07	30.7	2.38	1.39	22.0	2.50	22.8	n/a	n/a	n/a	2.50	22.75	2.78	63.25	0.104	22.75	27	0.80	1.00	0.11	1.50
12.25884	0.25 #	14.5	3.7	1389	24	52.9	52.9	1.8	0.57	0.07	25.3	2.54	1.38	18.2	2.66	19.0	1.6	21.6	2.59	2.59	21.61	3.29	71.15	0.113	18.97	25	0.80	1.00	0.12	1.64

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
12.38284	0.32 #	19	3.8	1819	31	53.4	53.4	1.7	0.57	0.07	33.1	2.44	1.38	24.0	2.55	24.7	n/a	n/a	n/a	2.55	24.74	3.03	74.88	0.119	24.74	28	0.80	1.00	0.13	1.72
12.50429	0.37 #	32.9	3.8	3151	35	53.9	53.9	1.1	0.57	0.07	57.4	2.14	1.37	41.9	2.25	42.6	n/a	n/a	n/a	2.25	42.62	1.79	76.29	0.121	42.62	37	0.80	1.00	0.13	1.75
12.62446	0.42 #	29.1	3.8	2787	40	54.4	54.4	1.5	0.57	0.07	50.2	2.25	1.36	36.8	2.36	37.5	n/a	n/a	n/a	2.36	37.52	2.14	80.41	0.128	37.52	35	0.80	1.00	0.14	1.86
12.74634	0.44 #	21.1	3.9	2021	42	55.0	55.0	2.1	0.57	0.07	35.8	2.47	1.36	26.3	2.57	27.1	n/a	n/a	n/a	2.57	27.07	3.15	85.27	0.138	27.07	30	0.80	1.00	0.15	1.99
12.86864	0.37 #	18.1	3.9	1733	35	55.5	55.5	2.1	0.57	0.07	30.2	2.52	1.35	22.4	2.62	23.1	1.5	26.1	2.57	2.57	26.07	3.15	82.05	0.131	23.11	28	0.80	1.00	0.14	1.90
12.99094	0.33 #	21.4	4.0	2049	32	56.0	56.0	1.6	0.57	0.07	35.6	2.39	1.34	26.5	2.49	27.2	n/a	n/a	n/a	2.49	27.20	2.73	74.18	0.118	27.20	30	0.80	1.00	0.13	1.71
13.11493	0.29 #	14	4.0	1341	28	56.6	56.2	2.2	0.57	0.07	22.8	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.23851	0.23 #	13	4.0	1245	22	57.1	56.4	1.9	0.57	0.07	21.1	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.36378	0.17 #	10.5	4.1	1005	16	57.6	56.5	1.7	0.57	0.07	16.8	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.4899	0.09 #	16.4	4.1	1570	9	58.2	56.7	0.6	0.57	0.07	26.7	2.26	1.34	20.0	2.38	20.7	n/a	n/a	n/a	2.38	20.72	2.23	46.20	0.088	20.72	26	0.80	1.00	0.09	1.27
13.61645	0.11 #	10.8	4.2	1034	11	58.7	56.9	1.1	0.57	0.07	17.2	2.56	1.33	12.8	2.67	13.6	1.5	15.3	2.61	2.61	15.29	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.74299	0.11 #	13.7	4.2	1312	11	59.3	57.0	0.8	0.57	0.07	22.0	2.42	1.33	16.5	2.53	17.3	n/a	n/a	n/a	2.53	17.26	2.91	50.22	0.092	17.26	24	0.80	1.00	0.10	1.32
13.86996	0.15 #	10.5	4.2	1005	14	59.8	57.2	1.5	0.57	0.07	16.5	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.99694	0.13 #	11.5	4.3	1101	12	60.4	57.4	1.2	0.57	0.07	18.1	2.56	1.33	13.7	2.67	14.4	1.5	16.2	2.61	2.61	16.18	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.12603	0.15 8	7.5	4.3	718	14	60.9	57.5	2.2	0.57	0.07	11.4	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.25428	0.2 9	8.7	4.3	833	19	61.5	57.7	2.5	0.57	0.07	13.4	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.38422	0.2 #	11.4	4.4	1092	19	62.0	57.9	1.9	0.57	0.07	17.8	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.51077	0.15 #	18.3	4.4	1752	14	62.6	58.1	0.9	0.57	0.07	29.1	2.31	1.32	22.0	2.42	22.8	n/a	n/a	n/a	2.42	22.85	2.39	54.51	0.095	22.85	27	0.80	1.00	0.10	1.36
14.64113	0.12 #	15.7	4.5	1503	11	63.1	58.2	0.8	0.57	0.08	24.7	2.36	1.32	18.8	2.47	19.6	n/a	n/a	n/a	2.47	19.57	2.61	51.02	0.092	19.57	25	0.80	1.00	0.10	1.32
14.77108	0.14 #	14.1	4.5	1350	13	63.7	58.4	1.0	0.57	0.08	22.0	2.46	1.32	16.7	2.57	17.6	n/a	n/a	n/a	2.57	17.55	3.12	54.76	0.095	17.55	24	0.80	1.00	0.10	1.36
14.89932	0.18 #	14.1	4.5	1350	17	64.3	58.6	1.3	0.57	0.08	22.0	2.52	1.32	16.7	2.62	17.5	1.5	19.6	2.56	2.56	19.56	3.10	60.62	0.101	17.53	24	0.80	1.00	0.11	1.43
15.02926	0.17 #	16.1	4.6	1542	16	64.8	58.7	1.1	0.57	0.08	25.1	2.42	1.31	19.1	2.53	20.0	n/a	n/a	n/a	2.53	19.98	2.90	58.02	0.098	19.98	26	0.80	1.00	0.11	1.40
15.15751	0.17 #	14.4	4.6	1379	16	65.4	58.9	1.2	0.57	0.08	22.3	2.50	1.31	17.0	2.60	17.8	n/a	n/a	n/a	2.60	17.85	3.30	58.95	0.099	17.85	24	0.80	1.00	0.11	1.41
15.49086	0.21 #	13.8	4.7	1321	20	66.8	59.4	1.6	0.57	0.08	21.1	2.58	1.31	16.2	2.67	17.0	1.5	19.0	2.61	2.61	18.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.62505	0.16 #	19.3	4.8	1848	15	67.4	59.5	0.9	0.57	0.08	29.9	2.30	1.30	22.9	2.40	23.8	n/a	n/a	n/a	2.40	23.80	2.33	55.51	0.096	23.80	28	0.80	1.00	0.10	1.36
15.76009	0.15 #	12.5	4.8	1197	14	68.0	59.7	1.3	0.57	0.08	18.9	2.56	1.30	14.5	2.66	15.4	1.4	17.1	2.60	2.60	17.11	3.32	56.87	0.097	15.39	22	0.80	1.00	0.10	1.37
15.89555	0.11 #	15.8	4.8	1513	11	68.5	59.9	0.7	0.57	0.08	24.1	2.35	1.30	18.5	2.45	19.4	n/a	n/a	n/a	2.45	19.42	2.55	49.43	0.091	19.42	25	0.80	1.00	0.10	1.29
16.03017	0.12 #	15.1	4.9	1446	11	69.1	60.1	0.8	0.57	0.08	22.9	2.40	1.30	17.6	2.50	18.5	n/a	n/a	n/a	2.50	18.53	2.76	51.24	0.093	18.53	25	0.80	1.00	0.10	1.31
16.16393	0.12 #	20.5	4.9	1963	11	69.7	60.2	0.6	0.57	0.08	31.4	2.21	1.30	24.2	2.31	25.1	n/a	n/a	n/a	2.31	25.13	2.00	50.14	0.092	25.13	29	0.80	1.00	0.10	1.29
16.29727	0.1 #	17.1	5.0	1637	10	70.3	60.4	0.6	0.57	0.08	25.9	2.29	1.29	20.0	2.39	20.9	n/a	n/a	n/a	2.39	20.93	2.27	47.58	0.090	20.93	26	0.80	1.00	0.10	1.26
16.43104	0.11 #	15.8	5.0	1513	11	70.9	60.6	0.7	0.57	0.08	23.8	2.36	1.29	18.4	2.46	19.3	n/a	n/a	n/a	2.46	19.31	2.56	49.43	0.091	19.31	25	0.80	1.00	0.10	1.28
16.56268	0.1 #	14.7	5.0	1408	10	71.4	60.8	0.7	0.57	0.08	22.0	2.38	1.29	17.0	2.48	17.9	n/a	n/a	n/a	2.48	17.94	2.69	48.20	0.090	17.94	24	0.80	1.00	0.10	1.27
16.69602	0.08 #	19.6	5.1	1877	8	72.0	60.9	0.4	0.57	0.08	29.6	2.17	1.29	23.0	2.27	23.9	n/a	n/a	n/a	2.27	23.88	1.86	44.54	0.087	23.88	28	0.80	1.00	0.09	1.22
16.82851	0.09 #	15.8	5.1	1513	9	72.6	61.1	0.6	0.57	0.08	23.6	2.32	1.29	18.3	2.42	19.2	n/a	n/a	n/a	2.42	19.23	2.41	46.24	0.089	19.23	25	0.80	1.00	0.09	1.24
16.961	0.16 #	13.4	5.2	1283	15	73.1	61.3	1.3	0.57	0.08	19.7	2.55	1.29	15.4	2.64	16.3	1.4	18.0	2.58	2.58	18.00	3.20	57.67	0.098	16.28	23	0.80	1.00	0.10	1.37
17.09349	0.22 #	16	5.2	1532	21	73.7	61.5	1.4	0.57	0.08	23.7	2.51	1.28	18.5	2.60	19.4	n/a	n/a	n/a	2.60	19.41	3.32	64.54	0.105	19.41	25	0.80	1.00	0.11	1.47
17.22556	0.21 #	18.4	5.3	1762	20	74.3	61.6	1.2	0.57	0.08	27.4	2.41	1.28	21.4	2.50	22.3	n/a	n/a	n/a	2.50	22.29	2.78	61.98	0.102	22.29	27	0.80	1.00	0.11	1.43
17.3572	0.21 #	16.5	5.3	1580	20	74.8	61.8	1.3	0.57	0.08	24.3	2.48	1.28	19.0	2.57	20.0	n/a	n/a	n/a	2.57	19.96	3.15	62.98	0.103	19.96	26	0.80	1.00	0.11	1.44
17.4863	0.18 #	19.1	5.3	1829	17	75.4	62.0	1.0	0.57	0.08	28.3	2.35	1.28	22.1	2.45	23.1	n/a	n/a	n/a	2.45	23.08	2.51	58.00	0.098	23.08	28	0.80	1.00	0.11	1.37
17.61751	0.15 #	18.8	5.4	1800	14	76.0	62.2	0.8	0.57	0.08	27.7	2.33	1.28	21.7	2.42	22.7	n/a	n/a	n/a	2.42	22.68	2.39	54.24	0.095	22.68	27	0.80	1.00	0.10	1.32
17.74576	0.14 #	23.9	5.4	2289	13	76.5	62.3	0.6	0.57	0.08	35.5	2.17	1.27	27.8	2.26	28.8	n/a	n/a	n/a	2.26	28.80	1.83	52.60	0.094	28.80	31	0.80	1.00	0.10	1.30
17.8757	0.14 #	17.4	5.4	1666	13	77.1	62.5	0.8	0.57	0.08	25.4	2.36	1.27	20.0	2.45	20.9	n/a	n/a	n/a	2.45	20.94	2.55	53.30	0.094	20.94	26	0.80	1.00	0.10	1.31
18.00437	0.12 #	18.2	5.5	1743	11	77.6	62.7	0.7	0.57	0.08	26.6	2.30	1.27	20.9	2.40	21.9	n/a	n/a	n/a	2.40	21.87	2.30	50.27	0.092	21.87	27	0.80	1.00	0.10	1.28
18.13431	0.09 #	17.8	5.5	1705	9	78.2	62.8	0.5	0.57	0.08	25.9	2.26	1.27	20.4	2.36	21.4	n/a	n/a	n/a	2.36	21.36	2.15	45.91	0.088	21.36	26	0.80	1.00	0.09	1.23
18.26299	0.09 7	7.3	5.6	699	9	78.8	63.0	1.4	0.57	0.08	9.8	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.3925	0.09 8	7.8	5.6	747	9	79.3	63.2	1.3	0.57	0.08	10.6	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.68551	0.12 4	4.6	5.7	440	11	80.6	63.6	3.2	0.57	0.08	5.7	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.94497	0.04 4	3.8	5.8	364	4	81.7	63.9	1.4	0.57	0.08	4.4	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
19.20444	0.12 1	1.2	5.9	115	11	82.8	64.3	35.8	0.57	0.08	0.5	4.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.46263	0.13 3	3	5.9	287	12	83.9	64.6	6.1	0.57	0.08	3.1	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.59342	0.16 3	3.1	6.0	297	15	84.5	64.8	7.2	0.57	0.08	3.3	3.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.72251	0.16 4	3.8	6.0	364	15	85.0	65.0	5.5	0.57	0.08	4.3	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.85288	0.13 5	5.4	6.1	517	12	85.6	65.1	2.9	0.57	0.08	6.6	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.11617	0.18 2	1.9	6.1	182	17	86.7	65.5	18.1	0.57	0.08	1.5	4.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.24823	0.15 3	2.8	6.2	268	14	87.3	65.6	7.9	0.57	0.08	2.8	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.38199	0.1 5	5.6	6.2	536	10	87.9	65.8	2.1	0.57	0.08	6.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.65038	0.05 3	3	6.3	287	5	89.1	66.2	2.4	0.57	0.08	3.0	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.92215	0.1 3	3.7	6.4	354	10	90.2	66.5	3.6	0.57	0.08	4.0	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.18968	0.21 5	5	6.5	479	20	91.4	66.9	5.2	0.57	0.08	5.8	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.32387	0.21 9	9.3	6.5	891	20	92.0	67.1	2.5	0.57	0.08	11.9	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.45848	0.1 4	4.5	6.5	431	10	92.5	67.2	2.8	0.57	0.08	5.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.59183	0.05 4	4.6	6.6	440	5	93.1	67.4	1.4	0.57	0.08	5.2	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.6568	0.04 6	6.5	6.6	622	4	93.4	67.5	0.7	0.57	0.08	7.8	2.79	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.83006	0.08 1	1.4	6.7	134	8	94.1	67.7	19.2	0.57	0.08	0.6	4.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.96934	0.15 6	5.8	6.7	555	14	94.7	67.9	3.1	0.57	0.08	6.8	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.24919	0.16 4	4.6	6.8	440	15	95.9	68.3	4.4	0.57	0.08	5.0	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.38805	0.2 4	4.7	6.8	450	19	96.5	68.5	5.4	0.57	0.08	5.2	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.52648	0.22 5	5.2	6.9	498	21	97.1	68.7	5.3	0.57	0.08	5.8	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.66619	0.12 4	4.1	6.9	393	11	97.7	68.8	3.9	0.57	0.08	4.3	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.94434	0.17 3	3	7.0	287	16	98.9	69.2	8.6	0.57	0.08	2.7	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.08405	0.2 4	4.6	7.0	440	19	99.5	69.4	5.6	0.57	0.08	4.9	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.22164	0.25 4	4.3	7.1	412	24	100.1	69.6	7.7	0.57	0.08	4.5	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.35923	0.22 3	3.4	7.1	326	21	100.7	69.8	9.4	0.57	0.08	3.2	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.49851	0.15 #	11.6	7.2	1111	14	101.3	69.9	1.4	0.57	0.08	14.4	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.63737	0.17 2	2.3	7.2	220	16	101.9	70.1	13.8	0.57	0.08	1.7	4.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.77369	0.18 3	3.8	7.2	364	17	102.5	70.3	6.6	0.57	0.08	3.7	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.91339	0.18 9	9	7.3	862	17	103.1	70.5	2.3	0.57	0.08	10.8	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.05013	0.17 3	3.3	7.3	316	16	103.7	70.7	7.7	0.57	0.08	3.0	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.18857	0.2 4	4	7.4	383	19	104.3	70.9	6.9	0.57	0.08	3.9	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.32701	0.21 8	8.3	7.4	795	20	104.9	71.0	2.9	0.57	0.08	9.7	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.46247	0.21 9	9.3	7.5	891	20	105.5	71.2	2.6	0.57	0.08	11.0	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.59666	0.23 #	50.7	7.5	4855	22	106.1	71.4	0.5	0.57	0.08	66.5	1.87	1.19	55.8	1.94	57.1	n/a	n/a	n/a	1.94	57.08	1.23	70.01	0.112	57.08	43	0.78	1.00	0.12	1.49
24.72533	0.28 #	23.9	7.5	2289	27	106.6	71.6	1.2	0.57	0.08	30.5	2.38	1.19	25.6	2.44	26.9	n/a	n/a	n/a	2.44	26.88	2.49	66.99	0.108	26.88	30	0.80	1.00	0.12	1.43
24.87311	0.28 9	9.1	7.6	871	27	107.3	71.8	3.5	0.57	0.08	10.6	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.00985	0.26 8	8.3	7.6	795	25	107.9	71.9	3.6	0.57	0.08	9.5	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.14786	0.24 6	6.1	7.7	584	23	108.4	72.1	4.8	0.57	0.08	6.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.2846	0.31 4	4.8	7.7	460	30	109.0	72.3	8.5	0.57	0.08	4.8	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.42134	0.34 #	11.1	7.7	1063	33	109.6	72.5	3.4	0.57	0.08	13.2	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.55382	0.36 #	44.3	7.8	4242	34	110.2	72.7	0.8	0.57	0.08	56.9	2.06	1.18	48.2	2.12	49.4	n/a	n/a	n/a	2.12	49.44	1.49	73.84	0.117	49.44	40	0.80	1.00	0.13	1.55
25.67443	0.36 #	71	7.8	6799	34	110.7	72.8	0.5	0.57	0.08	91.8	1.77	1.18	77.9	1.83	79.2	n/a	n/a	n/a	1.83	79.15	1.13	89.58	0.147	79.15	51	0.75	1.00	0.16	1.94
25.7929	0.31 #	48.8	7.9	4673	30	111.2	73.0	0.7	0.57	0.08	62.5	1.97	1.18	53.1	2.03	54.3	n/a	n/a	n/a	2.03	54.34	1.34	72.75	0.116	54.34	42	0.79	1.00	0.12	1.53
25.91733	0.31 #	34.3	7.9	3285	30	111.8	73.1	0.9	0.57	0.08	43.4	2.19	1.18	36.9	2.25	38.2	n/a	n/a	n/a	2.25	38.15	1.79	68.12	0.109	38.15	35	0.80	1.00	0.12	1.44
26.04302	0.35 #	16	7.9	1532	34	112.3	73.3	2.4	0.57	0.08	19.4	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.17254	0.33 #	11.5	8.0	1101	32	112.9	73.5	3.2	0.57	0.08	13.5	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.30461	0.31 9	9.6	8.0	919	30	113.4	73.7	3.7	0.57	0.08	10.9	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.43328	0.31 #	20.7	8.1	1982	30	114.0	73.8	1.6	0.57	0.08	25.3	2.51	1.17	21.6	2.57	22.9	n/a	n/a	n/a	2.57	22.92	3.12	71.51	0.114	22.92	27	0.80	1.00	0.12	1.50

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{cIN} n=.5	C_Q n=.7	q_{cIN} n=.7	I_c n=.7	I_c[5]	q_{cIN}	K_c[5]	$(q_{cIN})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
26.5577	0.27 #	37.7	8.1	3610	26	114.5	74.0	0.7	0.57	0.08	47.2	2.10	1.17	40.4	2.16	41.7	n/a	n/a	n/a	2.16	41.69	1.57	65.52	0.106	41.69	37	0.80	1.00	0.11	1.39
26.67575	0.3 #	46.8	8.1	4482	29	115.0	74.1	0.7	0.57	0.08	58.9	1.99	1.17	50.4	2.05	51.7	n/a	n/a	n/a	2.05	51.70	1.37	70.90	0.113	51.70	41	0.79	1.00	0.12	1.48
26.79253	0.28 #	39.2	8.2	3754	27	115.5	74.3	0.7	0.57	0.08	49.0	2.09	1.17	41.9	2.14	43.3	n/a	n/a	n/a	2.14	43.26	1.54	66.61	0.107	43.26	38	0.80	1.00	0.12	1.41
26.90889	0.21 #	33	8.2	3160	20	116.0	74.5	0.7	0.57	0.08	40.9	2.13	1.17	35.0	2.19	36.4	n/a	n/a	n/a	2.19	36.38	1.64	59.61	0.100	36.38	35	0.80	1.00	0.11	1.31
27.02524	0.18 #	29.7	8.2	2844	17	116.5	74.6	0.6	0.57	0.08	36.6	2.16	1.17	31.4	2.22	32.7	n/a	n/a	n/a	2.22	32.71	1.72	56.32	0.097	32.71	33	0.80	1.00	0.10	1.26
27.14372	0.15 #	21.1	8.3	2021	14	117.1	74.8	0.8	0.57	0.08	25.5	2.34	1.16	21.9	2.40	23.2	n/a	n/a	n/a	2.40	23.21	2.30	53.34	0.094	23.21	28	0.80	1.00	0.10	1.23
27.26432	0.19 #	20	8.3	1915	18	117.6	74.9	1.0	0.57	0.08	24.0	2.42	1.16	20.6	2.48	22.0	n/a	n/a	n/a	2.48	21.98	2.67	58.61	0.099	21.98	27	0.80	1.00	0.11	1.29
27.3845	0.22 #	20.9	8.3	2001	21	118.1	75.1	1.1	0.57	0.08	25.1	2.43	1.16	21.6	2.48	22.9	n/a	n/a	n/a	2.48	22.95	2.69	61.71	0.102	22.95	27	0.80	1.00	0.11	1.33
27.50722	0.24 #	15.6	8.4	1494	23	118.6	75.2	1.7	0.57	0.08	18.3	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.6291	0.27 #	20.1	8.4	1925	26	119.1	75.4	1.4	0.57	0.08	23.9	2.50	1.16	20.7	2.56	22.0	n/a	n/a	n/a	2.56	22.02	3.07	67.65	0.109	22.02	27	0.80	1.00	0.12	1.42
27.74757	0.29 #	37.4	8.5	3581	28	119.7	75.6	0.8	0.57	0.08	45.8	2.13	1.16	39.6	2.18	40.9	n/a	n/a	n/a	2.18	40.93	1.63	66.68	0.108	40.93	37	0.80	1.00	0.12	1.40
27.8652	0.22 #	30.6	8.5	2930	21	120.2	75.7	0.7	0.57	0.08	37.1	2.19	1.16	32.1	2.25	33.5	n/a	n/a	n/a	2.25	33.45	1.79	60.00	0.100	33.45	33	0.80	1.00	0.11	1.30
27.98155	0.22 #	32	8.5	3064	21	120.7	75.9	0.7	0.57	0.08	38.8	2.17	1.16	33.6	2.22	34.9	n/a	n/a	n/a	2.22	34.95	1.72	60.13	0.100	34.95	34	0.80	1.00	0.11	1.30
28.02657	0.23 #	28.8	8.5	2758	22	120.9	75.9	0.8	0.57	0.08	34.7	2.24	1.16	30.1	2.30	31.4	n/a	n/a	n/a	2.30	31.44	1.94	60.87	0.101	31.44	32	0.80	1.00	0.11	1.31
28.17307	0.28 #	34.1	8.6	3265	27	121.5	76.1	0.9	0.57	0.08	41.3	2.18	1.15	35.8	2.24	37.2	n/a	n/a	n/a	2.24	37.18	1.76	65.34	0.106	37.18	35	0.80	1.00	0.11	1.38
28.29453	0.4 #	28.9	8.6	2767	38	122.0	76.3	1.4	0.57	0.08	34.7	2.37	1.15	30.1	2.42	31.5	n/a	n/a	n/a	2.42	31.48	2.41	75.87	0.121	31.48	32	0.80	1.00	0.13	1.57
28.41555	0.52 #	21.7	8.7	2078	50	122.5	76.4	2.5	0.57	0.08	25.6	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.53785	0.57 #	18.2	8.7	1743	55	123.1	76.6	3.4	0.57	0.08	21.1	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.66185	0.62 #	18.4	8.7	1762	59	123.6	76.8	3.6	0.57	0.08	21.3	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.78372	0.62 #	15.9	8.8	1523	59	124.1	76.9	4.2	0.57	0.08	18.2	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.90517	0.59 #	18.8	8.8	1800	56	124.6	77.1	3.4	0.57	0.08	21.7	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.02492	0.62 #	13.5	8.8	1293	59	125.2	77.3	5.1	0.57	0.08	15.1	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.14552	0.71 #	13.7	8.9	1312	68	125.7	77.4	5.7	0.57	0.08	15.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.264	0.84 #	17.1	8.9	1637	80	126.2	77.6	5.3	0.57	0.08	19.5	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.38291	0.98 #	11.7	9.0	1120	94	126.7	77.7	9.4	0.57	0.08	12.8	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.50266	1.03 #	12.7	9.0	1216	99	127.2	77.9	9.1	0.57	0.08	14.0	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.62029	1.02 #	15.7	9.0	1503	98	127.7	78.0	7.1	0.57	0.08	17.6	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.73876	1 #	12.3	9.1	1178	96	128.2	78.2	9.1	0.57	0.08	13.4	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.85682	0.96 #	11.8	9.1	1130	92	128.8	78.4	9.2	0.57	0.08	12.8	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.97657	0.93 #	15	9.1	1436	89	129.3	78.5	6.8	0.57	0.08	16.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.09547	0.91 #	9.5	9.2	910	87	129.8	78.7	11.2	0.57	0.08	9.9	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.21352	0.88 #	9.6	9.2	919	84	130.3	78.8	10.7	0.57	0.08	10.0	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.33412	0.9 #	14	9.2	1341	86	130.8	79.0	7.1	0.57	0.08	15.3	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.4526	0.93 8	8	9.3	766	89	131.3	79.1	14.0	0.57	0.08	8.0	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.57108	0.91 #	9.9	9.3	948	87	131.8	79.3	10.7	0.57	0.08	10.3	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.69083	0.9 #	13.6	9.4	1302	86	132.3	79.5	7.4	0.57	0.08	14.7	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.80973	0.91 #	9.7	9.4	929	87	132.9	79.6	10.9	0.57	0.08	10.0	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.92779	0.82 #	12.1	9.4	1159	79	133.4	79.8	7.7	0.57	0.08	12.9	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.04626	0.84 #	12.5	9.5	1197	80	133.9	79.9	7.6	0.57	0.08	13.3	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.16474	0.87 #	10.3	9.5	986	83	134.4	80.1	9.8	0.57	0.08	10.6	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.20381	0.87 #	10.6	9.5	1015	83	134.6	80.1	9.5	0.57	0.08	11.0	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.32229	0.88 #	14	9.5	1341	84	135.1	80.3	7.0	0.57	0.08	15.0	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.44246	0.9 9	8.6	9.6	824	86	135.6	80.4	12.5	0.57	0.08	8.6	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.56179	0.91 #	10.7	9.6	1025	87	136.1	80.6	9.8	0.57	0.08	11.0	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.68027	0.89 #	16.8	9.7	1609	85	136.6	80.8	5.8	0.57	0.08	18.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.79832	0.84 #	10.6	9.7	1015	80	137.1	80.9	9.2	0.57	0.08	10.8	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.91892	0.81 #	14.1	9.7	1350	78	137.6	81.1	6.4	0.57	0.08	15.0	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.03528	0.79 #	13	9.8	1245	76	138.1	81.2	6.8	0.57	0.08	13.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
32.15248	0.77	9 8.4	9.8	804	74	138.7	81.4	11.1	0.57	0.08	8.2	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.27181	0.74	# 10.9	9.8	1044	71	139.2	81.5	7.8	0.57	0.08	11.1	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.38944	0.74	# 13.6	9.9	1302	71	139.7	81.7	6.1	0.57	0.08	14.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.50664	0.76	9 8.9	9.9	852	73	140.2	81.9	10.2	0.57	0.08	8.7	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.62597	0.76	9 9.1	9.9	871	73	140.7	82.0	10.0	0.57	0.08	8.9	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.74402	0.78	# 13.3	10.0	1274	75	141.2	82.2	6.6	0.57	0.08	13.8	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.8608	0.8	7 7.5	10.0	718	77	141.7	82.3	13.3	0.57	0.08	7.0	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.978	0.8	# 12.2	10.1	1168	77	142.2	82.5	7.5	0.57	0.08	12.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.09606	0.83	# 15.5	10.1	1484	79	142.7	82.6	5.9	0.57	0.09	16.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.21454	0.88	# 10	10.1	958	84	143.2	82.8	10.3	0.57	0.09	9.8	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.33089	0.88	# 10.9	10.2	1044	84	143.7	82.9	9.4	0.57	0.09	10.9	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.44682	0.87	# 15.5	10.2	1484	83	144.2	83.1	6.2	0.57	0.09	16.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.5636	0.86	# 12	10.2	1149	82	144.7	83.3	8.2	0.57	0.09	12.1	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.67953	0.82	# 12.7	10.3	1216	79	145.2	83.4	7.3	0.57	0.09	12.8	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.79461	0.8	# 15.6	10.3	1494	77	145.7	83.6	5.7	0.57	0.09	16.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.91139	0.84	# 14.9	10.3	1427	80	146.2	83.7	6.3	0.57	0.09	15.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.02774	0.85	# 11.5	10.4	1101	81	146.7	83.9	8.5	0.57	0.09	11.4	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.1424	0.8	# 14.4	10.4	1379	77	147.2	84.0	6.2	0.57	0.09	14.7	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.2579	0.84	# 18.8	10.4	1800	80	147.7	84.2	4.9	0.57	0.09	19.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.37256	0.83	# 14.9	10.5	1427	79	148.2	84.3	6.2	0.57	0.09	15.2	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.43583	0.83	# 20.4	10.5	1954	79	148.5	84.4	4.4	0.57	0.09	21.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.55431	0.86	# 13.2	10.5	1264	82	149.0	84.6	7.4	0.57	0.09	13.2	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.67279	0.89	# 15.7	10.6	1503	85	149.5	84.7	6.3	0.57	0.09	16.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.78999	0.88	# 16.5	10.6	1580	84	150.0	84.9	5.9	0.57	0.09	16.8	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.90719	0.88	# 12.2	10.6	1168	84	150.5	85.0	8.3	0.57	0.09	12.0	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.02652	0.89	# 13.6	10.7	1302	85	151.0	85.2	7.4	0.57	0.09	13.5	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.145	0.89	# 13.2	10.7	1264	85	151.6	85.3	7.7	0.57	0.09	13.0	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.26008	0.86	# 15.5	10.7	1484	82	152.1	85.5	6.2	0.57	0.09	15.6	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.35223	0.85	# 16.1	10.8	1542	81	152.4	85.6	5.9	0.57	0.09	16.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.46944	0.87	# 17.5	10.8	1676	83	153.0	85.8	5.5	0.57	0.09	17.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.58706	0.85	# 12.7	10.8	1216	81	153.5	85.9	7.7	0.57	0.09	12.4	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.70257	0.84	# 17.8	10.9	1705	80	154.0	86.1	5.2	0.57	0.09	18.0	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.81935	0.85	# 11.3	10.9	1082	81	154.5	86.2	8.8	0.57	0.09	10.8	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.93655	0.83	# 13.1	11.0	1254	79	155.0	86.4	7.2	0.57	0.09	12.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.05248	0.84	# 15.2	11.0	1456	80	155.5	86.5	6.2	0.57	0.09	15.0	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.16799	0.84	# 10.5	11.0	1005	80	156.0	86.7	9.5	0.57	0.09	9.8	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.28391	0.82	# 11.7	11.1	1120	79	156.5	86.9	8.1	0.57	0.09	11.1	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.40112	0.86	# 17.5	11.1	1676	82	157.0	87.0	5.4	0.57	0.09	17.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.51663	0.85	# 11	11.1	1053	81	157.5	87.2	9.1	0.57	0.09	10.3	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.63213	0.8	# 12.8	11.2	1226	77	158.0	87.3	7.2	0.57	0.09	12.2	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.74976	0.74	# 16.9	11.2	1618	71	158.5	87.5	4.9	0.57	0.09	16.7	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.86569	0.69	# 15.3	11.2	1465	66	159.0	87.6	5.1	0.57	0.09	14.9	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.97992	0.68	# 16	11.3	1532	65	159.5	87.8	4.7	0.57	0.09	15.6	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.09542	0.73	# 22.9	11.3	2193	70	160.0	87.9	3.4	0.57	0.09	23.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.21305	0.74	# 17	11.3	1628	71	160.5	88.1	4.8	0.57	0.09	16.7	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.32771	0.73	# 15.2	11.4	1456	70	161.0	88.2	5.4	0.57	0.09	14.7	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.44364	0.76	# 19.7	11.4	1886	73	161.5	88.4	4.2	0.57	0.09	19.5	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.55787	0.81	# 14.1	11.4	1350	78	162.0	88.5	6.5	0.57	0.09	13.4	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ℞(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
37.61605	0.82 #	15.2	11.5	1456	79	162.2	88.6	6.1	0.57	0.09	14.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.6704	0.81 #	18.8	11.5	1800	78	162.4	88.7	4.7	0.57	0.09	18.5	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.78633	0.81 #	14.7	11.5	1408	78	162.9	88.8	6.2	0.57	0.09	14.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.87806	0.82 #	18.6	11.5	1781	79	163.3	89.0	4.9	0.57	0.09	18.2	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.99271	0.83 #	14.4	11.6	1379	79	163.8	89.1	6.5	0.57	0.09	13.6	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.10822	0.84 #	15.8	11.6	1513	80	164.3	89.3	6.0	0.57	0.09	15.1	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.22329	0.84 #	18.8	11.7	1800	80	164.8	89.4	4.9	0.57	0.09	18.3	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.33965	0.83 #	14.1	11.7	1350	79	165.3	89.6	6.7	0.57	0.09	13.2	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.45388	0.86 #	16.9	11.7	1618	82	165.8	89.7	5.7	0.57	0.09	16.2	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.56769	0.88 #	15.1	11.8	1446	84	166.3	89.9	6.6	0.57	0.09	14.2	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.68192	0.88 #	15	11.8	1436	84	166.8	90.0	6.6	0.57	0.09	14.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.79827	0.9 #	18.7	11.8	1791	86	167.3	90.2	5.3	0.57	0.09	18.0	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.91166	0.89 #	14.9	11.9	1427	85	167.8	90.3	6.8	0.57	0.09	13.9	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.02631	0.88 #	18.1	11.9	1733	84	168.3	90.5	5.4	0.57	0.09	17.3	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.14054	0.91 #	18.6	11.9	1781	87	168.8	90.6	5.4	0.57	0.09	17.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.25351	0.92 #	16.3	12.0	1561	88	169.3	90.8	6.3	0.57	0.09	15.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.36646	0.93 #	18.7	12.0	1791	89	169.8	90.9	5.5	0.57	0.09	17.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.47899	0.95 #	14.4	12.0	1379	91	170.2	91.1	7.5	0.57	0.09	13.3	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.59407	0.98 #	18	12.1	1724	94	170.7	91.2	6.0	0.57	0.09	17.0	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.7066	0.98 #	22	12.1	2107	94	171.2	91.4	4.8	0.57	0.09	21.2	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.81871	0.98 #	16.5	12.1	1580	94	171.7	91.5	6.7	0.57	0.09	15.4	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.93167	0.99 #	18.1	12.2	1733	95	172.2	91.7	6.1	0.57	0.09	17.0	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.0442	0.96 #	16.8	12.2	1609	92	172.7	91.8	6.4	0.57	0.09	15.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.15588	0.96 #	22.1	12.2	2116	92	173.2	92.0	4.7	0.57	0.09	21.1	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.26842	1.01 #	24.5	12.3	2346	97	173.6	92.1	4.5	0.57	0.09	23.6	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.37968	0.99 #	17.9	12.3	1714	95	174.1	92.3	6.2	0.57	0.09	16.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.49221	0.99 #	21	12.3	2011	95	174.6	92.4	5.2	0.57	0.09	19.9	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.60305	0.93 #	18.1	12.4	1733	89	175.1	92.6	5.7	0.57	0.09	16.8	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.71473	0.97 #	18.9	12.4	1810	93	175.6	92.7	5.7	0.57	0.09	17.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.82131	1.01 #	21.7	12.4	2078	97	176.0	92.9	5.1	0.57	0.09	20.5	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.85699	1.02 #	18.9	12.5	1810	98	176.2	92.9	6.0	0.57	0.09	17.6	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.94149	1.05 #	19.3	12.5	1848	101	176.6	93.0	6.0	0.57	0.09	18.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.06039	1.11 #	20.1	12.5	1925	106	177.1	93.2	6.1	0.57	0.09	18.8	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.17208	1.13 #	18.6	12.5	1781	108	177.5	93.3	6.7	0.57	0.09	17.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.28334	1.13 #	19.5	12.6	1867	108	178.0	93.5	6.4	0.57	0.09	18.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.39587	1.11 #	16.7	12.6	1599	106	178.5	93.6	7.5	0.57	0.09	15.2	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.50755	1.1 #	17.7	12.7	1695	105	179.0	93.8	6.9	0.57	0.09	16.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.61839	1.12 #	23.1	12.7	2212	107	179.5	93.9	5.3	0.57	0.09	21.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.72795	1.09 #	20	12.7	1915	104	179.9	94.1	6.0	0.57	0.09	18.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.83878	1.08 #	25.7	12.8	2461	103	180.4	94.2	4.5	0.57	0.09	24.2	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.95004	1.06 #	21.1	12.8	2021	102	180.9	94.3	5.5	0.57	0.09	19.5	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.05917	1.05 #	24.5	12.8	2346	101	181.4	94.5	4.6	0.57	0.09	22.9	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.17255	1.06 #	24.7	12.9	2365	102	181.9	94.6	4.6	0.57	0.09	23.1	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.28254	1.05 #	19.9	12.9	1906	101	182.3	94.8	5.8	0.57	0.09	18.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.39295	1.02 #	23.9	12.9	2289	98	182.8	94.9	4.6	0.57	0.09	22.2	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.50251	1.04 #	20.5	13.0	1963	100	183.3	95.1	5.6	0.57	0.09	18.7	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.61207	1.09 #	22.2	13.0	2126	104	183.8	95.2	5.4	0.57	0.09	20.4	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.72248	1.09 #	24	13.0	2298	104	184.2	95.4	4.9	0.57	0.09	22.2	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
42.83374	1.03 #	23.1	13.1	2212	99	184.7	95.5	4.9	0.57	0.09	21.2	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.94245	0.96 #	27.2	13.1	2605	92	185.2	95.7	3.8	0.57	0.09	25.3	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.05286	0.96 #	32.7	13.1	3131	92	185.7	95.8	3.1	0.57	0.09	30.7	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.16285	1.03 #	29.5	13.2	2825	99	186.1	95.9	3.7	0.57	0.09	27.5	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.26986	1.07 #	29	13.2	2777	102	186.6	96.1	4.0	0.57	0.09	27.0	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.37856	1.11 #	29.1	13.2	2787	106	187.1	96.2	4.1	0.57	0.09	27.0	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.48812	1.05 #	34.9	13.3	3342	101	187.5	96.4	3.2	0.57	0.09	32.7	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.59599	0.95 #	30.5	13.3	2921	91	188.0	96.5	3.3	0.57	0.09	28.3	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.703	1.01 #	32.7	13.3	3131	97	188.5	96.7	3.3	0.57	0.09	30.4	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.81171	1.03 #	26.7	13.4	2557	99	188.9	96.8	4.2	0.57	0.09	24.5	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.9183	1.11 #	26	13.4	2490	106	189.4	96.9	4.6	0.57	0.09	23.7	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.99898	1.16 #	27.4	13.4	2624	111	189.7	97.1	4.6	0.57	0.09	25.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.13275	1.2 #	26	13.5	2490	115	190.3	97.2	5.0	0.57	0.09	23.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.24273	1.19 #	26.3	13.5	2518	114	190.8	97.4	4.9	0.57	0.09	23.9	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.35314	1.12 #	25.6	13.5	2451	107	191.3	97.5	4.7	0.57	0.09	23.2	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.46228	1.09 #	30.4	13.6	2911	104	191.7	97.7	3.8	0.57	0.09	27.8	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.57141	1.09 #	24.2	13.6	2317	104	192.2	97.8	4.9	0.57	0.09	21.7	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.68055	1.13 #	25	13.6	2394	108	192.7	98.0	4.9	0.57	0.09	22.5	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.79138	1.19 #	29.2	13.7	2796	114	193.2	98.1	4.4	0.57	0.09	26.5	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.89882	1.2 #	22.6	13.7	2164	115	193.6	98.2	5.8	0.57	0.09	20.1	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.00753	1.23 #	25.5	13.7	2442	118	194.1	98.4	5.2	0.57	0.09	22.8	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.11581	1.27 #	22.4	13.8	2145	122	194.6	98.5	6.2	0.57	0.09	19.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.22538	1.28 #	24.2	13.8	2317	123	195.0	98.7	5.8	0.57	0.09	21.5	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.33281	1.29 #	27.4	13.8	2624	124	195.5	98.8	5.1	0.57	0.09	24.6	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.44194	1.24 #	21.4	13.9	2049	119	196.0	99.0	6.4	0.57	0.09	18.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.55066	1.23 #	22.1	13.9	2116	118	196.4	99.1	6.1	0.57	0.09	19.4	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.65852	1.21 #	22.1	13.9	2116	116	196.9	99.2	6.0	0.57	0.09	19.3	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.76596	1.19 #	23.5	13.9	2250	114	197.4	99.4	5.6	0.57	0.09	20.7	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.87339	1.18 #	27.4	14.0	2624	113	197.8	99.5	4.7	0.57	0.09	24.4	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.98168	1.17 #	22.8	14.0	2183	112	198.3	99.7	5.6	0.57	0.09	19.9	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.09039	1.21 #	25.7	14.0	2461	116	198.8	99.8	5.1	0.57	0.09	22.7	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.1974	1.21 #	25.6	14.1	2451	116	199.2	100.0	5.1	0.57	0.09	22.5	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.30484	1.18 #	27.3	14.1	2614	113	199.7	100.1	4.7	0.57	0.09	24.1	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.41355	1.2 #	28.6	14.1	2739	115	200.1	100.2	4.5	0.57	0.09	25.3	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.52184	1.2 #	23.1	14.2	2212	115	200.6	100.4	5.7	0.57	0.09	20.0	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.62885	1.19 #	26.1	14.2	2499	114	201.1	100.5	5.0	0.57	0.09	22.9	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.73671	1.18 #	24.6	14.2	2356	113	201.5	100.7	5.2	0.57	0.09	21.4	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.84457	1.18 #	26	14.3	2490	113	202.0	100.8	4.9	0.57	0.09	22.7	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.95158	1.15 #	30.4	14.3	2911	110	202.5	101.0	4.1	0.57	0.09	26.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.05944	1.28 #	23.6	14.3	2260	123	202.9	101.1	6.0	0.57	0.09	20.3	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.16646	1.58 #	29.1	14.4	2787	151	203.4	101.2	5.9	0.57	0.09	25.5	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.25478	1.94 #	31.8	14.4	3045	186	203.8	101.4	6.5	0.57	0.09	28.0	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.36222	2.36 #	53.8	14.4	5152	226	204.2	101.5	4.6	0.57	0.09	48.7	2.59	1.00	48.8	2.59	50.8	n/a	n/a	n/a	2.59	50.80	3.27	~~165.89~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.47008	2.74 #	55.1	14.5	5276	262	204.7	101.6	5.2	0.57	0.09	49.9	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.57794	2.77 #	45.8	14.5	4386	265	205.2	101.8	6.3	0.57	0.09	41.1	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.68453	2.35 #	43.5	14.5	4166	225	205.6	101.9	5.7	0.57	0.09	38.9	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.79154	1.73 #	39.8	14.6	3811	166	206.1	102.1	4.6	0.57	0.09	35.3	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.89771	1.28 #	44.8	14.6	4290	123	206.5	102.2	3.0	0.57	0.09	40.0	2.52	1.00	40.1	2.52	42.2	n/a	n/a	n/a	2.52	42.16	2.89	121.71	0.248	42.16	37	0.80	1.00	0.26	2.87

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
48.00642	1.14	# 39	14.6	3735	109	207.0	102.4	3.1	0.57	0.09	34.5	2.58	0.99	34.6	2.58	36.7	n/a	n/a	n/a	2.58	36.67	3.20	117.43	0.231	36.67	35	0.80	1.00	0.25	2.67
48.11258	1.22	# 37.7	14.7	3610	117	207.5	102.5	3.4	0.57	0.09	33.2	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.21747	1.31	# 32.1	14.7	3074	125	207.9	102.6	4.4	0.57	0.09	27.9	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.32533	1.4	# 30.2	14.7	2892	134	208.4	102.8	5.0	0.57	0.09	26.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.43234	1.39	# 28.4	14.8	2720	133	208.9	102.9	5.3	0.57	0.09	24.4	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.53808	1.39	# 29.4	14.8	2815	133	209.3	103.1	5.1	0.57	0.09	25.3	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.64382	1.39	# 33.2	14.8	3179	133	209.8	103.2	4.5	0.57	0.09	28.8	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.7504	1.38	# 31.6	14.9	3026	132	210.2	103.3	4.7	0.57	0.09	27.2	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.85572	1.39	# 38.3	14.9	3668	133	210.7	103.5	3.9	0.57	0.09	33.4	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.96103	1.28	# 34.2	14.9	3275	123	211.1	103.6	4.0	0.57	0.09	29.6	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.06635	1.11	# 38.9	15.0	3725	106	211.6	103.8	3.0	0.57	0.09	33.9	2.58	0.99	34.3	2.58	36.3	n/a	n/a	n/a	2.58	36.33	3.18	115.70	0.224	36.33	35	0.80	1.00	0.24	2.58
49.17124	1.16	# 43.6	15.0	4175	111	212.0	103.9	2.8	0.57	0.09	38.1	2.52	0.99	38.6	2.52	40.7	n/a	n/a	n/a	2.52	40.69	2.85	115.87	0.225	40.69	37	0.80	1.00	0.24	2.58
49.2774	1.3	# 38.7	15.0	3706	124	212.5	104.0	3.6	0.57	0.09	33.6	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.38271	1.42	# 38.3	15.1	3668	136	213.0	104.2	3.9	0.57	0.09	33.2	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.4876	1.45	# 32.3	15.1	3093	139	213.4	104.3	4.8	0.57	0.09	27.6	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.59291	1.45	# 32.2	15.1	3083	139	213.9	104.5	4.8	0.57	0.09	27.5	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.69908	1.4	# 27	15.1	2586	134	214.3	104.6	5.7	0.57	0.09	22.7	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.80312	1.43	# 27.3	15.2	2614	137	214.8	104.7	5.7	0.57	0.09	22.9	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.90928	1.41	# 29	15.2	2777	135	215.2	104.9	5.3	0.57	0.09	24.4	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.01332	1.46	# 30.5	15.2	2921	140	215.7	105.0	5.2	0.57	0.09	25.8	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.11948	1.5	# 34.2	15.3	3275	144	216.1	105.1	4.7	0.57	0.09	29.1	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.22352	1.33	# 33.3	15.3	3189	127	216.6	105.3	4.3	0.57	0.09	28.2	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.32926	1.32	# 41.4	15.3	3964	126	217.0	105.4	3.4	0.57	0.09	35.5	2.60	0.98	36.3	2.59	38.4	n/a	n/a	n/a	2.59	38.36	3.26	125.18	0.262	38.36	35	0.80	0.99	0.28	2.99
50.43245	1.31	# 44.7	15.4	4280	125	217.5	105.6	3.1	0.57	0.09	38.5	2.54	0.98	39.3	2.54	41.4	n/a	n/a	n/a	2.54	41.39	2.97	122.83	0.252	41.39	37	0.80	0.99	0.27	2.87
50.48468	1.27	# 45.1	15.4	4319	122	217.7	105.6	3.0	0.57	0.09	38.8	2.53	0.98	39.6	2.52	41.7	n/a	n/a	n/a	2.52	41.75	2.89	120.60	0.243	41.75	37	0.80	0.99	0.26	2.77
50.60529	1.22	# 57.4	15.4	5497	117	218.2	105.8	2.2	0.57	0.09	49.9	2.36	0.98	51.0	2.36	53.1	n/a	n/a	n/a	2.36	53.09	2.15	113.92	0.217	53.09	42	0.79	0.99	0.23	2.47
50.7106	1.27	# 58.3	15.5	5583	122	218.7	105.9	2.3	0.57	0.09	50.6	2.37	0.98	51.8	2.36	53.9	n/a	n/a	n/a	2.36	53.89	2.15	116.02	0.225	53.89	42	0.79	0.99	0.24	2.56
50.81506	1.37	# 57.7	15.5	5525	131	219.1	106.1	2.5	0.57	0.09	50.0	2.40	0.98	51.2	2.39	53.3	n/a	n/a	n/a	2.39	53.30	2.26	120.68	0.243	53.30	42	0.79	0.99	0.26	2.76
50.91995	1.39	# 53.9	15.5	5161	133	219.6	106.2	2.7	0.57	0.09	46.5	2.44	0.98	47.6	2.44	49.8	n/a	n/a	n/a	2.44	49.76	2.47	122.70	0.252	49.76	40	0.80	0.99	0.27	2.86
51.02441	1.36	# 57.3	15.6	5487	130	220.0	106.3	2.5	0.57	0.09	49.5	2.40	0.98	50.7	2.39	52.9	n/a	n/a	n/a	2.39	52.86	2.28	120.28	0.242	52.86	42	0.79	0.99	0.26	2.74
51.1293	1.33	# 51.8	15.6	4960	127	220.5	106.5	2.7	0.57	0.09	44.5	2.46	0.98	45.6	2.45	47.8	n/a	n/a	n/a	2.45	47.75	2.52	120.57	0.243	47.75	40	0.80	0.99	0.26	2.75
51.23462	1.33	# 51.5	15.6	4932	127	220.9	106.6	2.7	0.57	0.09	44.2	2.46	0.97	45.3	2.45	47.4	n/a	n/a	n/a	2.45	47.45	2.54	120.66	0.243	47.45	39	0.80	0.99	0.26	2.75
51.33908	1.42	# 51	15.6	4884	136	221.4	106.8	2.9	0.57	0.09	43.7	2.49	0.97	44.8	2.48	47.0	n/a	n/a	n/a	2.48	46.96	2.66	125.12	0.262	46.96	39	0.80	0.99	0.28	2.96
51.44397	1.54	# 42.6	15.7	4079	147	221.8	106.9	3.8	0.57	0.09	36.1	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.54844	1.56	# 46.8	15.7	4482	149	222.3	107.0	3.5	0.57	0.09	39.8	2.57	0.97	40.9	2.56	43.0	n/a	n/a	n/a	2.56	43.03	3.11	133.70	0.302	43.03	38	0.80	0.99	0.32	3.41
51.65417	1.46	# 41.6	15.7	3984	140	222.7	107.2	3.7	0.57	0.09	35.1	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.75779	1.46	# 44	15.8	4213	140	223.2	107.3	3.5	0.57	0.09	37.2	2.59	0.97	38.3	2.58	40.4	n/a	n/a	n/a	2.58	40.41	3.23	130.43	0.286	40.41	36	0.80	0.99	0.30	3.23
51.86183	1.44	# 45.5	15.8	4357	138	223.6	107.5	3.3	0.57	0.09	38.5	2.57	0.97	39.6	2.56	41.8	n/a	n/a	n/a	2.56	41.76	3.08	128.60	0.278	41.76	37	0.80	0.99	0.29	3.13
51.96587	1.49	# 43.4	15.8	4156	143	224.1	107.6	3.6	0.57	0.09	36.5	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.07076	1.53	# 45.2	15.9	4328	147	224.5	107.7	3.6	0.57	0.09	38.1	2.59	0.97	39.3	2.58	41.4	n/a	n/a	n/a	2.58	41.43	3.21	133.07	0.299	41.43	37	0.80	0.99	0.32	3.36
52.17394	1.52	# 42.6	15.9	4079	146	225.0	107.9	3.8	0.57	0.09	35.7	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.27629	1.55	# 44.5	15.9	4261	148	225.4	108.0	3.7	0.57	0.09	37.4	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.38118	1.52	# 41.5	16.0	3974	146	225.9	108.1	3.9	0.57	0.09	34.7	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.48564	1.52	# 44.2	16.0	4233	146	226.3	108.3	3.6	0.57	0.09	37.0	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.58798	1.52	# 50	16.0	4788	146	226.8	108.4	3.2	0.57	0.09	42.1	2.53	0.97	43.5	2.52	45.7	n/a	n/a	n/a	2.52	45.68	2.85	130.01	0.284	45.68	39	0.80	0.99	0.30	3.19
52.69117	1.55	# 46.1	16.1	4415	148	227.2	108.5	3.5	0.57	0.09	38.6	2.58	0.97	39.9	2.57	42.1	n/a	n/a	n/a	2.57	42.09	3.17	133.40	0.301	42.09	37	0.80	0.99	0.32	3.37
52.79436	1.62	# 48.1	16.1	4606	155	227.7	108.7	3.5	0.57	0.09	40.3	2.57	0.97	41.7	2.56	43.9	n/a	n/a	n/a	2.56	43.89	3.09	135.57	0.312	43.89	38	0.80	0.99	0.33	3.49
52.89798	1.73	# 44.8	16.1	4290	166	228.1	108.8	4.1	0.57	0.09	37.3	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
53.00116	1.78 #	50.1	16.2	4798	170	228.6	109.0	3.7	0.57	0.09	41.9	2.57	0.96	43.5	2.56	45.7	n/a	n/a	n/a	2.56	45.66	3.10	141.72	0.345	45.66	39	0.80	0.99	0.36	3.85
53.10521	1.67 #	49.8	16.2	4769	160	229.0	109.1	3.5	0.57	0.09	41.6	2.56	0.96	43.2	2.55	45.4	n/a	n/a	n/a	2.55	45.36	3.02	136.91	0.319	45.36	39	0.80	0.99	0.34	3.56
53.20712	1.52 #	61.1	16.2	5851	146	229.4	109.2	2.6	0.57	0.09	51.5	2.40	0.96	53.4	2.39	55.6	n/a	n/a	n/a	2.39	55.62	2.26	125.91	0.266	55.62	43	0.79	0.98	0.28	2.96
53.30946	1.55 #	57.6	16.2	5516	148	229.9	109.4	2.8	0.57	0.09	48.3	2.44	0.96	50.2	2.43	52.4	n/a	n/a	n/a	2.43	52.40	2.45	128.21	0.276	52.40	41	0.79	0.98	0.29	3.07
53.41138	1.6 #	56.3	16.3	5391	153	230.3	109.5	3.0	0.57	0.09	47.1	2.47	0.96	49.0	2.46	51.2	n/a	n/a	n/a	2.46	51.18	2.56	130.84	0.288	51.18	41	0.80	0.98	0.30	3.21
53.51457	1.64 #	57.9	16.3	5545	157	230.8	109.6	3.0	0.57	0.09	48.5	2.46	0.96	50.4	2.45	52.6	n/a	n/a	n/a	2.45	52.60	2.51	132.00	0.294	52.60	42	0.79	0.98	0.31	3.27
53.61606	1.72 #	55.6	16.3	5324	165	231.2	109.8	3.2	0.57	0.09	46.4	2.50	0.96	48.3	2.49	50.5	n/a	n/a	n/a	2.49	50.48	2.70	136.34	0.316	50.48	41	0.80	0.98	0.33	3.51
53.87383	1.96 #	58.5	16.4	5602	188	232.3	110.1	3.5	0.57	0.09	48.8	2.51	0.96	50.8	2.49	53.0	n/a	n/a	n/a	2.49	53.03	2.74	145.28	0.365	53.03	42	0.79	0.98	0.38	4.05
53.97617	1.88 #	60.5	16.5	5793	180	232.8	110.2	3.2	0.57	0.09	50.4	2.47	0.96	52.6	2.46	54.8	n/a	n/a	n/a	2.46	54.81	2.57	141.15	0.342	54.81	42	0.79	0.98	0.36	3.79
54.07893	1.91 #	65.6	16.5	6282	183	233.2	110.4	3.0	0.57	0.09	54.8	2.43	0.96	57.2	2.41	59.4	n/a	n/a	n/a	2.41	59.40	2.37	140.68	0.339	59.40	44	0.78	0.98	0.36	3.75
54.18255	1.95 #	72.2	16.5	6914	187	233.7	110.5	2.8	0.57	0.10	60.4	2.37	0.96	63.1	2.36	65.3	n/a	n/a	n/a	2.36	65.33	2.15	140.66	0.339	65.33	46	0.77	0.98	0.36	3.74
54.28574	1.97 #	73.3	16.5	7019	189	234.1	110.7	2.8	0.57	0.10	61.3	2.37	0.96	64.1	2.35	66.3	n/a	n/a	n/a	2.35	66.29	2.13	141.19	0.342	66.29	47	0.77	0.98	0.36	3.77
54.38977	2.07 #	74.8	16.6	7163	198	234.5	110.8	2.9	0.57	0.10	62.5	2.37	0.96	65.4	2.36	67.6	n/a	n/a	n/a	2.36	67.60	2.14	144.64	0.361	67.60	47	0.76	0.98	0.38	3.99
54.49084	2.18 #	78.6	16.6	7527	209	235.0	110.9	2.9	0.57	0.10	65.7	2.35	0.96	68.8	2.34	71.0	n/a	n/a	n/a	2.34	70.99	2.08	148.01	0.382	70.99	48	0.76	0.98	0.40	4.20
54.59361	2.29 #	79	16.6	7565	219	235.4	111.1	3.0	0.57	0.10	66.0	2.37	0.96	69.1	2.35	71.3	n/a	n/a	n/a	2.35	71.31	2.13	151.84	0.406	71.31	48	0.76	0.98	0.42	4.46
54.6951	2.23 #	85.1	16.7	8149	214	235.9	111.2	2.7	0.57	0.10	71.2	2.31	0.95	74.6	2.30	76.8	n/a	n/a	n/a	2.30	76.77	1.94	148.99	0.388	76.77	50	0.75	0.98	0.41	4.26
54.79744	2.3 #	86.3	16.7	8264	220	236.3	111.3	2.7	0.57	0.10	72.1	2.31	0.95	75.6	2.30	77.8	n/a	n/a	n/a	2.30	77.81	1.94	151.25	0.402	77.81	51	0.75	0.98	0.42	4.41
54.89808	2.44 #	92.9	16.7	8896	234	236.7	111.5	2.7	0.57	0.10	77.7	2.29	0.95	81.5	2.27	83.7	n/a	n/a	n/a	2.27	83.71	1.86	155.56	0.430	83.71	52	0.74	0.98	0.45	4.71
54.99958	2.53 #	91.7	16.8	8781	242	237.2	111.6	2.8	0.57	0.10	76.6	2.31	0.95	80.3	2.29	82.6	n/a	n/a	n/a	2.29	82.58	1.92	158.47	0.450	82.58	52	0.74	0.98	0.47	4.93
55.10149	2.69 #	97	16.8	9289	258	237.6	111.7	2.8	0.57	0.10	81.0	2.29	0.95	85.1	2.27	87.3	n/a	n/a	n/a	2.27	87.30	1.87	~~163.32~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.20171	2.81 #	97.6	16.8	9346	269	238.0	111.9	3.0	0.57	0.10	81.4	2.30	0.95	85.5	2.29	87.8	n/a	n/a	n/a	2.29	87.78	1.90	~~167.00~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.30108	2.86 #	103.7	16.9	9930	274	238.5	112.0	2.8	0.57	0.10	86.5	2.27	0.95	91.0	2.25	93.2	n/a	n/a	n/a	2.25	93.22	1.81	~~168.42~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.40088	2.98 #	104	16.9	9959	285	238.9	112.1	2.9	0.57	0.10	86.7	2.28	0.95	91.2	2.26	93.4	n/a	n/a	n/a	2.26	93.43	1.84	~~171.95~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.50109	3.09 #	111.2	16.9	10649	296	239.3	112.3	2.8	0.57	0.10	92.7	2.25	0.95	97.6	2.23	99.8	n/a	n/a	n/a	2.23	99.84	1.76	~~175.30~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.60173	3.1 #	116.7	16.9	11175	297	239.8	112.4	2.7	0.57	0.10	97.3	2.22	0.95	102.5	2.21	104.7	n/a	n/a	n/a	2.21	104.72	1.68	~~175.98~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.70025	3.19 #	122.2	17.0	11702	305	240.2	112.5	2.7	0.57	0.10	101.9	2.20	0.95	107.3	2.19	109.6	n/a	n/a	n/a	2.19	109.59	1.63	~~179.05~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.79834	3.22 #	119.8	17.0	11472	308	240.6	112.7	2.7	0.57	0.10	99.7	2.22	0.95	105.1	2.20	107.4	n/a	n/a	n/a	2.20	107.37	1.67	~~179.48~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.89729	3.31 #	124.4	17.0	11913	317	241.0	112.8	2.7	0.57	0.10	103.5	2.20	0.95	109.2	2.19	111.4	n/a	n/a	n/a	2.19	111.43	1.64	~~182.41~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.99623	3.33 #	121.5	17.1	11635	319	241.5	112.9	2.8	0.57	0.10	100.9	2.22	0.95	106.5	2.20	108.8	n/a	n/a	n/a	2.20	108.77	1.68	~~182.51~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.09348	3.41 #	126.1	17.1	12075	327	241.9	113.0	2.8	0.57	0.10	104.7	2.20	0.95	110.6	2.19	112.8	n/a	n/a	n/a	2.19	112.83	1.64	~~185.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.19157	3.27 #	121.9	17.1	11673	313	242.3	113.2	2.7	0.57	0.10	101.0	2.21	0.95	106.7	2.20	109.0	n/a	n/a	n/a	2.20	109.01	1.66	~~180.85~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.29009	3.04 #	126.4	17.2	12104	291	242.7	113.3	2.5	0.57	0.10	104.7	2.17	0.95	110.7	2.15	113.0	n/a	n/a	n/a	2.15	112.96	1.55	~~175.54~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.38776	2.8 #	125.3	17.2	11999	268	243.2	113.4	2.3	0.57	0.10	103.6	2.15	0.95	109.6	2.13	111.9	n/a	n/a	n/a	2.13	111.92	1.51	~~169.11~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.485	2.56 #	137.9	17.2	13205	245	243.6	113.6	1.9	0.57	0.10	114.1	2.06	0.94	120.8	2.04	123.1	n/a	n/a	n/a	2.04	123.10	1.36	~~167.13~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.73215	2.51 #	137.8	17.3	13196	240	244.6	113.9	1.9	0.57	0.10	113.7	2.05	0.94	120.6	2.04	122.8	n/a	n/a	n/a	2.04	122.84	1.35	~~165.79~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
56.93938	2.81 #	138.5	17.4	13263	269	245.5	114.2	2.1	0.57	0.10	114.0	2.09	0.94	121.0	2.07	123.3	n/a	n/a	n/a	2.07	123.31	1.40	~~172.83~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.03833	2.78 #	140.3	17.4	13435	266	246.0	114.3	2.0	0.57	0.10	115.4	2.08	0.94	122.6	2.06	124.8	n/a	n/a	n/a	2.06	124.84	1.38	~~172.69~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.13599	2.67 #	145.6	17.4	13943	256	246.4	114.4	1.9	0.57	0.10	119.7	2.04	0.94	127.2	2.02	129.5	n/a	n/a	n/a	2.02	129.49	1.33	~~172.17~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.23579	2.72 #	138.1	17.4	13224	260	246.8	114.6	2.0	0.57	0.10	113.3	2.08	0.94	120.5	2.06	122.7	n/a	n/a	n/a	2.06	122.75	1.39	~~170.42~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.33134	2.68 #	133.6	17.5	12794	257	247.2	114.7	2.0	0.57	0.10	109.4	2.10	0.94	116.4	2.08	118.7	n/a	n/a	n/a	2.08	118.68	1.41	~~167.93~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.42943	2.52 #	117.4	17.5	11242	241	247.7	114.8	2.2	0.57	0.10	95.8	2.16	0.94	101.9	2.14	104.2	n/a	n/a	n/a	2.14	104.23	1.53	159.42	0.457	104.23	58	0.71	0.96	0.47	4.89
57.52752	2.71 #	96.1	17.5	9203	260	248.1	114.9	2.9	0.57	0.10	77.9	2.31	0.94	83.0	2.29	85.3	n/a	n/a	n/a	2.29	85.27	1.91	~~162.96~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.62605	2.66 #	74	17.6	7086	255	248.5	115.1	3.7	0.57	0.10	59.4	2.47	0.94	63.3	2.45	65.6	n/a	n/a	n/a	2.45	65.62	2.52	~~165.27~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.72371	2.6 #	64.4	17.6	6167	249	248.9	115.2	4.2	0.57	0.10	51.4	2.55	0.94	54.8	2.53	57.1	n/a	n/a	n/a	2.53	57.08	2.92	~~166.77~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
57.82011	2.64 #	50	17.6	4788	253	249.3	115.3	5.6	0.57	0.10	39.4	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.03881	2.83 #	50.4	17.7	4826	271	250.3	115.6	5.9	0.57	0.10	39.6	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.13733	2.69 #	47.9	17.7	4587	258	250.7	115.8	5.9	0.57	0.10	37.5	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.23585	2.59 #	50.2	17.8	4807	248	251.1	115.9	5.4	0.57	0.10	39.3	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.33521	2.73 #	40	17.8	3830	261	251.6	116.0	7.3	0.57	0.10	30.8	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.43373	2.92 #	49.4	17.8	4731	280	252.0	116.1	6.2	0.57	0.10	38.6	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.5314	3.05 #	48.4	17.8	4635	292	252.4	116.3	6.7	0.57	0.10	37.7	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.62822	3.17 #	48.8	17.9	4673	304	252.8	116.4	6.9	0.57	0.10	38.0	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.72547	3.01 #	47.7	17.9	4568	288	253.2	116.5	6.7	0.57	0.10	37.0	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.82399	2.92 #	47	17.9	4501	280	253.7	116.7	6.6	0.57	0.10	36.4	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
58.92208	3.05 #	50.9	18.0	4874	292	254.1	116.8	6.3	0.57	0.10	39.6	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.01975	3.16 #	51.1	18.0	4893	303	254.5	116.9	6.5	0.57	0.10	39.7	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.11699	3.24 #	56.7	18.0	5430	310	254.9	117.0	6.0	0.57	0.10	44.2	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.21466	3.29 #	53.5	18.0	5123	315	255.4	117.2	6.5	0.57	0.10	41.5	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.31361	3.39 #	56.3	18.1	5391	325	255.8	117.3	6.3	0.57	0.10	43.8	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.41001	3.38 #	50.7	18.1	4855	324	256.2	117.4	7.0	0.57	0.10	39.2	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
59.50768	3.25 #	53.8	18.1	5152	311	256.6	117.6	6.4	0.57	0.10	41.6	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-10)
GW Depth: 13.0 ft
GW Depth: 4.0 m

Depth (ft)	fs (tsf)	qc (tsf)
59.60662	3.1 #	48.5

z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_O n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_O n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
18.2	4644	297	257.0	117.7	6.8	0.57	0.10	37.3	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.2863	0.22 8	8.1	0.1	776	21	1.2	1.2	2.7	0.57	0.07	627.3	1.79	9.06	69.2	2.32	13.0	n/a	n/a	n/a	2.32	13.01	2.02	26.32	0.072	69.35	48	0.76	1.00	0.08	1.04
0.42078	0.19 #	15.2	0.1	1456	18	1.8	1.8	1.3	0.57	0.07	801.2	1.43	7.47	107.2	1.95	24.4	n/a	n/a	n/a	1.95	24.42	1.24	30.32	0.075	107.35	59	0.70	1.00	0.08	1.09
0.55272	0.19 #	17.9	0.2	1714	18	2.4	2.4	1.1	0.57	0.07	718.2	1.39	6.52	110.1	1.90	28.8	n/a	n/a	n/a	1.90	28.76	1.18	34.07	0.078	110.30	60	0.70	1.00	0.08	1.13
0.68678	0.17 #	9.6	0.2	919	16	3.0	3.0	1.8	0.57	0.07	309.4	1.77	5.85	52.9	2.28	15.4	n/a	n/a	n/a	2.28	15.42	1.89	29.21	0.074	53.07	42	0.79	1.00	0.08	1.07
0.81999	0.22 #	16.9	0.2	1618	21	3.5	3.5	1.3	0.57	0.07	456.7	1.56	5.35	85.3	2.04	27.2	n/a	n/a	n/a	2.04	27.15	1.35	36.72	0.081	85.50	53	0.74	1.00	0.09	1.17
0.95278	0.24 #	17.7	0.3	1695	23	4.1	4.1	1.4	0.57	0.07	411.5	1.60	4.97	82.9	2.06	28.4	n/a	n/a	n/a	2.06	28.44	1.38	39.38	0.083	83.07	52	0.74	1.00	0.09	1.20
1.08769	0.26 #	20.6	0.3	1973	25	4.7	4.7	1.3	0.57	0.07	419.6	1.57	4.65	90.3	2.01	33.1	n/a	n/a	n/a	2.01	33.10	1.31	43.48	0.086	90.49	54	0.73	1.00	0.09	1.25
1.21836	0.26 #	16.5	0.4	1580	25	5.3	5.3	1.6	0.57	0.07	299.7	1.73	4.39	68.3	2.17	26.5	n/a	n/a	n/a	2.17	26.51	1.59	42.05	0.085	68.48	47	0.76	1.00	0.09	1.23
1.34904	0.26 #	29.9	0.4	2863	25	5.8	5.8	0.9	0.57	0.07	491.2	1.40	4.17	117.7	1.82	48.0	n/a	n/a	n/a	1.82	48.04	1.12	53.79	0.094	117.93	62	0.69	1.00	0.10	1.37
1.48183	0.32 #	23	0.5	2202	31	6.4	6.4	1.4	0.57	0.07	343.7	1.65	3.98	86.3	2.05	37.0	n/a	n/a	n/a	2.05	36.95	1.38	50.84	0.092	86.56	53	0.73	1.00	0.10	1.33
1.60954	0.28 #	29.6	0.5	2834	27	6.9	6.9	0.9	0.57	0.07	407.4	1.47	3.82	106.6	1.87	47.6	n/a	n/a	n/a	1.87	47.56	1.17	55.42	0.096	106.88	59	0.70	1.00	0.10	1.39
1.73683	0.27 #	29.5	0.5	2825	26	7.5	7.5	0.9	0.57	0.07	376.2	1.48	3.68	102.3	1.88	47.4	n/a	n/a	n/a	1.88	47.40	1.17	55.44	0.096	102.54	58	0.71	1.00	0.10	1.39
1.86201	0.23 #	21.5	0.6	2059	22	8.0	8.0	1.1	0.57	0.07	255.4	1.64	3.55	71.9	2.04	34.5	n/a	n/a	n/a	2.04	34.54	1.36	46.91	0.089	72.18	49	0.76	1.00	0.10	1.29
1.98676	0.26 #	14.6	0.6	1398	25	8.6	8.6	1.8	0.57	0.07	162.2	1.94	3.44	47.2	2.32	23.5	n/a	n/a	n/a	2.32	23.46	2.03	47.52	0.090	47.45	39	0.80	1.00	0.10	1.30
2.11025	0.26 #	18.4	0.6	1762	25	9.1	9.1	1.4	0.57	0.07	192.6	1.81	3.34	57.7	2.19	29.6	n/a	n/a	n/a	2.19	29.56	1.65	48.67	0.091	58.03	44	0.78	1.00	0.10	1.31
2.2312	0.27 #	24.4	0.7	2337	26	9.6	9.6	1.1	0.57	0.07	241.8	1.67	3.25	74.5	2.04	39.2	n/a	n/a	n/a	2.04	39.20	1.35	53.06	0.094	74.83	50	0.75	1.00	0.10	1.36
2.5268	0.27 #	26.8	0.8	2566	26	10.9	10.9	1.0	0.57	0.07	234.5	1.65	3.05	76.9	2.00	43.1	n/a	n/a	n/a	2.00	43.06	1.30	56.12	0.096	77.24	50	0.75	1.00	0.10	1.39
2.64014	0.28 #	32	0.8	3064	27	11.4	11.4	0.9	0.57	0.07	268.2	1.56	2.98	89.9	1.91	51.4	n/a	n/a	n/a	1.91	51.41	1.20	61.68	0.102	90.22	54	0.73	1.00	0.11	1.47
2.75094	0.26 #	39.1	0.8	3744	25	11.9	11.9	0.7	0.57	0.07	314.6	1.43	2.92	107.7	1.78	62.8	n/a	n/a	n/a	1.78	62.82	1.09	68.49	0.110	108.00	60	0.70	1.00	0.12	1.59
2.86216	0.23 #	31	0.9	2969	22	12.3	12.3	0.7	0.57	0.07	239.5	1.54	2.87	83.6	1.89	49.8	n/a	n/a	n/a	1.89	49.81	1.18	58.95	0.099	83.94	52	0.74	1.00	0.11	1.43
2.97634	0.19 #	24.3	0.9	2327	18	12.8	12.8	0.8	0.57	0.07	180.3	1.65	2.81	64.2	2.00	39.0	n/a	n/a	n/a	2.00	39.04	1.30	50.87	0.092	64.53	46	0.77	1.00	0.10	1.33
3.08756	0.23 #	20.5	0.9	1963	22	13.3	13.3	1.1	0.57	0.07	146.4	1.82	2.76	53.1	2.16	32.9	n/a	n/a	n/a	2.16	32.94	1.57	51.85	0.093	53.45	42	0.79	1.00	0.10	1.34
3.19794	0.22 #	15	1.0	1436	21	13.8	13.8	1.5	0.57	0.07	103.2	2.01	2.71	38.1	2.35	24.1	n/a	n/a	n/a	2.35	24.10	2.11	50.74	0.092	38.43	35	0.80	1.00	0.10	1.33
3.30916	0.19 #	18	1.0	1724	18	14.3	14.3	1.1	0.57	0.07	119.8	1.87	2.66	45.0	2.20	28.9	n/a	n/a	n/a	2.20	28.92	1.68	48.49	0.090	45.33	39	0.80	1.00	0.10	1.31
3.42123	0.25 #	15.2	1.0	1456	24	14.8	14.8	1.7	0.57	0.07	97.7	2.07	2.62	37.3	2.38	24.4	n/a	n/a	n/a	2.38	24.42	2.25	54.84	0.095	37.65	35	0.80	1.00	0.10	1.38
3.53245	0.26 #	11.5	1.1	1101	25	15.2	15.2	2.3	0.57	0.07	71.3	2.26	2.58	27.6	2.57	18.5	n/a	n/a	n/a	2.57	18.48	3.16	58.31	0.098	28.03	30	0.80	1.00	0.11	1.42
3.64494	0.2 #	15.6	1.1	1494	19	15.7	15.7	1.3	0.57	0.07	94.0	2.00	2.54	37.0	2.32	25.1	n/a	n/a	n/a	2.32	25.06	2.02	50.64	0.092	37.43	35	0.80	1.00	0.10	1.33
3.75616	0.18 #	16	1.1	1532	17	16.2	16.2	1.1	0.57	0.07	93.6	1.97	2.50	37.4	2.29	25.7	n/a	n/a	n/a	2.29	25.71	1.90	48.96	0.091	37.82	35	0.80	1.00	0.10	1.31
3.86696	0.21 #	10.2	1.2	977	20	16.7	16.7	2.1	0.57	0.07	57.6	2.30	2.47	23.4	2.61	16.4	3.5	16.4	2.73	2.73	16.39	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.97564	0.24 #	12.8	1.2	1226	23	17.1	17.1	1.9	0.57	0.07	70.5	2.21	2.43	29.0	2.51	20.6	n/a	n/a	n/a	2.51	20.56	2.80	57.52	0.098	29.41	31	0.80	1.00	0.10	1.41
4.08559	0.22 #	13	1.2	1245	21	17.6	17.6	1.7	0.57	0.07	69.7	2.18	2.40	29.0	2.48	20.9	n/a	n/a	n/a	2.48	20.89	2.66	55.62	0.096	29.46	31	0.80	1.00	0.10	1.39
4.19724	0.17 #	12.7	1.3	1216	16	18.1	18.1	1.4	0.57	0.07	66.2	2.13	2.37	28.0	2.43	20.4	n/a	n/a	n/a	2.43	20.40	2.46	50.13	0.092	28.40	31	0.80	1.00	0.10	1.33
4.31015	0.24 #	11.9	1.3	1140	23	18.6	18.6	2.1	0.57	0.07	60.3	2.28	2.33	25.8	2.57	19.1	n/a	n/a	n/a	2.57	19.12	3.12	59.68	0.100	26.26	29	0.80	1.00	0.11	1.44
4.42095	0.24 #	11.6	1.3	1111	23	19.1	19.1	2.1	0.57	0.07	57.3	2.30	2.31	24.8	2.59	18.6	n/a	n/a	n/a	2.59	18.64	3.24	60.41	0.100	25.27	29	0.80	1.00	0.11	1.45
4.53344	0.22 8	7.7	1.4	737	21	19.5	19.5	2.9	0.57	0.07	36.7	2.55	2.28	16.1	2.82	12.4	3.2	12.4	2.92	2.92	12.37	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.6231	0.23 #	9.6	1.4	919	22	19.9	19.9	2.4	0.57	0.07	45.1	2.43	2.25	20.0	2.70	15.4	3.1	15.4	2.79	2.79	15.42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.73601	0.24 #	17.5	1.4	1676	23	20.4	20.4	1.4	0.57	0.07	81.1	2.07	2.23	36.4	2.35	28.1	n/a	n/a	n/a	2.35	28.12	2.10	59.13	0.099	36.84	35	0.80	1.00	0.11	1.43
4.8485	0.25 #	26	1.5	2490	24	20.9	20.9	1.0	0.57	0.07	118.1	1.85	2.20	53.6	2.12	41.8	n/a	n/a	n/a	2.12	41.77	1.49	62.16	0.102	54.09	42	0.79	1.00	0.11	1.48
4.96268	0.26 #	22.2	1.5	2126	25	21.4	21.4	1.2	0.57	0.07	98.3	1.96	2.18	45.2	2.23	35.7	n/a	n/a	n/a	2.23	35.67	1.74	62.03	0.102	45.65	39	0.80	1.00	0.11	1.48
5.07644	0.25 #	24.6	1.5	2356	24	21.9	21.9	1.0	0.57	0.07	106.6	1.90	2.15	49.6	2.16	39.5	n/a	n/a	n/a	2.16	39.52	1.57	62.23	0.102	50.02	40	0.80	1.00	0.11	1.48
5.18851	0.22 #	21.9	1.6	2097	21	22.4	22.4	1.0	0.57	0.07	92.7	1.94	2.13	43.6	2.20	35.2	n/a	n/a	n/a	2.20	35.19	1.68	58.97	0.099	44.04	38	0.80	1.00	0.11	1.43
5.30396	0.2 #	20.6	1.6	1973	19	22.9	22.9	1.0	0.57	0.07	85.2	1.96	2.10	40.5	2.22	33.1	n/a	n/a	n/a	2.22	33.10	1.72	57.03	0.097	40.98	37	0.80	1.00	0.10	1.41
5.41772	0.2 #	10.4	1.7	996	19	23.4	23.4	2.0	0.57	0.07	41.6	2.39	2.08	20.0	2.65	16.7	2.8	16.7	2.71	2.71	16.71	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.471	0.23 #	12.2	1.7	1168	22	23.6	23.6	1.9	0.57	0.07	48.5	2.33	2.07	23.4	2.58	19.6	n/a	n/a	n/a	2.58	19.60	3.23	63.27	0.104	23.89	28	0.80	1.00	0.11	1.50
5.59153	0.23 8	8.2	1.7	785	22	24.1	24.1	2.9	0.57	0.07	31.6	2.59	2.05	15.4	2.84	13.2	2.7	13.2	2.89	2.89	13.17	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.71163	0.19 #	15.4	1.7	1475	18	24.6	24.6	1.3	0.57	0.07	58.9	2.15	2.03	29.0	2.40	24.7	n/a	n/a	n/a	2.40	24.74	2.32	57.37	0.098	29.52	31	0.80	1.00	0.10	1.41
5.83089	0.22 #	19.6	1.8	1877	21	25.1	25.1	1.1	0.57	0.07	73.6	2.05	2.01	36.7	2.29	31.5	n/a	n/a	n/a	2.29	31.49	1.93	60.69	0.101	37.18	35	0.80	1.00	0.11	1.46
5.92223	0.21 #	26.2	1.8	2509	20	25.5	25.5	0.8	0.57	0.07	97.2	1.86	1.99	48.8	2.11	42.1	n/a	n/a	n/a	2.11	42.09	1.47	61.91	0.102	49.32	40	0.80	1.00	0.11	1.48

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.03895	0.22 #	18	1.8	1724	21	26.0	26.0	1.2	0.57	0.07	65.2	2.11	1.97	33.0	2.35	28.9	n/a	n/a	n/a	2.35	28.92	2.13	61.51	0.102	33.56	33	0.80	1.00	0.11	1.47
6.15525	0.22 #	17.9	1.9	1714	21	26.5	26.5	1.2	0.57	0.07	63.6	2.12	1.95	32.5	2.36	28.8	n/a	n/a	n/a	2.36	28.76	2.15	61.91	0.102	33.05	33	0.80	1.00	0.11	1.48
6.24363	0.23 #	13.9	1.9	1331	22	26.9	26.9	1.7	0.57	0.07	48.4	2.30	1.94	25.0	2.53	22.3	n/a	n/a	n/a	2.53	22.33	2.91	65.09	0.106	25.48	29	0.80	1.00	0.11	1.53
6.365	0.24 #	17.7	1.9	1695	23	27.4	27.4	1.4	0.57	0.07	60.8	2.17	1.92	31.6	2.39	28.4	n/a	n/a	n/a	2.39	28.44	2.29	65.01	0.106	32.14	32	0.80	1.00	0.11	1.53
6.48088	0.24 #	16.1	2.0	1542	23	27.9	27.9	1.5	0.57	0.07	54.2	2.23	1.90	28.4	2.46	25.9	n/a	n/a	n/a	2.46	25.87	2.55	66.01	0.107	28.97	31	0.80	1.00	0.11	1.54
6.59886	0.25 #	14.2	2.0	1360	24	28.5	28.5	1.8	0.57	0.07	46.8	2.33	1.89	24.8	2.55	22.8	n/a	n/a	n/a	2.55	22.81	3.01	68.75	0.110	25.32	29	0.80	1.00	0.12	1.59
6.71389	0.26 6	5.6	2.0	536	25	29.0	29.0	4.9	0.57	0.07	17.5	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.83061	0.24 #	15.6	2.1	1494	23	29.5	29.5	1.6	0.57	0.07	49.7	2.27	1.85	26.8	2.48	25.1	n/a	n/a	n/a	2.48	25.06	2.69	67.46	0.109	27.34	30	0.80	1.00	0.12	1.57
6.94902	0.24 #	12.4	2.1	1187	23	30.0	30.0	2.0	0.57	0.07	38.6	2.42	1.84	21.0	2.63	19.9	2.3	19.9	2.65	2.65	19.92	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.06743	0.21 #	17.3	2.2	1657	20	30.5	30.5	1.2	0.57	0.07	53.4	2.18	1.82	29.3	2.40	27.8	n/a	n/a	n/a	2.40	27.79	2.29	63.72	0.104	29.81	31	0.80	1.00	0.11	1.50
7.18204	0.23 #	11.4	2.2	1092	22	31.0	31.0	2.1	0.57	0.07	34.2	2.47	1.81	18.9	2.68	18.3	2.3	18.3	2.69	2.69	18.32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.29833	0.24 #	18.3	2.2	1752	23	31.5	31.5	1.3	0.57	0.07	54.7	2.19	1.79	30.5	2.40	29.4	n/a	n/a	n/a	2.40	29.40	2.31	67.87	0.109	31.03	32	0.80	1.00	0.12	1.58
7.38883	0.21 #	15.2	2.3	1456	20	31.9	31.9	1.4	0.57	0.07	44.7	2.28	1.78	25.1	2.48	24.4	n/a	n/a	n/a	2.48	24.42	2.68	65.57	0.106	25.62	29	0.80	1.00	0.11	1.54
7.5064	0.2 #	16.1	2.3	1542	19	32.4	32.4	1.3	0.57	0.07	46.6	2.24	1.77	26.4	2.44	25.9	n/a	n/a	n/a	2.44	25.87	2.48	64.15	0.105	26.92	30	0.80	1.00	0.11	1.51
7.6227	0.22 6	5.9	2.3	565	21	32.9	32.9	4.0	0.57	0.07	16.2	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.73857	0.21 5	5.1	2.4	488	20	33.4	33.4	4.4	0.57	0.07	13.6	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.85825	0.2 3	3.3	2.4	316	19	33.9	33.9	6.8	0.57	0.07	8.3	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.9775	0.18 9	8.5	2.4	814	17	34.4	34.4	2.2	0.57	0.07	22.7	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.09676	0.19 8	8.4	2.5	804	18	34.9	34.9	2.4	0.57	0.07	22.0	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.21517	0.2 #	13.6	2.5	1302	19	35.4	35.4	1.5	0.57	0.07	35.8	2.37	1.69	21.1	2.56	21.7	n/a	n/a	n/a	2.56	21.74	3.10	67.30	0.108	21.74	27	0.80	1.00	0.12	1.57
8.33274	0.19 #	17.9	2.5	1714	18	35.9	35.9	1.1	0.57	0.07	46.7	2.19	1.68	27.8	2.38	28.4	n/a	n/a	n/a	2.38	28.41	2.24	63.76	0.104	28.41	31	0.80	1.00	0.11	1.51
8.45115	0.16 8	7.6	2.6	728	15	36.4	36.4	2.2	0.57	0.07	19.0	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.56998	0.14 5	5.2	2.6	498	13	37.0	37.0	2.9	0.57	0.07	12.5	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.90407	0.14 7	7.3	2.7	699	13	38.4	38.4	2.0	0.57	0.07	17.2	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.02925	0.11 6	5.7	2.8	546	11	38.9	38.9	2.1	0.57	0.07	13.0	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.15316	0.13 4	4.5	2.8	431	12	39.5	39.5	3.2	0.57	0.07	9.9	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.27706	0.18 #	10.9	2.8	1044	17	40.0	40.0	1.7	0.57	0.07	25.1	2.53	1.59	15.8	2.70	16.4	1.9	17.5	2.66	2.66	17.51	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.40013	0.17 #	13.6	2.9	1302	16	40.5	40.5	1.3	0.57	0.07	31.1	2.38	1.58	19.7	2.55	20.3	n/a	n/a	n/a	2.55	20.32	3.04	61.71	0.102	20.32	26	0.80	1.00	0.11	1.47
9.5215	0.15 #	9.5	2.9	910	14	41.1	41.1	1.7	0.57	0.07	21.2	2.58	1.57	13.5	2.75	14.1	1.9	15.3	2.70	2.70	15.26	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.77143	0.13 3	2.7	3.0	259	12	42.1	42.1	5.8	0.57	0.07	5.1	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.89703	0.1 1	0.5	3.0	48	10	42.7	42.7	184.1	0.57	0.07	0.1	5.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.15161	0.16 2	1.9	3.1	182	15	43.8	43.8	11.1	0.57	0.07	3.2	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.65951	0.19 #	16.4	3.2	1570	18	46.0	46.0	1.2	0.57	0.07	33.2	2.34	1.48	22.3	2.49	23.0	n/a	n/a	n/a	2.49	23.01	2.70	62.10	0.102	23.01	27	0.80	1.00	0.11	1.48
10.78596	0.16 #	12.3	3.3	1178	15	46.5	46.5	1.4	0.57	0.07	24.3	2.48	1.48	16.5	2.63	17.2	1.7	19.8	2.56	2.56	19.76	3.09	61.09	0.101	17.16	24	0.80	1.00	0.11	1.46
10.91198	0.14 #	11.4	3.3	1092	13	47.1	47.1	1.3	0.57	0.07	22.2	2.50	1.47	15.1	2.65	15.8	1.7	18.3	2.58	2.58	18.32	3.18	58.31	0.098	15.81	23	0.80	1.00	0.11	1.42
11.04012	0.19 3	2.8	3.4	268	18	47.6	47.6	8.3	0.57	0.07	4.6	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.16529	0.16 #	11.5	3.4	1101	15	48.1	48.1	1.5	0.57	0.07	21.9	2.54	1.45	15.1	2.68	15.8	1.7	18.3	2.60	2.60	18.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.29343	0.15 8	8.2	3.4	785	14	48.7	48.7	2.0	0.57	0.07	15.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.42114	0.14 6	6.1	3.5	584	13	49.3	49.3	2.5	0.57	0.07	10.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.67531	0.18 2	1.7	3.6	163	17	50.3	50.3	15.3	0.57	0.07	2.2	3.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.8026	0.18 9	9.3	3.6	891	17	50.9	50.9	2.1	0.57	0.07	16.5	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.86519	0.14 9	8.8	3.6	843	13	51.2	51.2	1.7	0.57	0.07	15.5	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.95695	0.15 9	8.6	3.6	824	14	51.6	51.6	1.9	0.57	0.07	15.0	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.05084	0.17 #	14.5	3.7	1389	16	52.0	52.0	1.2	0.57	0.07	25.7	2.44	1.40	18.4	2.56	19.1	n/a	n/a	n/a	2.56	19.14	3.10	59.39	0.099	19.14	25	0.80	1.00	0.11	1.44
12.17601	0.15 #	13	3.7	1245	14	52.5	52.5	1.2	0.57	0.07	22.7	2.48	1.39	16.3	2.60	17.1	1.6	19.5	2.54	2.54	19.47	2.97	57.91	0.098	17.07	24	0.80	1.00	0.11	1.42
12.2995	0.13 #	10.2	3.7	977	12	53.0	53.0	1.3	0.57	0.07	17.4	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.43398	0.17 4	4.4	3.8	421	16	53.6	53.6	4.4	0.57	0.07	6.9	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.55704	0.17 #	10.5	3.8	1005	16	54.1	54.1	1.7	0.57	0.07	17.6	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ℞(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
12.68856	0.18 8	8.2	3.9	785	17	54.7	54.7	2.4	0.57	0.07	13.4	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.81459	0.17 5	4.8	3.9	460	16	55.3	55.3	4.0	0.57	0.07	7.3	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.9182	0.15 3	2.7	3.9	259	14	55.7	55.7	7.1	0.57	0.07	3.6	3.57	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.1343	0.22 1	1.4	4.0	134	21	56.6	56.6	27.2	0.57	0.07	1.4	4.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.26708	0.21 9	9.4	4.0	900	20	57.2	57.2	2.4	0.57	0.07	14.7	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.39565	0.15 #	12.5	4.1	1197	14	57.8	57.8	1.3	0.57	0.07	19.7	2.54	1.32	14.9	2.65	15.6	1.5	17.5	2.59	2.59	17.51	3.26	57.07	0.097	15.65	23	0.80	1.00	0.10	1.41
13.49122	0.16 #	15	4.1	1436	15	58.2	58.2	1.1	0.57	0.07	23.7	2.45	1.32	18.0	2.55	18.7	n/a	n/a	n/a	2.55	18.71	3.05	56.98	0.097	18.71	25	0.80	1.00	0.10	1.41
13.61386	0.17 #	13.2	4.1	1264	16	58.7	58.7	1.4	0.57	0.07	20.5	2.55	1.31	15.6	2.65	16.4	1.5	18.3	2.59	2.59	18.28	3.26	59.52	0.100	16.39	23	0.80	1.00	0.11	1.44
13.71535	0.15 #	12.7	4.2	1216	14	59.1	59.1	1.2	0.57	0.07	19.6	2.54	1.31	14.9	2.64	15.7	1.5	17.5	2.59	2.59	17.50	3.24	56.70	0.097	15.71	23	0.80	1.00	0.10	1.40
13.83884	0.18 6	6.1	4.2	584	17	59.7	59.7	3.3	0.57	0.07	8.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.96106	0.21 6	5.9	4.3	565	20	60.2	60.2	4.0	0.57	0.07	8.4	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.08412	0.17 #	17.4	4.3	1666	16	60.7	60.7	1.0	0.57	0.07	26.4	2.39	1.29	20.5	2.48	21.2	n/a	n/a	n/a	2.48	21.24	2.68	56.99	0.097	21.24	26	0.80	1.00	0.10	1.41
14.20507	0.17 #	15.7	4.3	1503	16	61.3	61.3	1.1	0.57	0.07	23.5	2.45	1.29	18.3	2.55	19.1	n/a	n/a	n/a	2.55	19.08	3.02	57.69	0.098	19.08	25	0.80	1.00	0.10	1.41
14.32855	0.2 8	7.6	4.4	728	19	61.8	61.8	2.9	0.57	0.07	10.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.45119	0.21 3	3.5	4.4	335	20	62.3	62.3	7.4	0.57	0.07	4.4	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.57383	0.17 #	16.7	4.4	1599	16	62.8	62.8	1.1	0.57	0.07	24.4	2.43	1.27	19.3	2.52	20.0	n/a	n/a	n/a	2.52	20.04	2.85	57.06	0.097	20.04	26	0.80	1.00	0.10	1.41
14.6952	0.17 #	15.3	4.5	1465	16	63.4	63.4	1.2	0.57	0.07	22.1	2.48	1.26	17.5	2.57	18.3	n/a	n/a	n/a	2.57	18.28	3.16	57.69	0.098	18.28	24	0.80	1.00	0.10	1.41
14.81658	0.21 #	11.2	4.5	1073	20	63.9	63.9	2.0	0.57	0.07	15.8	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.93541	0.18 #	18.6	4.6	1781	17	64.4	64.4	1.0	0.57	0.07	26.7	2.38	1.25	21.3	2.47	22.0	n/a	n/a	n/a	2.47	22.05	2.60	57.43	0.098	22.05	27	0.80	1.00	0.10	1.41
15.01999	0.21 #	23.4	4.6	2241	20	64.8	64.8	0.9	0.57	0.07	33.6	2.28	1.25	26.9	2.36	27.7	n/a	n/a	n/a	2.36	27.66	2.16	59.68	0.100	27.66	30	0.80	1.00	0.11	1.44
15.13163	0.25 #	21.6	4.6	2068	24	65.3	65.3	1.2	0.57	0.07	30.7	2.37	1.25	24.6	2.45	25.4	n/a	n/a	n/a	2.45	25.44	2.53	64.33	0.105	25.44	29	0.80	1.00	0.11	1.51
15.24581	0.25 #	33.4	4.6	3198	24	65.7	65.7	0.8	0.57	0.07	47.6	2.10	1.24	38.4	2.18	39.2	n/a	n/a	n/a	2.18	39.19	1.63	63.89	0.104	39.19	36	0.80	1.00	0.11	1.51
15.36507	0.23 #	29.9	4.7	2863	22	66.3	66.3	0.8	0.57	0.07	42.2	2.16	1.24	34.1	2.24	34.9	n/a	n/a	n/a	2.24	34.94	1.76	61.43	0.102	34.94	34	0.80	1.00	0.11	1.47
15.46784	0.2 #	23.8	4.7	2279	19	66.7	66.7	0.9	0.57	0.07	33.2	2.27	1.23	26.9	2.35	27.7	n/a	n/a	n/a	2.35	27.72	2.10	58.31	0.098	27.72	30	0.80	1.00	0.11	1.42
15.5909	0.18 #	14.6	4.8	1398	17	67.2	67.2	1.3	0.57	0.07	19.8	2.55	1.23	16.1	2.63	16.9	1.3	18.4	2.58	2.58	18.39	3.19	58.60	0.099	16.94	24	0.80	1.00	0.11	1.43
15.71142	0.2 #	19.4	4.8	1858	19	67.8	67.8	1.1	0.57	0.07	26.4	2.40	1.22	21.6	2.47	22.4	n/a	n/a	n/a	2.47	22.42	2.64	59.21	0.099	22.42	27	0.80	1.00	0.11	1.44
15.83195	0.19 #	16.8	4.8	1609	18	68.3	68.3	1.2	0.57	0.07	22.6	2.48	1.22	18.5	2.55	19.3	n/a	n/a	n/a	2.55	19.34	3.05	59.07	0.099	19.34	25	0.80	1.00	0.11	1.43
15.95247	0.19 #	18.3	4.9	1752	18	68.8	68.8	1.1	0.57	0.07	24.5	2.43	1.21	20.2	2.50	21.0	n/a	n/a	n/a	2.50	20.99	2.78	58.34	0.098	20.99	26	0.80	1.00	0.11	1.42
16.07173	0.21 #	9.8	4.9	938	20	69.3	69.3	2.3	0.57	0.07	12.5	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.19141	0.21 #	13.7	4.9	1312	20	69.8	69.8	1.6	0.57	0.07	17.8	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.31236	0.18 8	7.7	5.0	737	17	70.3	70.3	2.6	0.57	0.07	9.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.43119	0.19 #	16.4	5.0	1570	18	70.9	70.9	1.2	0.57	0.07	21.2	2.51	1.20	17.7	2.58	18.5	n/a	n/a	n/a	2.58	18.53	3.19	59.04	0.099	18.53	25	0.80	1.00	0.11	1.43
16.54833	0.24 #	13.5	5.0	1293	23	71.4	71.4	1.9	0.57	0.07	17.1	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.6659	0.21 #	16.4	5.1	1570	20	71.9	71.9	1.3	0.57	0.07	20.9	2.54	1.19	17.6	2.60	18.4	1.3	19.7	2.56	2.56	19.71	3.08	60.80	0.101	18.40	25	0.80	1.00	0.11	1.46
16.78473	0.17 #	9.7	5.1	929	16	72.4	72.4	1.9	0.57	0.07	11.8	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.90483	0.18 9	9.2	5.2	881	17	72.9	72.9	2.1	0.57	0.07	11.1	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.0224	0.22 5	4.5	5.2	431	21	73.4	73.4	5.9	0.57	0.07	4.9	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.14166	0.19 6	6.3	5.2	603	18	73.9	73.9	3.4	0.57	0.07	7.2	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.26303	0.18 4	3.8	5.3	364	17	74.4	74.4	6.0	0.57	0.07	3.9	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.38355	0.17 1	1.5	5.3	144	16	75.0	75.0	23.7	0.57	0.07	0.9	4.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.74809	0.18 2	1.8	5.4	172	17	76.5	76.5	18.0	0.57	0.07	1.3	4.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.78249	0.06 2	2.4	5.7	230	6	81.0	81.0	3.9	0.57	0.07	1.8	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.91443	0.01 1	1.7	5.8	163	1	81.6	81.6	1.2	0.57	0.07	1.0	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.71498	0.07 4	4.5	6.0	431	7	85.0	85.0	1.9	0.57	0.07	4.1	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.85031	0.06 3	3.2	6.1	306	6	85.6	85.6	2.6	0.57	0.07	2.6	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.11715	0.12 2	1.8	6.1	172	11	86.8	86.8	13.4	0.57	0.07	1.0	4.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.25205	0.15 1	1.7	6.2	163	14	87.3	87.3	19.0	0.57	0.07	0.9	4.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.38611	0.22 3	3.1	6.2	297	21	87.9	87.9	10.1	0.57	0.07	2.4	3.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{cIN} n=.5	C_Q n=.7	q_{cIN} n=.7	I_c n=.7	I_c[5]	q_{cIN}	K_c[5]	$(q_{cIN})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
20.6538	0.2 7	6.9	6.3	661	19	89.1	89.1	3.4	0.57	0.07	6.4	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.78321	0.21 #	39.3	6.3	3763	20	89.6	89.6	0.5	0.57	0.07	41.0	2.09	1.06	38.6	2.11	39.5	n/a	n/a	n/a	2.11	39.49	1.48	58.45	0.099	39.49	36	0.80	1.00	0.11	1.43
20.91008	0.19 #	41.6	6.4	3984	18	90.2	90.2	0.5	0.57	0.07	43.2	2.04	1.06	40.7	2.06	41.7	n/a	n/a	n/a	2.06	41.68	1.39	57.92	0.098	41.68	37	0.80	1.00	0.11	1.42
21.00819	0.15 #	33.7	6.4	3227	14	90.6	90.6	0.5	0.57	0.07	34.6	2.12	1.06	32.7	2.14	33.7	n/a	n/a	n/a	2.14	33.68	1.54	51.89	0.093	33.68	33	0.80	1.00	0.10	1.34
21.15916	0.12 #	34.3	6.4	3285	11	91.2	91.2	0.4	0.57	0.07	35.0	2.08	1.05	33.2	2.10	34.2	n/a	n/a	n/a	2.10	34.16	1.45	49.55	0.091	34.16	33	0.80	1.00	0.10	1.32
21.2873	0.14 #	26.8	6.5	2566	13	91.8	91.8	0.5	0.57	0.07	27.0	2.25	1.05	25.7	2.27	26.6	n/a	n/a	n/a	2.27	26.61	1.86	49.45	0.091	26.61	30	0.80	1.00	0.10	1.32
21.41459	0.21 #	23.7	6.5	2270	20	92.3	92.3	0.9	0.57	0.07	23.6	2.41	1.05	22.5	2.43	23.5	n/a	n/a	n/a	2.43	23.46	2.43	56.91	0.097	23.46	28	0.80	1.00	0.10	1.40
21.544	0.19 8	7.8	6.6	747	18	92.9	92.9	2.8	0.57	0.07	7.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.67467	0.19 6	5.6	6.6	536	18	93.5	93.5	4.1	0.57	0.07	4.7	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.80366	0.22 2	1.7	6.6	163	21	94.0	94.0	30.6	0.57	0.07	0.7	4.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.93053	0.19 6	5.8	6.7	555	18	94.6	94.6	3.9	0.57	0.07	4.9	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.05528	0.15 9	9.2	6.7	881	14	95.1	95.1	1.8	0.57	0.07	8.3	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.1775	0.17 4	3.8	6.8	364	16	95.6	95.6	6.1	0.57	0.07	2.8	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.2976	0.19 #	11	6.8	1053	18	96.2	96.2	1.9	0.57	0.07	10.0	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.41813	0.18 4	4.1	6.8	393	17	96.7	96.7	5.8	0.57	0.07	3.1	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.53907	0.18 5	4.9	6.9	469	17	97.2	97.2	4.6	0.57	0.07	3.8	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.65791	0.16 7	7.6	6.9	728	15	97.7	97.7	2.4	0.57	0.07	6.4	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.77759	0.16 #	11.6	6.9	1111	15	98.2	98.2	1.5	0.57	0.07	10.3	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.89684	0.19 #	14.1	7.0	1350	18	98.7	98.7	1.5	0.57	0.07	12.7	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.01695	0.2 4	3.6	7.0	345	19	99.3	99.3	7.8	0.57	0.07	2.5	3.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.13536	0.19 7	6.9	7.1	661	18	99.8	99.8	3.2	0.57	0.07	5.6	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.25419	0.18 2	2.4	7.1	230	17	100.3	100.3	13.3	0.57	0.07	1.3	4.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.4982	0.17 8	8.2	7.2	785	16	101.3	101.3	2.4	0.57	0.07	6.7	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.6238	0.15 4	4.8	7.2	460	14	101.9	101.9	4.0	0.57	0.07	3.5	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.87754	0.16 1	1.5	7.3	144	15	103.0	103.0	37.7	0.57	0.07	0.4	4.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.00441	0.13 1	1.3	7.3	124	12	103.5	103.5	59.4	0.57	0.07	0.2	5.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.13128	0.07 2	2.3	7.4	220	7	104.1	104.1	5.8	0.57	0.07	1.1	3.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.27718	0.07 2	2	7.4	192	7	104.7	104.7	7.7	0.57	0.07	0.8	4.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.53599	0.07 3	3.8	7.5	364	7	105.8	105.8	2.6	0.57	0.07	2.4	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.66666	0.02 3	3.7	7.5	354	2	106.4	106.4	0.8	0.57	0.07	2.3	3.29	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.92548	0.05 4	4.8	7.6	460	5	107.5	107.5	1.4	0.57	0.07	3.3	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.31835	0.06 3	3.9	7.7	373	6	109.2	109.2	2.2	0.57	0.07	2.4	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.11297	0.11 5	5.2	8.0	498	11	112.6	112.3	2.7	0.57	0.07	3.4	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.24533	0.07 6	6.6	8.0	632	7	113.2	112.4	1.3	0.57	0.07	4.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.51133	0.08 3	3.9	8.1	373	8	114.3	112.8	3.0	0.57	0.07	2.3	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.64497	0.12 4	4.8	8.1	460	11	114.9	113.0	3.3	0.57	0.07	3.1	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.91139	0.08 3	3.5	8.2	335	8	116.1	113.3	3.5	0.57	0.07	1.9	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.15709	0.08 5	5.8	8.3	555	8	117.1	113.7	1.7	0.57	0.07	3.9	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.33556	0.04 5	5.4	8.3	517	4	117.9	113.9	1.0	0.57	0.07	3.5	3.16	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.46793	0.01 2	2.1	8.4	201	1	118.5	114.1	1.2	0.57	0.07	0.7	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.86714	0.08 8	8.9	8.5	852	8	120.2	114.6	1.0	0.57	0.08	6.4	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.99654	0.1 6	6.4	8.5	613	10	120.7	114.8	1.9	0.57	0.08	4.3	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.12933	0.09 5	5.6	8.6	536	9	121.3	114.9	2.1	0.57	0.08	3.6	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.52643	0.1 2	2.8	8.7	268	10	123.0	115.5	6.6	0.57	0.08	1.3	3.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.79032	0.12 3	3.6	8.8	345	11	124.2	115.8	5.2	0.57	0.08	1.9	3.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.92311	0.09 4	4.5	8.8	431	9	124.7	116.0	2.8	0.57	0.08	2.6	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.18911	0.11 2	3	8.9	287	11	125.9	116.3	6.5	0.57	0.08	1.4	3.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.58452	0.13 4	4.7	9.0	450	12	127.6	116.9	3.9	0.57	0.08	2.8	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{cIN} n=.5	C_Q n=.7	q_{cIN} n=.7	I_c n=.7	I_c[5]	q_{cIN}	K_c[5]	$(q_{cIN})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
29.98035	0.08 1	2	9.1	192	8	129.3	117.4	12.3	0.57	0.08	0.5	4.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.1106	0.12 7	7.4	9.2	709	11	129.8	117.6	2.0	0.57	0.08	4.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.24043	0.11 1	1.9	9.2	182	11	130.4	117.7	20.4	0.57	0.08	0.4	4.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.32755	0.12 2	2.9	9.2	278	11	130.8	117.8	7.8	0.57	0.08	1.2	3.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.51912	0.13 1	1.8	9.3	172	12	131.6	118.1	30.5	0.57	0.08	0.3	4.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.65149	0.15 3	4.1	9.3	393	14	132.2	118.3	5.5	0.57	0.08	2.2	3.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.91326	0.15 3	4	9.4	383	14	133.3	118.6	5.8	0.57	0.08	2.1	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.04605	0.15 4	5	9.5	479	14	133.9	118.8	4.2	0.57	0.08	2.9	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.3074	0.16 3	4.1	9.5	393	15	135.0	119.1	5.9	0.57	0.08	2.2	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.44061	0.13 5	6	9.6	575	12	135.6	119.3	2.8	0.57	0.08	3.7	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.70196	0.18 2	2.4	9.7	230	17	136.7	119.7	18.5	0.57	0.08	0.8	4.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.8339	0.2 5	5.2	9.7	498	19	137.3	119.8	5.3	0.57	0.08	3.0	3.57	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.0944	0.21 4	4.2	9.8	402	20	138.4	120.2	7.6	0.57	0.08	2.2	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.22381	0.18 #	14.8	9.8	1417	17	139.0	120.4	1.3	0.57	0.08	10.6	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.35533	0.2 #	19.7	9.9	1886	19	139.5	120.5	1.1	0.57	0.08	14.5	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.48135	0.24 #	13.5	9.9	1293	23	140.1	120.7	2.0	0.57	0.08	9.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.60864	0.21 6	6.5	9.9	622	20	140.6	120.9	4.2	0.57	0.08	4.0	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.86661	0.23 2	2.7	10.0	259	22	141.7	121.2	18.9	0.57	0.08	1.0	4.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.99602	0.19 5	5.6	10.1	536	18	142.3	121.4	4.6	0.57	0.08	3.2	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.25145	0.18 7	7.8	10.1	747	17	143.4	121.7	2.9	0.57	0.08	5.0	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.38043	0.15 4	4.4	10.2	421	14	143.9	121.9	5.2	0.57	0.08	2.3	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.50687	0.19 2	2.6	10.2	249	18	144.5	122.0	17.4	0.57	0.08	0.9	4.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.55805	0.2 4	5	10.2	479	19	144.7	122.1	5.7	0.57	0.08	2.7	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.68407	0.2 9	9.9	10.3	948	19	145.3	122.3	2.4	0.57	0.08	6.6	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.80882	0.19 4	4.2	10.3	402	18	145.8	122.4	7.1	0.57	0.08	2.1	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.93696	0.24 4	4.1	10.3	393	23	146.3	122.6	9.3	0.57	0.08	2.0	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.06383	0.22 7	7.4	10.4	709	21	146.9	122.8	3.8	0.57	0.08	4.6	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.18858	0.23 #	13.4	10.4	1283	22	147.4	122.9	1.9	0.57	0.08	9.2	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.31461	0.26 8	8.3	10.5	795	25	148.0	123.1	3.8	0.57	0.08	5.3	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.44106	0.24 5	5.8	10.5	555	23	148.5	123.3	5.6	0.57	0.08	3.3	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.5675	0.2 5	5.2	10.5	498	19	149.1	123.5	5.5	0.57	0.08	2.8	3.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.69183	0.19 3	3.2	10.6	306	18	149.6	123.6	11.6	0.57	0.08	1.3	4.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.81743	0.18 2	3	10.6	287	17	150.1	123.8	12.6	0.57	0.08	1.1	4.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.94473	0.18 #	11.2	10.7	1073	17	150.7	123.9	1.9	0.57	0.08	7.4	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.06778	0.2 #	16.9	10.7	1618	19	151.2	124.1	1.3	0.57	0.08	11.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.18916	0.15 #	20.3	10.7	1944	14	151.7	124.3	0.8	0.57	0.08	14.4	2.57	0.90	16.0	2.53	17.3	n/a	n/a	n/a	2.53	17.32	2.92	50.67	0.092	17.32	24	0.80	0.96	0.09	1.20
35.31137	0.16 #	17.3	10.8	1657	15	152.3	124.4	1.0	0.57	0.08	12.1	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.43274	0.2 #	12	10.8	1149	19	152.8	124.6	1.9	0.57	0.08	8.0	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.55285	0.2 #	15.3	10.8	1465	19	153.3	124.8	1.5	0.57	0.08	10.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.67253	0.18 #	13.6	10.9	1302	17	153.8	124.9	1.5	0.57	0.08	9.2	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.79517	0.2 9	9.5	10.9	910	19	154.4	125.1	2.5	0.57	0.08	6.0	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.914	0.17 #	14.7	10.9	1408	16	154.9	125.2	1.3	0.57	0.08	10.0	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.03749	0.17 #	10.4	11.0	996	16	155.4	125.4	1.9	0.57	0.08	6.7	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.15716	0.21 7	7.5	11.0	718	20	155.9	125.6	3.6	0.57	0.08	4.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.27727	0.18 #	11.9	11.1	1140	17	156.4	125.7	1.8	0.57	0.08	7.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.39779	0.18 9	9.2	11.1	881	17	157.0	125.9	2.4	0.57	0.08	5.8	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.51704	0.16 6	5.9	11.1	565	15	157.5	126.0	3.8	0.57	0.08	3.2	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.58767	0.14 #	10.7	11.2	1025	13	157.8	126.1	1.5	0.57	0.08	6.9	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[3]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
36.73569	0.2	8	8	11.2	766	19	158.4	126.3	3.2	0.57	0.08	4.8	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.85494	0.21	6	6.7	11.2	642	20	158.9	126.5	4.2	0.57	0.08	3.8	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.95136	0.21	5	5.5	11.3	527	20	159.3	126.6	5.5	0.57	0.08	2.9	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.07273	0.21	3	3.6	11.3	345	20	159.9	126.8	10.9	0.57	0.08	1.5	4.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.17	0.2	4	4.1	11.3	393	19	160.3	126.9	8.2	0.57	0.08	1.8	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.28883	0.19	4	4.7	11.4	450	18	160.8	127.0	6.3	0.57	0.08	2.3	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.40894	0.19	3	3.3	11.4	316	18	161.3	127.2	11.8	0.57	0.08	1.2	4.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.65083	0.19	2	2.3	11.5	220	18	162.4	127.5	31.4	0.57	0.08	0.5	4.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.77221	0.2	4	4.4	11.5	421	19	162.9	127.7	7.4	0.57	0.08	2.0	3.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.87328	0.2	4	4.8	11.5	460	19	163.3	127.8	6.5	0.57	0.08	2.3	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.09445	0.19	3	3.2	11.6	306	18	164.3	128.1	12.8	0.57	0.08	1.1	4.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.40908	0.21	4	4.3	11.7	412	20	165.6	128.5	8.2	0.57	0.08	1.9	3.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.7677	0.23	3	3.3	11.8	316	22	167.2	129.0	14.8	0.57	0.08	1.2	4.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.89288	0.2	3	3.8	11.9	364	19	167.7	129.2	9.8	0.57	0.08	1.5	3.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.01763	0.2	6	7	11.9	670	19	168.3	129.3	3.8	0.57	0.08	3.9	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.14408	0.24	3	4	11.9	383	23	168.8	129.5	10.7	0.57	0.08	1.7	3.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.39486	0.19	2	3	12.0	287	18	169.9	129.8	15.5	0.57	0.08	0.9	4.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.51961	0.2	1	2.1	12.0	201	19	170.4	130.0	62.4	0.57	0.08	0.2	5.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.66212	0.21	6	6.2	12.1	594	20	171.0	130.2	4.8	0.57	0.08	3.2	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.78857	0.24	3	3.4	12.1	326	23	171.6	130.4	14.9	0.57	0.08	1.2	4.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.91502	0.23	7	7.9	12.2	757	22	172.1	130.5	3.8	0.57	0.08	4.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.01355	0.22	8	8.7	12.2	833	21	172.6	130.7	3.2	0.57	0.08	5.1	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.1493	0.22	8	8	12.2	766	21	173.1	130.8	3.6	0.57	0.08	4.5	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.27575	0.22	4	4.9	12.3	469	21	173.7	131.0	7.1	0.57	0.08	2.3	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.40134	0.2	8	8.2	12.3	785	19	174.2	131.2	3.1	0.57	0.08	4.7	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.52483	0.19	#	14.3	12.4	1369	18	174.8	131.3	1.5	0.57	0.08	9.1	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.64916	0.2	#	11.6	12.4	1111	19	175.3	131.5	2.0	0.57	0.08	7.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.77392	0.27	#	11.9	12.4	1140	26	175.8	131.7	2.7	0.57	0.08	7.3	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.89782	0.25	#	13.9	12.5	1331	24	176.4	131.8	2.1	0.57	0.08	8.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.02131	0.19	#	15.5	12.5	1484	18	176.9	132.0	1.4	0.57	0.08	9.9	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.14226	0.22	#	18.2	12.5	1743	21	177.4	132.1	1.3	0.57	0.08	11.8	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.26236	0.21	#	20.8	12.6	1992	20	177.9	132.3	1.1	0.57	0.08	13.7	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.38458	0.24	#	15.7	12.6	1503	23	178.5	132.5	1.7	0.57	0.08	10.0	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.50553	0.24	8	8.4	12.7	804	23	179.0	132.6	3.7	0.57	0.08	4.7	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.62605	0.21	5	5.6	12.7	536	20	179.5	132.8	5.6	0.57	0.08	2.7	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.74869	0.23	2	2.5	12.7	239	22	180.0	132.9	37.1	0.57	0.08	0.4	4.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.99355	0.21	5	5.7	12.8	546	20	181.1	133.3	5.5	0.57	0.08	2.7	3.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.11661	0.25	7	7.9	12.8	757	24	181.6	133.4	4.2	0.57	0.08	4.3	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.2384	0.24	4	4.7	12.9	450	23	182.1	133.6	8.6	0.57	0.08	2.0	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.3602	0.22	7	7.3	12.9	699	21	182.7	133.8	4.1	0.57	0.08	3.9	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.48284	0.21	7	7.6	12.9	728	20	183.2	133.9	3.7	0.57	0.08	4.1	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.60421	0.21	3	3.2	13.0	306	20	183.7	134.1	16.4	0.57	0.08	0.9	4.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.6613	0.22	4	4.2	13.0	402	21	184.0	134.2	9.7	0.57	0.08	1.6	3.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.78648	0.24	6	6.5	13.0	622	23	184.5	134.3	5.2	0.57	0.08	3.3	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.90996	0.24	4	4.8	13.1	460	23	185.0	134.5	8.4	0.57	0.08	2.0	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.03345	0.22	4	4.7	13.1	450	21	185.6	134.6	8.0	0.57	0.08	2.0	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.15778	0.22	2	3	13.2	287	21	186.1	134.8	20.8	0.57	0.08	0.8	4.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.28296	0.24	6	6.9	13.2	661	23	186.6	135.0	4.8	0.57	0.08	3.5	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
43.40518	0.23	8 8.8	13.2	843	22	187.2	135.1	3.4	0.57	0.08	4.9	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.52951	0.24	7 7	13.3	670	23	187.7	135.3	4.8	0.57	0.08	3.6	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.65469	0.25	4 4.9	13.3	469	24	188.3	135.5	8.5	0.57	0.08	2.1	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.77775	0.24	5 5.4	13.3	517	23	188.8	135.6	7.0	0.57	0.08	2.4	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.90377	0.26	2 3	13.4	287	25	189.3	135.8	25.4	0.57	0.08	0.7	4.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.15582	0.23	8 8.7	13.5	833	22	190.4	136.1	3.4	0.57	0.08	4.7	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.28057	0.22	3 3.5	13.5	335	21	191.0	136.3	14.6	0.57	0.08	1.1	4.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.53431	0.19	3 3.7	13.6	354	18	192.0	136.6	11.2	0.57	0.08	1.2	4.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.65991	0.23	2 3	13.6	287	22	192.6	136.8	23.3	0.57	0.08	0.7	4.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.91238	0.23	3 4.1	13.7	393	22	193.7	137.1	11.1	0.57	0.08	1.5	4.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.16357	0.51	8 8.7	13.8	833	49	194.8	137.5	7.7	0.57	0.08	4.6	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.28918	0.7	# 23.7	13.8	2270	67	195.3	137.6	3.2	0.57	0.08	15.1	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.41055	0.84	# 31	13.8	2969	80	195.8	137.8	2.9	0.57	0.08	20.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.53192	1.15	# 32.5	13.9	3112	110	196.3	137.9	3.8	0.57	0.08	21.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.6516	1.09	# 32.7	13.9	3131	104	196.9	138.1	3.6	0.57	0.08	21.2	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.71419	1.04	# 24.7	13.9	2365	100	197.1	138.2	4.6	0.57	0.08	15.7	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.74421	1.04	# 30.3	13.9	2902	100	197.3	138.2	3.7	0.57	0.08	19.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.86389	1.02	# 27.8	14.0	2662	98	197.8	138.4	4.0	0.57	0.08	17.8	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.98357	0.96	# 21.2	14.0	2030	92	198.3	138.5	5.0	0.57	0.08	13.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.10156	0.9	# 20.9	14.1	2001	86	198.8	138.7	4.8	0.57	0.08	13.0	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.21955	0.85	# 16.1	14.1	1542	81	199.3	138.9	6.1	0.57	0.08	9.7	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.33796	0.74	# 12.4	14.1	1187	71	199.8	139.0	7.2	0.57	0.08	7.1	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.4551	0.65	8 8.2	14.2	785	62	200.3	139.2	10.6	0.57	0.08	4.2	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.56928	0.59	4 4.9	14.2	469	56	200.8	139.3	21.0	0.57	0.08	1.9	4.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.68262	0.56	5 5.9	14.2	565	54	201.3	139.5	14.7	0.57	0.08	2.6	3.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.79722	0.54	5 5.8	14.3	555	52	201.8	139.6	14.6	0.57	0.08	2.5	3.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.90718	0.54	3 3.6	14.3	345	52	202.3	139.8	36.3	0.57	0.08	1.0	4.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.01713	0.55	7 7.5	14.3	718	53	202.8	139.9	10.2	0.57	0.08	3.7	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.12877	0.56	3 3.9	14.4	373	54	203.2	140.1	31.5	0.57	0.08	1.2	4.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.23915	0.55	7 7.3	14.4	699	53	203.7	140.2	10.6	0.57	0.08	3.5	3.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.34698	0.55	6 6.7	14.4	642	53	204.2	140.4	12.0	0.57	0.08	3.1	3.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.45567	0.51	5 5	14.5	479	49	204.6	140.5	17.8	0.57	0.08	2.0	4.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.56435	0.53	7 7.8	14.5	747	51	205.1	140.6	9.4	0.57	0.08	3.9	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.6743	0.54	7 7.3	14.5	699	52	205.6	140.8	10.5	0.57	0.08	3.5	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.78299	0.53	8 8.3	14.6	795	51	206.1	140.9	8.6	0.57	0.08	4.2	3.57	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.8904	0.55	8 8.3	14.6	795	53	206.5	141.1	9.0	0.57	0.08	4.2	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.99952	0.54	4 4.1	14.6	393	52	207.0	141.2	27.9	0.57	0.08	1.3	4.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.10989	0.57	8 8.9	14.7	852	55	207.5	141.4	8.5	0.57	0.08	4.6	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.21857	0.58	8 8.4	14.7	804	56	207.9	141.5	9.3	0.57	0.08	4.2	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.3298	0.59	8 8.6	14.7	824	56	208.4	141.6	9.2	0.57	0.08	4.3	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.44059	0.62	9 9.2	14.8	881	59	208.9	141.8	8.8	0.57	0.08	4.7	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.55013	0.61	# 10.1	14.8	967	58	209.4	141.9	7.7	0.57	0.08	5.3	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.66346	0.61	# 9.8	14.8	938	58	209.9	142.1	8.0	0.57	0.08	5.1	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.77553	0.61	# 10.2	14.9	977	58	210.3	142.2	7.6	0.57	0.08	5.4	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.87195	0.6	7 7.3	14.9	699	57	210.8	142.4	11.8	0.57	0.08	3.4	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.01151	0.59	8 8.2	14.9	785	56	211.4	142.6	9.8	0.57	0.08	4.0	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.12315	0.58	# 10.4	15.0	996	56	211.8	142.7	7.1	0.57	0.09	5.5	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.23479	0.58	7 7.2	15.0	689	56	212.3	142.8	11.6	0.57	0.09	3.3	3.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ŁR(CPT-12)
GW Depth: 26.0 ft
GW Depth: 7.9 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
49.34644	0.56 #	10.7	15.0	1025	54	212.8	143.0	6.6	0.57	0.09	5.7	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.45851	0.58 #	10.2	15.1	977	56	213.3	143.1	7.3	0.57	0.09	5.3	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.571	0.6 8	9.1	15.1	871	57	213.8	143.3	8.7	0.57	0.09	4.6	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.6801	0.57 7	8.2	15.1	785	55	214.2	143.4	9.6	0.57	0.09	4.0	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.79048	0.6 #	10.7	15.2	1025	57	214.7	143.6	7.1	0.57	0.09	5.6	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.90128	0.61 8	8.3	15.2	795	58	215.2	143.7	10.1	0.57	0.09	4.0	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.00912	0.61 9	9.5	15.2	910	58	215.7	143.9	8.4	0.57	0.09	4.8	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.11907	0.61 7	8.1	15.3	776	58	216.1	144.0	10.4	0.57	0.09	3.9	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.22902	0.6 6	7.1	15.3	680	57	216.6	144.2	12.4	0.57	0.09	3.2	3.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.33644	0.6 8	8.3	15.3	795	57	217.1	144.3	9.9	0.57	0.09	4.0	3.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.44512	0.58 6	6.2	15.4	594	56	217.5	144.4	14.8	0.57	0.09	2.6	3.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.55338	0.59 9	9.3	15.4	891	56	218.0	144.6	8.4	0.57	0.09	4.7	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.66122	0.58 9	9.1	15.4	871	56	218.5	144.7	8.5	0.57	0.09	4.5	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.76948	0.59 8	8.6	15.5	824	56	218.9	144.9	9.3	0.57	0.09	4.2	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.8769	0.62 6	6.5	15.5	622	59	219.4	145.0	14.7	0.57	0.09	2.8	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.98347	0.59 #	14.1	15.5	1350	56	219.9	145.2	5.0	0.57	0.09	7.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.0913	0.64 8	8	15.6	766	61	220.3	145.3	11.2	0.57	0.09	3.8	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.20041	0.65 9	9.1	15.6	871	62	220.8	145.4	9.6	0.57	0.09	4.5	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.3074	0.64 8	8.3	15.6	795	61	221.3	145.6	10.7	0.57	0.09	3.9	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.4144	0.7 #	12.2	15.7	1168	67	221.7	145.7	7.1	0.57	0.09	6.5	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.52055	0.72 #	10.7	15.7	1025	69	222.2	145.9	8.6	0.57	0.09	5.5	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.62669	0.71 #	15.4	15.7	1475	68	222.6	146.0	5.4	0.57	0.09	8.6	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.73326	0.85 #	14.7	15.8	1408	81	223.1	146.2	6.9	0.57	0.09	8.1	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.83729	0.9 #	12.3	15.8	1178	86	223.5	146.3	9.0	0.57	0.09	6.5	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.92399	0.9 #	11.7	15.8	1120	86	223.9	146.4	9.6	0.57	0.09	6.1	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.05382	0.88 #	13.2	15.9	1264	84	224.5	146.6	8.1	0.57	0.09	7.1	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.16124	0.87 #	12.7	15.9	1216	83	224.9	146.7	8.4	0.57	0.09	6.8	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.26484	0.88 #	12.7	15.9	1216	84	225.4	146.9	8.5	0.57	0.09	6.7	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.36972	0.86 #	10.7	16.0	1025	82	225.8	147.0	10.3	0.57	0.09	5.4	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.47375	0.88 #	15.2	16.0	1456	84	226.3	147.1	6.9	0.57	0.09	8.4	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.5799	0.86 #	14	16.0	1341	82	226.7	147.3	7.4	0.57	0.09	7.6	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.68182	0.82 #	12.5	16.1	1197	79	227.2	147.4	8.1	0.57	0.09	6.6	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.785	0.8 #	11.2	16.1	1073	77	227.6	147.5	9.1	0.57	0.09	5.7	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.8903	0.79 #	12.3	16.1	1178	76	228.1	147.7	8.0	0.57	0.09	6.4	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.99476	0.79 9	10	16.2	958	76	228.5	147.8	10.4	0.57	0.09	4.9	3.57	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.09626	0.81 #	12.2	16.2	1168	78	229.0	148.0	8.3	0.57	0.09	6.3	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.17576	0.79 #	10.1	16.2	967	76	229.3	148.1	10.3	0.57	0.09	5.0	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.27895	0.81 #	11.3	16.2	1082	78	229.8	148.2	9.1	0.57	0.09	5.8	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.38256	0.81 8	8.9	16.3	852	78	230.2	148.3	12.5	0.57	0.09	4.2	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.48447	0.85 #	13.4	16.3	1283	81	230.6	148.5	7.7	0.57	0.09	7.1	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.58639	0.85 #	14.2	16.3	1360	81	231.1	148.6	7.2	0.57	0.09	7.6	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.68873	0.83 #	12.3	16.4	1178	79	231.5	148.7	8.4	0.57	0.09	6.4	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.79234	0.86 #	14.1	16.4	1350	82	232.0	148.9	7.4	0.57	0.09	7.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.89511	0.85 #	12.4	16.4	1187	81	232.4	149.0	8.5	0.57	0.09	6.4	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.99575	0.85 #	15.4	16.5	1475	81	232.8	149.1	6.6	0.57	0.09	8.3	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.09852	0.86 #	15.1	16.5	1446	82	233.3	149.3	6.8	0.57	0.09	8.1	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.19959	0.84 #	12.2	16.5	1168	80	233.7	149.4	8.6	0.57	0.09	6.3	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.30193	0.84 #	12.7	16.6	1216	80	234.2	149.5	8.2	0.57	0.09	6.6	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.40216	0.81 #	11.2	16.6	1073	78	234.6	149.7	9.3	0.57	0.09	5.6	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.50408	0.82 #	15.4	16.6	1475	79	235.0	149.8	6.3	0.57	0.09	8.3	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.60557	0.78 #	14.5	16.6	1389	75	235.5	149.9	6.5	0.57	0.09	7.7	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.31718	0.34	# 16.1	0.1	1542	33	1.4	1.4	2.1	0.57	0.07	1126.2	1.60	8.61	130.8	2.05	25.9	n/a	n/a	n/a	2.05	25.87	1.38	35.62	0.080	130.96	66	0.67	1.00	0.09	1.15
0.45838	0.29	# 16.4	0.1	1570	28	2.0	2.0	1.8	0.57	0.07	793.5	1.58	7.16	110.8	2.05	26.3	n/a	n/a	n/a	2.05	26.35	1.37	35.97	0.080	110.97	60	0.70	1.00	0.09	1.16
0.59831	0.3	# 18.7	0.2	1791	29	2.6	2.6	1.6	0.57	0.07	693.0	1.56	6.27	110.6	2.02	30.0	n/a	n/a	n/a	2.02	30.04	1.32	39.74	0.083	110.75	60	0.70	1.00	0.09	1.20
0.73994	0.41	# 26	0.2	2490	39	3.2	3.2	1.6	0.57	0.07	779.3	1.53	5.64	138.3	1.94	41.8	n/a	n/a	n/a	1.94	41.77	1.23	51.51	0.093	138.47	67	0.66	1.00	0.10	1.34
0.87902	0.42	# 34.5	0.3	3304	40	3.8	3.8	1.2	0.57	0.07	870.6	1.41	5.17	168.4	1.80	55.4	n/a	n/a	n/a	1.80	55.43	1.11	61.48	0.102	168.57	74	0.63	1.00	0.11	1.47
1.01683	0.44	# 26.4	0.3	2528	42	4.4	4.4	1.7	0.57	0.07	575.5	1.61	4.81	119.7	2.00	42.4	n/a	n/a	n/a	2.00	42.42	1.31	55.39	0.096	119.94	63	0.69	1.00	0.10	1.39
1.15464	0.35	# 22	0.4	2107	34	5.0	5.0	1.6	0.57	0.07	422.1	1.65	4.51	93.6	2.07	35.3	n/a	n/a	n/a	2.07	35.35	1.40	49.39	0.091	93.79	55	0.72	1.00	0.10	1.32
1.2916	0.35	# 15	0.4	1436	34	5.6	5.6	2.3	0.57	0.07	256.9	1.91	4.27	60.2	2.32	24.1	n/a	n/a	n/a	2.32	24.10	2.02	48.57	0.090	60.46	45	0.78	1.00	0.10	1.31
1.42984	0.32	# 14.1	0.4	1350	31	6.2	6.2	2.3	0.57	0.07	218.0	1.94	4.05	53.8	2.35	22.7	n/a	n/a	n/a	2.35	22.65	2.11	47.89	0.090	54.02	42	0.79	1.00	0.10	1.30
1.56722	0.37	# 18.8	0.5	1800	35	6.8	6.8	2.0	0.57	0.07	265.4	1.84	3.87	68.5	2.23	30.2	n/a	n/a	n/a	2.23	30.20	1.74	52.56	0.094	68.80	47	0.76	1.00	0.10	1.35
1.70249	0.39	# 26.7	0.5	2557	37	7.3	7.3	1.5	0.57	0.07	347.3	1.67	3.72	93.5	2.04	42.9	n/a	n/a	n/a	2.04	42.90	1.36	58.27	0.098	93.74	55	0.72	1.00	0.11	1.42
1.83521	0.37	# 25	0.6	2394	35	7.9	7.9	1.5	0.57	0.07	301.5	1.71	3.58	84.3	2.08	40.2	n/a	n/a	n/a	2.08	40.17	1.42	56.95	0.097	84.54	53	0.74	1.00	0.10	1.40
1.96708	0.35	# 29.4	0.6	2815	34	8.5	8.5	1.2	0.57	0.07	330.9	1.61	3.46	95.7	1.97	47.2	n/a	n/a	n/a	1.97	47.23	1.27	59.90	0.100	96.03	56	0.72	1.00	0.11	1.45
2.23931	0.35	# 19.8	0.7	1896	34	9.7	9.7	1.8	0.57	0.07	195.3	1.88	3.24	60.3	2.24	31.8	n/a	n/a	n/a	2.24	31.81	1.77	56.26	0.097	60.61	45	0.78	1.00	0.10	1.40
2.37119	0.31	# 16.3	0.7	1561	30	10.2	10.2	1.9	0.57	0.07	151.6	1.98	3.15	48.2	2.33	26.2	n/a	n/a	n/a	2.33	26.19	2.06	54.07	0.095	48.49	40	0.80	1.00	0.10	1.37
2.50009	0.33	# 12.4	0.8	1187	32	10.8	10.8	2.7	0.57	0.07	109.1	2.18	3.07	35.6	2.53	19.9	n/a	n/a	n/a	2.53	19.92	2.92	58.25	0.098	35.93	34	0.80	1.00	0.11	1.42
2.63069	0.29	# 10.2	0.8	977	28	11.3	11.3	2.9	0.57	0.07	85.1	2.28	2.99	28.5	2.62	16.4	4.6	16.4	2.81	2.81	16.39	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.7613	0.26	# 9.7	0.8	929	25	11.9	11.9	2.7	0.57	0.07	77.0	2.29	2.92	26.4	2.63	15.6	4.5	15.6	2.81	2.81	15.58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.89063	0.26	5 4.7	0.9	450	25	12.5	12.5	5.7	0.57	0.07	35.1	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.01996	0.27	7 7.2	0.9	689	26	13.0	13.0	3.8	0.57	0.07	51.9	2.52	2.79	18.6	2.84	11.6	4.2	11.6	3.01	3.01	11.57	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.15013	0.3	6 5.8	1.0	555	29	13.6	13.6	5.3	0.57	0.07	39.9	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.27819	0.29	# 11.5	1.0	1101	28	14.1	14.1	2.6	0.57	0.07	76.9	2.27	2.68	28.7	2.59	18.5	n/a	n/a	n/a	2.59	18.48	3.25	60.07	0.100	29.10	31	0.80	1.00	0.11	1.45
3.4071	0.26	8 7.9	1.0	757	25	14.7	14.7	3.4	0.57	0.07	50.5	2.48	2.63	19.2	2.80	12.7	3.9	12.7	2.94	2.94	12.69	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.53643	0.24	8 8.3	1.1	795	23	15.3	15.3	2.9	0.57	0.07	51.1	2.44	2.58	19.8	2.75	13.3	3.8	13.3	2.89	2.89	13.34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.66576	0.28	6 5.8	1.1	555	27	15.8	15.8	5.0	0.57	0.07	34.1	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.79594	0.27	7 6.8	1.2	651	26	16.4	16.4	4.1	0.57	0.07	38.8	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.92569	0.26	5 4.6	1.2	440	25	16.9	16.9	5.9	0.57	0.07	25.0	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.05714	0.26	7 7.3	1.2	699	25	17.5	17.5	3.7	0.57	0.07	39.0	2.59	2.41	16.2	2.88	11.7	3.4	11.7	2.99	2.99	11.73	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.18732	0.26	3 3.2	1.3	306	25	18.1	18.1	8.6	0.57	0.07	16.0	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.31919	0.19	4 3.8	1.3	364	18	18.6	18.6	5.3	0.57	0.07	18.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.45191	0.13	6 6.4	1.4	613	12	19.2	19.2	2.1	0.57	0.07	30.9	2.51	2.30	13.5	2.80	10.3	3.2	10.3	2.90	2.90	10.28	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.58463	0.11	1 0.7	1.4	67	11	19.8	19.8	22.3	0.57	0.07	2.4	4.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.71905	0.06	2 1.9	1.4	182	6	20.4	20.4	3.6	0.57	0.07	7.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.85389	0.07	1 0.6	1.5	57	7	20.9	20.9	18.4	0.57	0.07	1.7	4.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.98958	0.06	4 3.9	1.5	373	6	21.5	21.5	1.6	0.57	0.07	16.4	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.12655	0.07	3 3	1.6	287	7	22.1	22.1	2.5	0.57	0.07	12.0	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.36867	0.04	1 0.7	1.6	67	4	23.2	23.2	8.7	0.57	0.07	1.9	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.51072	0.07	2 1.8	1.7	172	7	23.8	23.8	4.5	0.57	0.07	6.3	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.64895	0.05	4 3.8	1.7	364	5	24.4	24.4	1.4	0.57	0.07	13.9	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.7592	0.03	2 1.9	1.8	182	3	24.8	24.8	1.8	0.57	0.07	6.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.90337	0.06	0 0.4	1.8	38	6	25.5	25.5	44.7	0.57	0.07	0.5	4.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.045	0.07	5 4.7	1.8	450	7	26.1	26.1	1.6	0.57	0.07	16.3	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.15101	0.05	3 3.4	1.9	326	5	26.5	26.5	1.6	0.57	0.07	11.3	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.29815	0.13	1 1.4	1.9	134	12	27.2	27.2	11.6	0.57	0.07	3.9	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.58225	0.23	# 11.9	2.0	1140	22	28.4	28.4	2.0	0.57	0.07	39.1	2.41	1.89	20.7	2.63	19.1	2.4	19.1	2.66	2.66	19.12	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.726	0.23	8 8.4	2.1	804	22	29.0	29.0	2.8	0.57	0.07	26.7	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.832	0.2	# 10.5	2.1	1005	19	29.5	29.5	2.0	0.57	0.07	33.1	2.47	1.85	17.9	2.68	16.9	2.4	16.9	2.71	2.71	16.87	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.97745	0.21	7 6.8	2.1	651	20	30.1	30.1	3.2	0.57	0.07	20.6	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
7.08346	0.17 9	9.2	2.2	881	16	30.5	30.3	1.9	0.57	0.07	28.1	2.52	1.83	15.3	2.73	14.8	2.3	14.8	2.75	2.75	14.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.23822	0.17 6	5.9	2.2	565	16	31.2	30.5	3.0	0.57	0.07	17.5	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.34381	0.19 4	3.9	2.2	373	18	31.7	30.6	5.3	0.57	0.07	11.2	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.49689	0.15 8	7.9	2.3	757	14	32.3	30.8	2.0	0.57	0.07	23.5	2.59	1.81	13.0	2.80	12.7	2.3	12.7	2.81	2.81	12.69	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.63978	0.11 5	4.8	2.3	460	11	32.9	31.0	2.5	0.57	0.07	13.8	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.7848	0.14 2	2	2.4	192	13	33.6	31.2	8.5	0.57	0.07	5.1	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.04601	0.07 1	0.7	2.5	67	7	34.7	31.6	20.7	0.57	0.07	1.0	4.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.16092	0.06 2	2.1	2.5	201	6	35.2	31.7	3.5	0.57	0.07	5.2	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.41619	0.06 5	4.7	2.6	450	6	36.3	32.1	1.4	0.57	0.07	12.9	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.48445	0.05 2	2.3	2.6	220	5	36.6	32.1	2.6	0.57	0.08	5.7	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.60573	0.1 3	2.9	2.6	278	10	37.1	32.3	4.0	0.57	0.08	7.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.74947	0.06 5	5.2	2.7	498	6	37.7	32.5	1.2	0.57	0.08	14.2	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.89068	0.09 1	1.5	2.7	144	9	38.3	32.7	8.2	0.57	0.08	3.2	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.03188	0.22 4	3.9	2.8	373	21	38.9	32.9	6.3	0.57	0.08	10.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.17223	0.19 7	7.6	2.8	728	18	39.6	33.1	2.6	0.57	0.08	20.8	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.31174	0.23 8	8.2	2.8	785	22	40.2	33.2	3.0	0.57	0.08	22.4	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.45294	0.21 #	9.8	2.9	938	20	40.8	33.4	2.2	0.57	0.08	26.9	2.58	1.74	15.4	2.77	15.7	2.2	15.7	2.76	2.76	15.74	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.59287	0.26 #	13.4	2.9	1283	25	41.4	33.6	2.0	0.57	0.08	36.9	2.44	1.74	21.3	2.63	21.5	2.2	21.5	2.62	2.62	21.53	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.73577	0.22 5	4.6	3.0	440	21	42.0	33.8	5.3	0.57	0.08	11.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.87613	0.2 3	2.8	3.0	268	19	42.6	34.0	8.5	0.57	0.08	6.6	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.01606	0.22 5	5.4	3.1	517	21	43.2	34.2	4.4	0.57	0.08	13.9	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.15684	0.23 5	5	3.1	479	22	43.8	34.4	5.1	0.57	0.08	12.7	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.29804	0.24 4	4.1	3.1	393	23	44.4	34.5	6.6	0.57	0.08	10.1	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.43627	0.25 5	5.5	3.2	527	24	45.0	34.7	5.0	0.57	0.08	13.9	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.57535	0.22 5	4.9	3.2	469	21	45.6	34.9	5.0	0.57	0.08	12.1	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.71528	0.25 #	11.8	3.3	1130	24	46.2	35.1	2.2	0.57	0.08	30.9	2.52	1.70	18.2	2.71	18.9	2.1	19.0	2.69	2.69	18.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.85225	0.3 #	14.5	3.3	1389	29	46.8	35.3	2.1	0.57	0.08	38.0	2.44	1.69	22.4	2.63	23.2	2.1	23.3	2.61	2.61	23.30	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.99048	0.25 #	12.8	3.3	1226	24	47.4	35.5	2.0	0.57	0.08	33.2	2.48	1.69	19.7	2.66	20.4	2.1	20.6	2.64	2.64	20.56	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.1266	0.22 #	11.5	3.4	1101	21	48.0	35.6	2.0	0.57	0.08	29.5	2.51	1.69	17.5	2.70	18.3	2.1	18.5	2.68	2.68	18.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.26356	0.22 3	3.4	3.4	326	21	48.6	35.8	7.6	0.57	0.08	7.7	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.39967	0.22 8	7.6	3.5	728	21	49.2	36.0	3.1	0.57	0.08	18.8	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.49126	0.22 #	11.7	3.5	1120	21	49.6	36.1	2.0	0.57	0.08	29.6	2.51	1.67	17.7	2.69	18.5	2.1	18.8	2.67	2.67	18.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.52434	0.21 8	7.6	3.5	728	20	49.7	36.2	3.0	0.57	0.08	18.7	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.66215	0.19 8	8	3.6	766	18	50.3	36.4	2.5	0.57	0.08	19.7	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.80165	0.25 8	7.8	3.6	747	24	50.9	36.5	3.4	0.57	0.08	19.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.94074	0.23 4	3.8	3.6	364	22	51.5	36.7	7.1	0.57	0.08	8.5	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.07939	0.23 5	4.8	3.7	460	22	52.1	36.9	5.4	0.57	0.08	11.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.21933	0.25 8	8.2	3.7	785	24	52.7	37.1	3.3	0.57	0.08	19.8	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.35799	0.25 #	11.8	3.8	1130	24	53.3	37.3	2.2	0.57	0.08	28.9	2.55	1.65	17.5	2.72	18.4	2.0	19.0	2.69	2.69	18.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.49664	0.2 #	11.1	3.8	1063	19	53.9	37.5	1.9	0.57	0.08	26.9	2.53	1.64	16.4	2.71	17.3	2.0	17.8	2.68	2.68	17.83	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.63615	0.2 7	7.1	3.9	680	19	54.5	37.6	3.1	0.57	0.08	16.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.77354	0.19 5	5.3	3.9	508	18	55.1	37.8	4.0	0.57	0.08	12.0	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.91135	0.26 6	6.4	3.9	613	25	55.7	38.0	4.5	0.57	0.08	14.7	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.0517	0.23 7	7.1	4.0	680	22	56.3	38.2	3.5	0.57	0.08	16.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.18909	0.21 9	9	4.0	862	20	56.9	38.4	2.5	0.57	0.08	21.0	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.3269	0.2 6	6.2	4.1	594	19	57.5	38.6	3.6	0.57	0.08	13.9	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.46555	0.19 6	5.8	4.1	555	18	58.1	38.7	3.7	0.57	0.08	12.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.60548	0.18 7	7.1	4.1	680	17	58.7	38.9	2.8	0.57	0.08	16.0	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{tcoil}: 90 lb/ft³
γ_{tcoil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
13.74457	0.21	3	2.7	4.2	259	20	59.3	39.1	10.1	0.57	0.08	5.1	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.88323	0.22	5	4.9	4.2	469	21	59.9	39.3	5.1	0.57	0.08	10.4	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.02104	0.26	5	4.8	4.3	460	25	60.5	39.5	6.2	0.57	0.08	10.1	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.16054	0.22	#	9.7	4.3	929	21	61.1	39.7	2.4	0.57	0.08	21.9	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.30005	0.28	#	10.3	4.4	986	27	61.7	39.8	2.9	0.57	0.08	23.2	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.43701	0.28	#	24.8	4.4	2375	27	62.3	40.0	1.2	0.57	0.08	57.8	2.14	1.59	36.3	2.30	37.3	n/a	n/a	n/a	2.30	37.29	1.95	72.86	0.116	37.29	35	0.80	1.00	0.12	1.58
14.57355	0.25	#	25.4	4.4	2432	24	62.8	40.2	1.0	0.57	0.08	58.9	2.09	1.59	37.1	2.26	38.1	n/a	n/a	n/a	2.26	38.11	1.83	69.69	0.111	38.11	35	0.80	1.00	0.12	1.52
14.70882	0.23	#	19.6	4.5	1877	22	63.4	40.4	1.2	0.57	0.08	44.9	2.24	1.58	28.4	2.40	29.3	n/a	n/a	n/a	2.40	29.34	2.32	68.14	0.109	29.34	31	0.80	1.00	0.12	1.49
14.85681	0.24	#	14.8	4.5	1417	23	64.1	40.6	1.7	0.57	0.08	33.3	2.43	1.58	21.1	2.59	22.1	n/a	n/a	n/a	2.59	22.10	3.26	72.15	0.115	22.10	27	0.80	1.00	0.12	1.56
14.99589	0.27	7	6.8	4.6	651	26	64.7	40.8	4.4	0.57	0.08	14.4	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.13454	0.23	2	2.1	4.6	201	22	65.3	40.9	16.2	0.57	0.08	3.3	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.27575	0.2	7	6.9	4.7	661	19	65.9	41.1	3.2	0.57	0.08	14.5	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.41568	0.17	5	5.3	4.7	508	16	66.5	41.3	3.7	0.57	0.08	10.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.55349	0.2	3	2.8	4.7	268	19	67.1	41.5	9.5	0.57	0.08	4.8	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.6913	0.19	5	5.1	4.8	488	18	67.7	41.7	4.3	0.57	0.08	10.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.83123	0.2	2	2	4.8	192	19	68.3	41.9	15.5	0.57	0.08	2.9	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.96904	0.23	4	4	4.9	383	22	68.9	42.0	7.0	0.57	0.08	7.5	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.1077	0.23	4	4.3	4.9	412	22	69.5	42.2	6.4	0.57	0.08	8.1	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.24763	0.21	7	7.2	5.0	689	20	70.1	42.4	3.2	0.57	0.08	14.6	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.38459	0.19	3	3.2	5.0	306	18	70.7	42.6	7.7	0.57	0.08	5.5	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.52283	0.19	6	5.6	5.0	536	18	71.3	42.8	3.9	0.57	0.08	10.9	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.66148	0.22	5	4.6	5.1	440	21	71.8	43.0	5.7	0.57	0.08	8.6	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.80141	0.23	3	2.9	5.1	278	22	72.5	43.1	10.7	0.57	0.08	4.8	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.93923	0.18	5	5	5.2	479	17	73.0	43.3	4.2	0.57	0.08	9.4	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.07831	0.2	5	5.3	5.2	508	19	73.6	43.5	4.4	0.57	0.08	10.0	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.21612	0.21	#	12.4	5.2	1187	20	74.2	43.7	1.8	0.57	0.08	25.5	2.54	1.52	16.7	2.69	17.8	1.8	19.9	2.63	2.63	19.92	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.3552	0.24	6	6.1	5.3	584	23	74.8	43.9	4.5	0.57	0.08	11.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.49471	0.24	7	6.7	5.3	642	23	75.4	44.1	4.1	0.57	0.08	12.8	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.77457	0.15	5	5.4	5.4	517	14	76.6	44.4	3.3	0.57	0.08	9.9	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.91407	0.18	2	2.5	5.5	239	17	77.3	44.6	10.6	0.57	0.08	3.6	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.02135	0.21	5	5.5	5.5	527	20	77.7	44.8	4.5	0.57	0.08	10.0	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.16128	0.23	2	2.3	5.5	220	22	78.3	44.9	15.5	0.57	0.08	3.2	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.30333	0.18	5	5.2	5.6	498	17	78.9	45.1	4.1	0.57	0.08	9.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.44284	0.18	4	3.6	5.6	345	17	79.5	45.3	6.5	0.57	0.08	5.9	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.58362	0.18	8	8.5	5.7	814	17	80.1	45.5	2.3	0.57	0.08	16.1	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.72567	0.17	2	2.4	5.7	230	16	80.8	45.7	10.9	0.57	0.08	3.3	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.86475	0.23	4	4.5	5.7	431	22	81.4	45.9	6.3	0.57	0.08	7.6	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.14631	0.19	8	8.6	5.8	824	18	82.6	46.2	2.5	0.57	0.08	16.0	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.28666	0.19	5	4.8	5.9	460	18	83.2	46.4	4.8	0.57	0.08	8.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.42829	0.15	4	4.4	5.9	421	14	83.8	46.6	4.3	0.57	0.08	7.2	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.57034	0.16	1	1.3	6.0	124	15	84.4	46.8	38.2	0.57	0.08	0.9	4.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.7107	0.11	5	5.6	6.0	536	11	85.0	47.0	2.3	0.57	0.08	9.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.85062	0.14	2	1.8	6.1	172	13	85.6	47.2	15.5	0.57	0.08	1.8	4.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.9931	0.1	4	4.2	6.1	402	10	86.2	47.4	3.0	0.57	0.08	6.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.13303	0.13	4	4.2	6.1	402	12	86.8	47.6	3.9	0.57	0.08	6.6	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.27423	0.14	9	9.5	6.2	910	13	87.4	47.7	1.6	0.57	0.08	17.2	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.41544	0.16	3	3.5	6.2	335	15	88.0	47.9	6.2	0.57	0.08	5.2	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.55664	0.15	4	4.5	6.3	431	14	88.6	48.1	4.2	0.57	0.08	7.1	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
20.69742	0.13	7.4	6.3	709	12	89.3	48.3	2.0	0.57	0.08	12.8	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.83819	0.14	3.5	6.4	335	13	89.9	48.5	5.5	0.57	0.08	5.1	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.9794	0.21	3.4	6.4	326	20	90.5	48.7	8.6	0.57	0.08	4.8	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.11975	0.19	5.6	6.4	536	18	91.1	48.9	4.1	0.57	0.08	9.1	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.21007	0.19	6.4	6.5	613	18	91.5	49.0	3.5	0.57	0.08	10.6	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.34576	0.19	4.6	6.5	440	18	92.0	49.2	5.2	0.57	0.08	7.1	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.4823	0.21	6.3	6.5	603	20	92.6	49.3	3.9	0.57	0.08	10.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.61799	0.22	9.3	6.6	891	21	93.2	49.5	2.6	0.57	0.08	16.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.75453	0.23	# 13	6.6	1245	22	93.8	49.7	1.9	0.57	0.08	23.2	2.59	1.43	16.2	2.71	17.5	1.6	20.2	2.63	2.63	20.23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.89064	0.24	5.5	6.7	527	23	94.4	49.9	5.3	0.57	0.08	8.7	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.02464	0.27	5	6.7	479	26	95.0	50.1	6.7	0.57	0.08	7.7	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.16075	0.24	8.7	6.8	833	23	95.6	50.2	3.1	0.57	0.08	14.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.29686	0.25	5.8	6.8	555	24	96.2	50.4	5.2	0.57	0.08	9.1	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.43171	0.25	6.7	6.8	642	24	96.7	50.6	4.4	0.57	0.08	10.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.56697	0.25	4.6	6.9	440	24	97.3	50.8	7.0	0.57	0.08	6.8	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.70224	0.22	# 10	6.9	958	21	97.9	51.0	2.5	0.57	0.08	16.9	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.83496	0.22	4.5	7.0	431	21	98.5	51.1	6.3	0.57	0.08	6.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.96938	0.19	4.6	7.0	440	18	99.1	51.3	5.3	0.57	0.08	6.7	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.1038	0.22	4.7	7.0	450	21	99.6	51.5	6.0	0.57	0.08	6.8	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.23949	0.21	7.3	7.1	699	20	100.2	51.7	3.4	0.57	0.08	11.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.37305	0.22	5	7.1	479	21	100.8	51.8	5.6	0.57	0.08	7.3	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.50747	0.27	6	7.2	575	26	101.4	52.0	5.5	0.57	0.08	9.1	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.64062	0.24	7.1	7.2	680	23	101.9	52.2	4.0	0.57	0.08	11.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.77504	0.26	4.8	7.2	460	25	102.5	52.4	7.0	0.57	0.08	6.8	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.90819	0.22	6.2	7.3	594	21	103.1	52.5	4.3	0.57	0.08	9.3	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.0426	0.12	6.3	7.3	603	11	103.7	52.7	2.3	0.57	0.08	9.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.17702	0.22	# 11.5	7.4	1101	21	104.3	52.9	2.1	0.57	0.08	18.8	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.31271	0.24	5.3	7.4	508	23	104.8	53.1	5.7	0.57	0.08	7.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.45476	0.15	8 7.7	7.5	737	14	105.5	53.3	2.3	0.57	0.08	11.9	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.59512	0.13	1 1.6	7.5	153	12	106.1	53.5	26.4	0.57	0.08	0.9	4.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.7359	0.14	4 4.3	7.5	412	13	106.7	53.6	4.4	0.57	0.08	5.7	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.87498	0.18	6 5.8	7.6	555	17	107.3	53.8	3.8	0.57	0.08	8.3	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.01788	0.17	2 2.3	7.6	220	16	107.9	54.0	14.5	0.57	0.08	2.1	3.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.1595	0.2	3 3.4	7.7	326	19	108.5	54.2	8.8	0.57	0.08	4.0	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.29859	0.16	2 1.7	7.7	163	15	109.1	54.4	28.5	0.57	0.08	1.0	4.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.43937	0.19	6 6.3	7.8	603	18	109.7	54.6	3.7	0.57	0.08	9.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.5793	0.18	2 2.6	7.8	249	17	110.3	54.8	12.4	0.57	0.08	2.5	3.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.71965	0.16	6 6.6	7.8	632	15	110.9	54.9	2.9	0.57	0.09	9.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.8617	0.21	5 4.8	7.9	460	20	111.5	55.1	5.8	0.57	0.09	6.3	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.00121	0.2	8 8	7.9	766	19	112.1	55.3	2.9	0.57	0.09	11.8	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.14029	0.16	4 4.2	8.0	402	15	112.7	55.5	5.3	0.57	0.09	5.2	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.28107	0.2	2 2.2	8.0	211	19	113.3	55.7	19.7	0.57	0.09	1.7	4.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.42227	0.15	6 6.6	8.1	632	14	113.9	55.9	2.8	0.57	0.09	9.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.56178	0.12	4 3.8	8.1	364	11	114.5	56.1	4.6	0.57	0.09	4.4	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.70255	0.15	5 4.8	8.1	460	14	115.1	56.2	4.2	0.57	0.09	6.1	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.84164	0.15	8 8.7	8.2	833	14	115.7	56.4	2.0	0.57	0.09	12.7	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.98284	0.16	3 3.9	8.2	373	15	116.4	56.6	6.0	0.57	0.09	4.5	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.1232	0.16	6 6	8.3	575	15	117.0	56.8	3.3	0.57	0.09	8.1	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ŁR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
27.26313	0.17 5	5.5	8.3	527	16	117.6	57.0	4.0	0.57	0.09	7.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.40306	0.17 4	4.2	8.4	402	16	118.2	57.2	5.7	0.57	0.09	5.0	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.54172	0.14 4	4.7	8.4	450	13	118.8	57.4	4.0	0.57	0.09	5.8	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.69394	0.17 4	4.6	8.4	440	16	119.4	57.6	5.1	0.57	0.09	5.6	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.83387	0.12 5	4.9	8.5	469	11	120.0	57.7	3.3	0.57	0.09	6.0	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.97465	0.12 3	3	8.5	287	11	120.6	57.9	6.9	0.57	0.09	2.9	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.11543	0.17 5	5	8.6	479	16	121.2	58.1	4.6	0.57	0.09	6.2	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.25621	0.15 4	4	8.6	383	14	121.8	58.3	5.5	0.57	0.09	4.5	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.39826	0.12 8	8	8.7	766	11	122.5	58.5	1.8	0.57	0.09	11.0	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.53692	0.14 3	2.9	8.7	278	13	123.1	58.7	8.7	0.57	0.09	2.6	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.67812	0.17 3	3.6	8.7	345	16	123.7	58.9	7.4	0.57	0.09	3.8	3.57	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.81932	0.14 7	7	8.8	670	13	124.3	59.0	2.5	0.57	0.09	9.2	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.95925	0.13 2	1.9	8.8	182	12	124.9	59.2	21.8	0.57	0.09	1.0	4.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.24081	0.12 7	7	8.9	670	11	126.1	59.6	2.1	0.57	0.09	9.1	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.38074	0.15 1	1.6	9.0	153	14	126.7	59.8	54.2	0.57	0.09	0.4	4.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.52194	0.1 4	4.3	9.0	412	10	127.3	60.0	3.4	0.57	0.09	4.7	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.80435	0.11 8	8.3	9.1	795	11	128.5	60.3	1.6	0.57	0.09	11.0	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.94555	0.12 3	3.3	9.1	316	11	129.1	60.5	6.1	0.57	0.09	3.1	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.08421	0.13 3	3	9.2	287	12	129.7	60.7	7.9	0.57	0.09	2.6	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.22584	0.22 4	3.9	9.2	373	21	130.3	60.9	8.7	0.57	0.09	4.0	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.36619	0.23 2	2.7	9.3	259	22	130.9	61.1	17.3	0.57	0.09	2.1	4.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.5057	0.26 5	5.2	9.3	498	25	131.6	61.3	6.8	0.57	0.09	6.0	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.64563	0.31 #	17.1	9.3	1637	30	132.2	61.5	2.0	0.57	0.09	24.5	2.57	1.28	19.1	2.66	20.8	1.4	22.9	2.60	2.60	22.93	3.31	75.89	0.121	20.75	26	0.80	1.00	0.13	1.47
30.78301	0.31 #	14.7	9.4	1408	30	132.7	61.6	2.3	0.57	0.09	20.7	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.88817	0.3 #	20.5	9.4	1963	29	133.2	61.8	1.6	0.57	0.09	29.6	2.45	1.28	23.1	2.54	24.8	n/a	n/a	n/a	2.54	24.81	2.97	73.59	0.117	24.81	29	0.80	1.00	0.13	1.43
31.02556	0.3 #	14.2	9.5	1360	29	133.8	62.0	2.3	0.57	0.09	19.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.12818	0.28 #	12.3	9.5	1178	27	134.2	62.1	2.6	0.57	0.09	16.8	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.27531	0.29 6	6.6	9.5	632	28	134.9	62.3	5.6	0.57	0.09	8.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.38726	0.26 4	3.9	9.6	373	25	135.4	62.4	10.5	0.57	0.09	3.8	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.63998	0.23 2	2.7	9.6	259	22	136.4	62.8	18.0	0.57	0.09	1.9	4.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.74472	0.25 6	6.2	9.7	594	24	136.9	62.9	5.2	0.57	0.09	7.3	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.86684	0.23 #	9.9	9.7	948	22	137.4	63.1	2.7	0.57	0.09	12.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.00423	0.23 5	4.8	9.8	460	22	138.0	63.3	6.8	0.57	0.09	5.1	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.14119	0.22 4	4.3	9.8	412	21	138.6	63.4	7.7	0.57	0.09	4.3	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.55377	0.14 4	4.7	9.9	450	13	140.4	64.0	4.3	0.57	0.09	4.8	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.82854	0.13 3	3.6	10.0	345	12	141.6	64.3	6.1	0.57	0.09	3.2	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.96551	0.14 2	2.8	10.0	268	13	142.2	64.5	10.6	0.57	0.09	2.0	3.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.10586	0.15 2	2.8	10.1	268	14	142.8	64.7	11.5	0.57	0.09	1.9	3.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.24113	0.16 1	1.7	10.1	163	15	143.3	64.9	78.8	0.57	0.09	0.3	5.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.37894	0.17 3	3.8	10.2	364	16	143.9	65.1	7.4	0.57	0.09	3.4	3.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.62275	0.14 2	2.8	10.2	268	13	145.0	65.4	10.9	0.57	0.09	1.9	3.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.75972	0.11 1	1.8	10.3	172	11	145.6	65.6	39.3	0.57	0.09	0.4	4.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.19096	0.09 5	5.4	10.4	517	9	147.4	66.1	2.3	0.57	0.09	5.6	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.60778	0.19 5	5.5	10.5	527	18	149.2	66.7	4.8	0.57	0.09	5.7	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.74856	0.19 6	6.3	10.6	603	18	149.8	66.9	4.0	0.57	0.09	6.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.88722	0.22 5	4.9	10.6	469	21	150.4	67.1	6.6	0.57	0.09	4.8	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.02715	0.19 4	4.4	10.7	421	18	151.0	67.3	6.7	0.57	0.09	4.0	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.16708	0.14 5	5.9	10.7	565	13	151.7	67.4	3.2	0.57	0.09	6.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
35.44524	0.17	3.2	10.8	306	16	152.9	67.8	10.6	0.57	0.09	2.3	3.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.58517	0.14	5.1	10.8	488	13	153.5	68.0	4.0	0.57	0.09	4.9	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.86292	0.13	3	10.9	287	12	154.7	68.4	9.4	0.57	0.09	1.9	3.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.00327	0.13	3.9	11.0	373	12	155.3	68.5	5.7	0.57	0.09	3.2	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.14108	0.14	2.6	11.0	249	13	155.9	68.7	14.4	0.57	0.09	1.4	4.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.27889	0.12	3.1	11.1	297	11	156.4	68.9	8.2	0.57	0.09	2.0	3.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.42052	0.13	3.1	11.1	297	12	157.1	69.1	8.9	0.57	0.09	2.0	3.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.83776	0.14	5.9	11.2	565	13	158.9	69.6	3.3	0.57	0.09	5.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.97557	0.2	1.9	11.3	182	19	159.5	69.8	85.1	0.57	0.09	0.3	5.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.11423	0.2	3	11.3	287	19	160.0	70.0	15.1	0.57	0.09	1.8	4.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.18547	0.22	5	11.3	479	21	160.4	70.1	6.6	0.57	0.09	4.5	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.24356	0.23	4.1	11.4	393	22	160.6	70.2	9.5	0.57	0.09	3.3	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.38095	0.19	3.6	11.4	345	18	161.2	70.4	9.9	0.57	0.09	2.6	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.65826	0.21	4.7	11.5	450	20	162.4	70.7	7.0	0.57	0.09	4.1	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.79692	0.18	7.1	11.5	680	17	163.0	70.9	3.3	0.57	0.09	7.3	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.21247	0.16	6.1	11.6	584	15	164.8	71.5	3.7	0.57	0.09	5.9	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.35113	0.15	2.4	11.7	230	14	165.4	71.6	22.3	0.57	0.09	0.9	4.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.76583	0.15	3.8	11.8	364	14	167.2	72.2	7.3	0.57	0.09	2.7	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.90195	0.16	5.8	11.9	555	15	167.8	72.4	4.0	0.57	0.09	5.4	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.03933	0.15	2.4	11.9	230	14	168.3	72.6	23.4	0.57	0.09	0.8	4.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.17799	0.19	3.6	11.9	345	18	168.9	72.7	10.4	0.57	0.09	2.4	3.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.31453	0.16	4	12.0	383	15	169.5	72.9	7.2	0.57	0.09	2.9	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.4515	0.16	3	12.0	287	15	170.1	73.1	13.1	0.57	0.09	1.6	4.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.59016	0.17	5.2	12.1	498	16	170.7	73.3	5.0	0.57	0.09	4.5	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.72542	0.16	6.8	12.1	651	15	171.3	73.5	3.2	0.57	0.09	6.5	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.86281	0.18	2.4	12.2	230	17	171.9	73.6	29.8	0.57	0.09	0.8	4.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.99892	0.18	4.1	12.2	393	17	172.5	73.8	7.8	0.57	0.09	3.0	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.13546	0.22	7.6	12.2	728	21	173.1	74.0	3.8	0.57	0.09	7.5	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.27242	0.26	4.5	12.3	431	25	173.7	74.2	9.7	0.57	0.09	3.5	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.60402	0.27	# 11	12.4	1053	26	175.1	74.6	2.9	0.57	0.09	11.8	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.74055	0.24	4.3	12.4	412	23	175.7	74.8	9.7	0.57	0.09	3.2	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.87709	0.26	5.5	12.5	527	25	176.3	75.0	7.1	0.57	0.09	4.7	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.01363	0.22	6.4	12.5	613	21	176.9	75.2	4.8	0.57	0.09	5.8	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.15101	0.21	2.6	12.5	249	20	177.5	75.3	28.1	0.57	0.09	0.9	4.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.42155	0.19	7.2	12.6	689	18	178.6	75.7	3.6	0.57	0.09	6.7	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.55851	0.2	3.7	12.7	354	19	179.2	75.9	10.9	0.57	0.09	2.3	3.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.69505	0.2	3.3	12.7	316	19	179.8	76.1	14.1	0.57	0.09	1.8	3.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.83158	0.2	6.9	12.8	661	19	180.4	76.2	4.0	0.57	0.09	6.3	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.96813	0.22	3.2	12.8	306	21	181.0	76.4	16.8	0.57	0.09	1.6	4.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.10297	0.18	5.5	12.8	527	17	181.6	76.6	5.0	0.57	0.09	4.5	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.2395	0.16	3.4	12.9	326	15	182.1	76.8	10.7	0.57	0.09	1.9	3.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.37732	0.19	4.4	12.9	421	18	182.7	77.0	7.6	0.57	0.09	3.1	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.51258	0.18	7	13.0	670	17	183.3	77.1	3.5	0.57	0.09	6.3	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.64827	0.2	3.8	13.0	364	19	183.9	77.3	10.6	0.57	0.09	2.3	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.92007	0.22	7.8	13.1	747	21	185.1	77.7	3.7	0.57	0.09	7.2	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.05746	0.19	3.7	13.1	354	18	185.7	77.9	10.8	0.57	0.09	2.2	3.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.19315	0.2	7.5	13.2	718	19	186.3	78.0	3.6	0.57	0.09	6.8	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.32927	0.24	4.6	13.2	440	23	186.8	78.2	9.1	0.57	0.09	3.2	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-15)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
43.46368	0.3	5 6.1	13.2	584	29	187.4	78.4	7.2	0.57	0.09	5.1	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.55782	0.29	4 4.2	13.3	402	28	187.8	78.5	13.0	0.57	0.09	2.7	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.71513	0.26	9 9.4	13.3	900	25	188.5	78.7	3.5	0.57	0.09	9.0	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.82411	0.29	4 4.2	13.4	402	28	189.0	78.9	13.0	0.57	0.09	2.7	3.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.9598	0.25	3 3.6	13.4	345	24	189.6	79.1	15.4	0.57	0.09	2.0	3.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.09719	0.28	# 11.5	13.4	1101	27	190.2	79.2	2.9	0.57	0.09	11.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.23415	0.27	8 8.4	13.5	804	26	190.8	79.4	4.2	0.57	0.09	7.7	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.36899	0.24	6 7.1	13.5	680	23	191.3	79.6	4.7	0.57	0.09	6.1	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.50384	0.21	4 4.7	13.6	450	20	191.9	79.8	7.8	0.57	0.09	3.2	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.64122	0.16	4 5.1	13.6	488	15	192.5	80.0	5.2	0.57	0.09	3.7	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.77691	0.14	4 4.9	13.6	469	13	193.1	80.1	4.9	0.57	0.09	3.4	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.91472	0.16	2 2.8	13.7	268	15	193.7	80.3	20.6	0.57	0.09	0.9	4.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.05211	0.16	3 3.6	13.7	345	15	194.3	80.5	10.2	0.57	0.09	1.9	3.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.18822	0.16	2 2.9	13.8	278	15	194.9	80.7	18.5	0.57	0.09	1.0	4.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.46215	0.17	2 2.6	13.9	249	16	196.0	81.1	30.8	0.57	0.10	0.7	4.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.59996	0.14	4 4.1	13.9	393	13	196.6	81.2	6.8	0.57	0.10	2.4	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.97777	0.15	2 2.9	14.0	278	14	198.3	81.7	18.1	0.57	0.10	1.0	4.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.11388	0.16	5 5.7	14.1	546	15	198.9	81.9	4.4	0.57	0.10	4.2	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.25085	0.26	2 2.8	14.1	268	25	199.4	82.1	36.3	0.57	0.10	0.8	4.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.38738	0.51	6 6.1	14.1	584	49	200.0	82.3	12.7	0.57	0.10	4.7	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.52265	1.56	# 20.3	14.2	1944	149	200.6	82.5	8.6	0.57	0.10	21.1	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.6524	1.36	# 60.4	14.2	5784	130	201.2	82.6	2.3	0.57	0.10	67.6	2.28	1.11	61.0	2.31	63.2	n/a	n/a	n/a	2.31	63.21	2.00	126.28	0.267	63.21	46	0.77	1.00	0.29	2.99
46.84534	1.44	# 46.1	14.3	4415	138	202.0	82.9	3.3	0.57	0.10	50.8	2.47	1.11	46.0	2.51	48.2	n/a	n/a	n/a	2.51	48.17	2.80	134.71	0.307	48.17	40	0.80	1.00	0.33	3.44
46.97043	0.94	# 44.9	14.3	4300	90	202.6	83.0	2.2	0.57	0.10	49.3	2.37	1.10	44.7	2.40	46.9	n/a	n/a	n/a	2.40	46.87	2.31	108.06	0.197	46.87	39	0.80	1.00	0.21	2.21
47.09848	0.56	# 21	14.4	2011	54	203.1	83.2	3.0	0.57	0.10	21.7	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.22273	1.16	# 57.9	14.4	5545	111	203.6	83.4	2.1	0.57	0.10	64.1	2.27	1.10	58.1	2.30	60.3	n/a	n/a	n/a	2.30	60.32	1.94	116.93	0.229	60.32	44	0.78	1.00	0.24	2.55
47.33509	1.54	# 21.3	14.4	2040	147	204.1	83.5	8.0	0.57	0.10	22.0	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.43347	1.76	# 51	14.5	4884	169	204.5	83.7	3.6	0.57	0.10	55.9	2.47	1.10	50.8	2.50	53.0	n/a	n/a	n/a	2.50	53.05	2.79	147.79	0.380	53.05	42	0.79	1.00	0.41	4.24
47.55135	2.04	# 57.7	14.5	5525	195	205.1	83.8	3.7	0.57	0.10	63.5	2.44	1.10	57.7	2.47	60.0	n/a	n/a	n/a	2.47	59.96	2.63	157.41	0.443	59.96	44	0.78	1.00	0.47	4.94
47.78415	2.15	# 88.3	14.6	8456	206	206.1	84.1	2.5	0.57	0.10	98.1	2.19	1.10	89.4	2.22	91.6	n/a	n/a	n/a	2.22	91.59	1.71	156.95	0.440	91.59	55	0.73	1.00	0.47	4.90
47.89439	1.73	# 60.5	14.6	5793	166	206.5	84.3	3.0	0.57	0.10	66.3	2.36	1.10	60.5	2.39	62.7	n/a	n/a	n/a	2.39	62.70	2.27	142.56	0.349	62.70	45	0.77	1.00	0.37	3.89
48.00209	1.41	# 24.8	14.6	2375	135	207.0	84.4	6.2	0.57	0.10	25.7	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	~~n/a~~	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.08733	1.31	# 42.3	14.7	4051	125	207.4	84.5	3.3	0.57	0.10	45.5	2.51	1.09	41.5	2.54	43.8	n/a	n/a	n/a	2.54	43.77	2.96	129.59	0.282	43.77	38	0.80	1.00	0.30	3.14
48.19715	1.18	# 41.4	14.7	3964	113	207.8	84.7	3.0	0.57	0.10	44.4	2.49	1.09	40.6	2.52	42.8	n/a	n/a	n/a	2.52	42.80	2.87	122.93	0.253	42.80	37	0.80	1.00	0.27	2.81
48.3057	1.14	# 42	14.7	4022	109	208.3	84.8	2.9	0.57	0.10	45.0	2.47	1.09	41.1	2.50	43.4	n/a	n/a	n/a	2.50	43.39	2.77	120.34	0.242	43.39	38	0.80	1.00	0.26	2.69
48.41214	1.18	# 42.4	14.8	4060	113	208.8	85.0	2.9	0.57	0.10	45.3	2.48	1.09	41.5	2.51	43.8	n/a	n/a	n/a	2.51	43.76	2.80	122.34	0.250	43.76	38	0.80	1.00	0.27	2.78
48.51857	1.14	# 43.9	14.8	4204	109	209.2	85.1	2.7	0.57	0.10	46.9	2.45	1.09	43.0	2.47	45.3	n/a	n/a	n/a	2.47	45.27	2.64	119.36	0.238	45.27	39	0.80	1.00	0.26	2.64
48.62585	1.11	# 47.7	14.8	4568	106	209.7	85.2	2.4	0.57	0.10	51.1	2.38	1.09	46.9	2.41	49.2	n/a	n/a	n/a	2.41	49.15	2.36	116.15	0.226	49.15	40	0.80	1.00	0.24	2.50
48.73483	1.2	# 46.9	14.9	4491	115	210.2	85.4	2.7	0.57	0.10	50.1	2.42	1.09	46.0	2.45	48.3	n/a	n/a	n/a	2.45	48.29	2.51	121.24	0.246	48.29	40	0.80	1.00	0.26	2.72
48.84211	1.27	# 47.4	14.9	4539	122	210.6	85.5	2.8	0.57	0.10	50.6	2.43	1.09	46.5	2.46	48.8	n/a	n/a	n/a	2.46	48.76	2.56	124.70	0.260	48.76	40	0.80	1.00	0.28	2.89
48.94938	1.23	# 47.1	14.9	4510	118	211.1	85.7	2.7	0.57	0.10	50.2	2.42	1.09	46.1	2.45	48.4	n/a	n/a	n/a	2.45	48.41	2.53	122.69	0.252	48.41	40	0.80	1.00	0.27	2.79
49.05666	1.28	# 45.9	15.0	4395	123	211.5	85.8	2.9	0.57	0.10	48.8	2.45	1.09	44.9	2.48	47.1	n/a	n/a	n/a	2.48	47.14	2.67	125.84	0.265	47.14	39	0.80	1.00	0.28	2.94
49.16394	1.3	# 47.8	15.0	4577	124	212.0	85.9	2.9	0.57	0.10	50.8	2.43	1.09	46.8	2.46	49.1	n/a	n/a	n/a	2.46	49.05	2.57	126.00	0.266	49.05	40	0.80	1.00	0.28	2.94
49.2691	1.25	# 49	15.0	4692	120	212.5	86.1	2.7	0.57	0.10	52.0	2.41	1.08	48.0	2.43	50.2	n/a	n/a	n/a	2.43	50.24	2.45	122.90	0.253	50.24	41	0.80	1.00	0.27	2.79
49.37723	1.28	# 52	15.1	4980	123	212.9	86.2	2.6	0.57	0.10	55.3	2.38	1.08	51.0	2.40	53.3	n/a	n/a	n/a	2.40	53.27	2.32	123.36	0.255	53.27	42	0.79	1.00	0.27	2.81
49.48663	1.33	# 47.1	15.1	4510	127	213.4	86.4	3.0	0.57	0.10	49.7	2.45	1.08	45.9	2.48	48.2	n/a	n/a	n/a	2.48	48.21	2.65	127.78	0.274	48.21	40	0.80	1.00	0.29	3.03
49.59476	1.38	# 44.9	15.1	4300	132	213.9	86.5	3.2	0.57	0.10	47.2	2.49	1.08	43.6	2.52	45.9	n/a	n/a	n/a	2.52	45.92	2.86	131.45	0.291	45.92	39	0.80	1.00	0.31	3.22
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.33024	0.27 #	12.4	0.1	1187	26	1.4	1.4	2.2	0.57	0.07	832.8	1.65	8.44	98.7	2.15	19.9	n/a	n/a	n/a	2.15	19.92	1.54	30.77	0.076	98.85	57	0.72	1.00	0.08	1.09
0.46462	0.23 #	15.4	0.1	1475	22	2.0	2.0	1.5	0.57	0.07	735.0	1.52	7.11	103.4	2.02	24.7	n/a	n/a	n/a	2.02	24.74	1.32	32.70	0.077	103.50	58	0.71	1.00	0.08	1.12
0.59901	0.19 #	14.7	0.2	1408	18	2.6	2.6	1.3	0.57	0.07	544.0	1.52	6.26	86.9	2.03	23.6	n/a	n/a	n/a	2.03	23.62	1.34	31.66	0.076	87.01	53	0.73	1.00	0.08	1.10
0.7317	0.21 #	17.5	0.2	1676	20	3.2	3.2	1.2	0.57	0.07	530.1	1.50	5.67	93.5	1.98	28.1	n/a	n/a	n/a	1.98	28.12	1.28	35.98	0.080	93.72	55	0.72	1.00	0.09	1.16
0.86609	0.2 #	19.8	0.3	1896	19	3.7	3.7	1.0	0.57	0.07	506.7	1.44	5.21	97.3	1.92	31.8	n/a	n/a	n/a	1.92	31.81	1.21	38.53	0.082	97.47	57	0.72	1.00	0.09	1.19
0.9992	0.21 #	17.9	0.3	1714	20	4.3	4.3	1.2	0.57	0.07	396.8	1.56	4.85	81.8	2.02	28.8	n/a	n/a	n/a	2.02	28.76	1.33	38.26	0.082	82.03	52	0.74	1.00	0.09	1.18
1.13146	0.24 #	15.8	0.3	1513	23	4.9	4.9	1.5	0.57	0.07	309.1	1.71	4.56	67.8	2.16	25.4	n/a	n/a	n/a	2.16	25.38	1.57	39.81	0.083	68.05	47	0.76	1.00	0.09	1.20
1.26416	0.23 #	15.5	0.4	1484	22	5.5	5.5	1.5	0.57	0.07	271.3	1.74	4.31	62.9	2.18	24.9	n/a	n/a	n/a	2.18	24.90	1.61	40.07	0.083	63.15	46	0.77	1.00	0.09	1.21
1.39515	0.22 #	12.4	0.4	1187	21	6.0	6.0	1.8	0.57	0.07	196.4	1.88	4.10	47.8	2.32	19.9	n/a	n/a	n/a	2.32	19.92	2.00	39.94	0.083	48.09	40	0.80	1.00	0.09	1.20
1.52699	0.25 #	13.3	0.5	1274	24	6.6	6.6	1.9	0.57	0.07	192.4	1.91	3.92	49.1	2.32	21.4	n/a	n/a	n/a	2.32	21.37	2.03	43.40	0.086	49.31	40	0.80	1.00	0.09	1.25
1.65841	0.22 #	15.3	0.5	1465	21	7.2	7.2	1.4	0.57	0.07	203.9	1.80	3.76	54.2	2.22	24.6	n/a	n/a	n/a	2.22	24.58	1.71	42.07	0.085	54.43	42	0.79	1.00	0.09	1.23
1.78686	0.23 #	14	0.5	1341	22	7.7	7.7	1.7	0.57	0.07	173.0	1.89	3.63	47.7	2.30	22.5	n/a	n/a	n/a	2.30	22.49	1.94	43.64	0.086	47.98	40	0.80	1.00	0.09	1.25
1.91531	0.23 #	13.7	0.6	1312	22	8.3	8.3	1.7	0.57	0.07	157.8	1.93	3.50	45.1	2.32	22.0	n/a	n/a	n/a	2.32	22.01	2.02	44.54	0.087	45.35	39	0.80	1.00	0.09	1.26
2.23114	0.25 #	11.3	0.7	1082	24	9.6	9.6	2.2	0.57	0.07	111.5	2.12	3.25	34.3	2.49	18.2	n/a	n/a	n/a	2.49	18.15	2.72	49.38	0.091	34.66	34	0.80	1.00	0.10	1.32
2.35831	0.23 #	11.2	0.7	1073	22	10.2	10.2	2.1	0.57	0.07	104.5	2.11	3.16	33.1	2.48	18.0	n/a	n/a	n/a	2.48	17.99	2.68	48.29	0.090	33.41	33	0.80	1.00	0.10	1.30
2.48465	0.21 9	9.4	0.8	900	20	10.7	10.7	2.3	0.57	0.07	83.0	2.21	3.08	27.0	2.58	15.1	n/a	n/a	n/a	2.58	15.10	3.18	48.05	0.090	27.32	30	0.80	1.00	0.10	1.30
2.6114	0.23 #	12.7	0.8	1216	22	11.3	11.3	1.8	0.57	0.07	107.0	2.07	3.00	35.7	2.42	20.4	n/a	n/a	n/a	2.42	20.40	2.41	49.20	0.091	36.00	34	0.80	1.00	0.10	1.32
2.73731	0.23 #	12.5	0.8	1197	22	11.8	11.8	1.9	0.57	0.07	100.4	2.09	2.93	34.3	2.44	20.1	n/a	n/a	n/a	2.44	20.08	2.49	50.02	0.092	34.61	34	0.80	1.00	0.10	1.32
2.86152	0.24 #	13.4	0.9	1283	23	12.3	12.3	1.8	0.57	0.07	103.0	2.08	2.87	35.9	2.42	21.5	n/a	n/a	n/a	2.42	21.53	2.39	51.41	0.093	36.29	34	0.80	1.00	0.10	1.34
2.98573	0.25 #	11	0.9	1053	24	12.9	12.9	2.3	0.57	0.07	80.8	2.22	2.81	28.8	2.56	17.7	n/a	n/a	n/a	2.56	17.67	3.08	54.44	0.095	29.16	31	0.80	1.00	0.10	1.37
3.11121	0.22 #	12.7	0.9	1216	21	13.4	13.4	1.8	0.57	0.07	89.6	2.11	2.75	32.6	2.44	20.4	n/a	n/a	n/a	2.44	20.40	2.50	50.97	0.092	32.98	33	0.80	1.00	0.10	1.33
3.2367	0.21 #	10	1.0	958	20	14.0	14.0	2.1	0.57	0.07	67.6	2.26	2.69	25.1	2.59	16.1	n/a	n/a	n/a	2.59	16.07	3.24	52.04	0.093	25.46	29	0.80	1.00	0.10	1.35
3.36133	0.22 #	11.9	1.0	1140	21	14.5	14.5	1.9	0.57	0.07	77.6	2.17	2.64	29.4	2.50	19.1	n/a	n/a	n/a	2.50	19.12	2.75	52.67	0.094	29.73	31	0.80	1.00	0.10	1.35
3.48724	0.23 #	10.2	1.1	977	22	15.0	15.0	2.3	0.57	0.07	64.0	2.29	2.60	24.6	2.61	16.4	3.8	16.4	2.75	2.75	16.39	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.61272	0.22 #	10.3	1.1	986	21	15.6	15.6	2.2	0.57	0.07	62.3	2.29	2.55	24.4	2.60	16.5	n/a	n/a	n/a	2.60	16.55	3.32	55.00	0.095	24.83	29	0.80	1.00	0.10	1.38
3.7382	0.22 9	9.5	1.1	910	21	16.1	16.1	2.4	0.57	0.07	55.4	2.35	2.51	22.1	2.66	15.3	3.6	15.3	2.79	2.79	15.26	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.86199	0.22 8	7.7	1.2	737	21	16.7	16.7	2.9	0.57	0.07	43.3	2.49	2.47	17.5	2.79	12.4	3.5	12.4	2.91	2.91	12.37	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.98832	0.22 #	10	1.2	958	21	17.2	17.2	2.2	0.57	0.07	54.7	2.34	2.43	22.5	2.64	16.1	3.5	16.1	2.76	2.76	16.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.11592	0.22 9	9.2	1.3	881	21	17.7	17.7	2.4	0.57	0.07	48.6	2.40	2.39	20.4	2.69	14.8	3.4	14.8	2.81	2.81	14.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.24056	0.21 #	11.7	1.3	1120	20	18.3	18.3	1.8	0.57	0.07	60.3	2.25	2.35	25.6	2.54	18.8	n/a	n/a	n/a	2.54	18.80	2.97	55.85	0.096	26.03	29	0.80	1.00	0.10	1.39
4.36646	0.21 #	9.9	1.3	948	20	18.8	18.8	2.2	0.57	0.07	49.3	2.36	2.32	21.3	2.65	15.9	3.2	15.9	2.75	2.75	15.91	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.4928	0.21 #	12.2	1.4	1168	20	19.4	19.4	1.8	0.57	0.07	59.3	2.24	2.29	25.9	2.52	19.6	n/a	n/a	n/a	2.52	19.60	2.89	56.66	0.097	26.37	29	0.80	1.00	0.10	1.40
4.61701	0.2 8	8	1.4	766	19	19.9	19.9	2.6	0.57	0.07	37.5	2.50	2.26	16.6	2.78	12.9	3.1	12.9	2.87	2.87	12.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.74376	0.19 6	5.9	1.4	565	18	20.5	20.5	3.3	0.57	0.07	26.6	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.87052	0.15 4	3.5	1.5	335	14	21.0	21.0	4.6	0.57	0.07	15.0	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.99727	0.06 2	1.9	1.5	182	6	21.5	21.5	3.6	0.57	0.07	7.4	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.12445	0.03 3	2.8	1.6	268	3	22.1	22.1	1.2	0.57	0.07	11.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.22831	0.03 1	0.7	1.6	67	3	22.5	22.5	6.5	0.57	0.07	2.0	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.30886	0.03 1	0.8	1.6	77	3	22.9	22.9	5.3	0.57	0.07	2.3	3.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.70226	0.03 2	2.2	1.7	211	3	24.6	24.6	1.5	0.57	0.07	7.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.96849	0.09 2	1.8	1.8	172	9	25.7	25.7	5.9	0.57	0.07	5.7	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.09991	0.12 3	2.6	1.9	249	11	26.3	26.3	5.2	0.57	0.07	8.5	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.23345	0.11 3	3.1	1.9	297	11	26.9	26.9	3.9	0.57	0.07	10.0	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.36656	0.17 5	5.2	1.9	498	16	27.5	27.5	3.5	0.57	0.07	17.1	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.49798	0.14 4	3.9	2.0	373	13	28.0	28.0	3.9	0.57	0.07	12.3	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.63109	0.07 2	2	2.0	192	7	28.6	28.6	4.1	0.57	0.07	5.7	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.7659	0.1 3	3.4	2.1	326	10	29.2	29.2	3.2	0.57	0.07	10.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.03467	0.09 3	3.3	2.1	316	9	30.3	30.2	3.0	0.57	0.07	9.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
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64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
7.16948	0.14	1 1.2	2.2	115	13	30.9	30.4	16.0	0.57	0.07	2.8	3.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.30514	0.15	1 0.7	2.2	67	14	31.5	30.6	40.4	0.57	0.07	1.2	4.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.4391	0.12	5 5.3	2.3	508	11	32.1	30.8	2.4	0.57	0.07	15.5	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.57433	0.11	5 5.1	2.3	488	11	32.7	30.9	2.3	0.57	0.07	14.7	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.70956	0.08	1 0.7	2.3	67	8	33.2	31.1	22.7	0.57	0.07	1.1	4.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.97791	0.07	2 2.1	2.4	201	7	34.4	31.5	4.0	0.57	0.07	5.3	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.11314	0.06	1 1.4	2.5	134	6	35.0	31.7	5.8	0.57	0.07	3.1	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.24753	0.06	1 1.3	2.5	124	6	35.6	31.8	6.5	0.57	0.07	2.8	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.69223	0.08	4 4	2.6	383	8	37.5	32.4	2.2	0.57	0.08	10.7	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.82662	0.17	1 0.8	2.7	77	16	38.1	32.6	42.2	0.57	0.08	1.2	4.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.961	0.2	4 4.4	2.7	421	19	38.6	32.8	5.0	0.57	0.08	11.7	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.09242	0.2	# 16.5	2.8	1580	19	39.2	33.0	1.2	0.57	0.08	46.8	2.23	1.75	26.7	2.43	26.5	n/a	n/a	n/a	2.43	26.51	2.44	64.68	0.105	27.34	30	0.80	1.00	0.11	1.49
9.22553	0.24	# 29	2.8	2777	23	39.8	33.1	0.8	0.57	0.08	82.6	1.93	1.75	47.2	2.13	46.6	n/a	n/a	n/a	2.13	46.59	1.51	70.36	0.112	47.93	40	0.80	1.00	0.12	1.60
9.35526	0.24	# 15.7	2.9	1503	23	40.3	33.3	1.6	0.57	0.08	43.9	2.31	1.74	25.2	2.51	25.2	n/a	n/a	n/a	2.51	25.22	2.80	70.74	0.113	25.88	29	0.80	1.00	0.12	1.60
9.4871	0.21	7 7.4	2.9	709	20	40.9	33.5	3.0	0.57	0.08	19.9	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.62106	0.21	4 4	2.9	383	20	41.5	33.7	5.9	0.57	0.08	10.1	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.75375	0.19	3 3.4	3.0	326	18	42.1	33.8	6.4	0.57	0.08	8.4	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.88644	0.18	# 17.8	3.0	1705	17	42.6	34.0	1.0	0.57	0.08	48.9	2.17	1.73	28.3	2.37	28.6	n/a	n/a	n/a	2.37	28.60	2.18	62.35	0.103	29.04	31	0.80	1.00	0.11	1.45
10.01955	0.2	8 8	3.1	766	19	43.2	34.2	2.6	0.57	0.08	21.1	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.15097	0.19	5 4.9	3.1	469	18	43.8	34.4	4.3	0.57	0.08	12.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.28366	0.15	8 8.5	3.1	814	14	44.3	34.5	1.9	0.57	0.08	22.3	2.59	1.71	13.0	2.79	13.7	2.1	13.7	2.77	2.77	13.66	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.41423	0.14	4 4.5	3.2	431	13	44.9	34.7	3.5	0.57	0.08	11.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.67749	0.18	3 3.3	3.3	316	17	46.0	35.0	6.4	0.57	0.08	7.7	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.80975	0.2	# 10.5	3.3	1005	19	46.6	35.2	2.0	0.57	0.08	27.2	2.54	1.70	16.1	2.73	16.8	2.1	16.9	2.71	2.71	16.87	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.93863	0.2	# 21.8	3.3	2088	19	47.2	35.4	0.9	0.57	0.08	57.6	2.08	1.69	34.1	2.28	34.9	n/a	n/a	n/a	2.28	34.86	1.87	65.24	0.106	34.86	34	0.80	1.00	0.11	1.48
11.06708	0.18	# 17.2	3.4	1647	17	47.7	35.6	1.1	0.57	0.08	45.0	2.21	1.69	26.6	2.40	27.4	n/a	n/a	n/a	2.40	27.44	2.30	63.18	0.103	27.44	30	0.80	1.00	0.11	1.45
11.19595	0.18	# 15.4	3.4	1475	17	48.3	35.7	1.2	0.57	0.08	39.9	2.28	1.68	23.7	2.47	24.5	n/a	n/a	n/a	2.47	24.51	2.61	63.88	0.104	24.51	28	0.80	1.00	0.11	1.46
11.32398	0.17	# 9.9	3.5	948	16	48.8	35.9	1.8	0.57	0.08	25.0	2.54	1.68	14.9	2.73	15.7	2.1	15.9	2.71	2.71	15.91	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.45286	0.13	5 5.3	3.5	508	12	49.4	36.1	2.7	0.57	0.08	12.7	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.87721	0.11	5 5.1	3.6	488	11	51.2	36.6	2.4	0.57	0.08	11.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.00735	0.11	2 2.5	3.7	239	11	51.8	36.8	5.6	0.57	0.08	5.1	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.13792	0.11	2 1.8	3.7	172	11	52.3	37.0	8.8	0.57	0.08	3.2	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.26849	0.09	4 3.6	3.7	345	9	52.9	37.2	3.0	0.57	0.08	7.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.40033	0.09	2 2.2	3.8	211	9	53.5	37.3	5.5	0.57	0.08	4.2	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.52963	0.1	2 2.3	3.8	220	10	54.0	37.5	5.8	0.57	0.08	4.4	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.65978	0.12	1 0.7	3.9	67	11	54.6	37.7	92.4	0.57	0.08	0.3	5.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.79077	0.1	4 3.7	3.9	354	10	55.2	37.8	3.2	0.57	0.08	7.9	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.92134	0.1	3 3	3.9	287	10	55.7	38.0	4.1	0.57	0.08	6.1	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.05403	0.08	1 1.4	4.0	134	8	56.3	38.2	9.9	0.57	0.08	2.0	3.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.18545	0.12	1 1.2	4.0	115	11	56.9	38.4	19.8	0.57	0.08	1.5	4.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.31602	0.15	3 3.1	4.1	297	14	57.4	38.5	6.0	0.57	0.08	6.2	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.44617	0.18	3 3	4.1	287	17	58.0	38.7	7.5	0.57	0.08	5.9	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.57928	0.19	# 10.3	4.1	986	18	58.6	38.9	2.0	0.57	0.08	23.9	2.58	1.61	14.8	2.75	15.7	2.0	16.5	2.71	2.71	16.55	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.7107	0.22	9 9	4.2	862	21	59.1	39.1	2.6	0.57	0.08	20.6	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.84169	0.19	# 11.9	4.2	1140	18	59.7	39.2	1.7	0.57	0.08	27.5	2.49	1.61	17.1	2.66	18.1	1.9	19.1	2.62	2.62	19.12	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.97396	0.17	# 11.9	4.3	1140	16	60.3	39.4	1.5	0.57	0.08	27.4	2.47	1.60	17.1	2.64	18.0	1.9	19.1	2.60	2.60	19.12	3.31	63.28	0.104	18.03	24	0.80	1.00	0.11	1.42
14.10368	0.18	# 9.8	4.3	938	17	60.8	39.6	2.0	0.57	0.08	22.2	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.23595	0.16	# 9.7	4.3	929	15	61.4	39.8	1.8	0.57	0.08	21.8	2.59	1.60	13.7	2.76	14.6	1.9	15.6	2.71	2.71	15.58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
14.36821	0.17 2	2.2	4.4	211	16	62.0	39.9	10.9	0.57	0.08	3.7	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.49921	0.13 4	3.6	4.4	345	12	62.5	40.1	4.4	0.57	0.08	7.0	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.63147	0.12 3	2.6	4.5	249	11	63.1	40.3	6.2	0.57	0.08	4.6	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.76247	0.14 4	4	4.5	383	13	63.7	40.5	4.2	0.57	0.08	7.9	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.80613	0.06 2	1.6	4.5	153	6	63.8	40.5	6.4	0.57	0.08	2.2	3.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.53614	0.08 2	2.4	4.7	230	8	67.0	41.5	4.7	0.57	0.08	3.9	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.63788	0.11 3	2.9	4.8	278	11	67.4	41.6	5.0	0.57	0.08	5.1	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.78074	0.13 3	3.5	4.8	335	12	68.1	41.8	4.7	0.57	0.08	6.4	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.91682	0.15 5	4.8	4.9	460	14	68.6	42.0	3.7	0.57	0.08	9.3	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.05163	0.18 4	4.4	4.9	421	17	69.2	42.2	4.9	0.57	0.08	8.4	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.1839	0.15 9	9.6	4.9	919	14	69.8	42.3	1.7	0.57	0.08	20.1	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.31701	0.14 6	5.8	5.0	555	13	70.4	42.5	2.8	0.57	0.08	11.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.39332	0.14 1	1.6	5.0	153	13	70.7	42.6	16.2	0.57	0.08	1.9	4.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.54424	0.15 7	7	5.0	670	14	71.3	42.8	2.4	0.57	0.08	14.0	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.75451	0.18 5	5.2	5.1	498	17	72.3	43.1	4.0	0.57	0.08	9.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.88847	0.17 6	5.7	5.1	546	16	72.8	43.3	3.4	0.57	0.08	10.9	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.01819	0.18 7	7.6	5.2	728	17	73.4	43.4	2.6	0.57	0.08	15.1	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.15215	0.19 5	4.9	5.2	469	18	74.0	43.6	4.6	0.57	0.08	9.1	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.28569	0.2 4	4.4	5.3	421	19	74.5	43.8	5.5	0.57	0.08	7.9	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.4171	0.19 3	3.4	5.3	326	18	75.1	44.0	7.3	0.57	0.08	5.7	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.55022	0.18 3	3.4	5.3	326	17	75.7	44.1	6.9	0.57	0.08	5.7	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.68333	0.17 4	3.8	5.4	364	16	76.3	44.3	5.7	0.57	0.08	6.5	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.8139	0.2 4	4.3	5.4	412	19	76.8	44.5	5.7	0.57	0.08	7.5	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.94532	0.21 7	6.8	5.5	651	20	77.4	44.7	3.5	0.57	0.08	12.8	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.07759	0.2 8	8.5	5.5	814	19	78.0	44.8	2.6	0.57	0.08	16.4	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.209	0.23 5	5.7	5.6	546	22	78.5	45.0	4.7	0.57	0.08	10.4	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.33915	0.2 #	10.7	5.6	1025	19	79.1	45.2	2.0	0.57	0.08	20.9	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.47099	0.19 6	5.9	5.6	565	18	79.7	45.4	3.7	0.57	0.08	10.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.60071	0.19 5	5.6	5.7	536	18	80.2	45.5	4.0	0.57	0.08	10.0	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.73171	0.21 3	3	5.7	287	20	80.8	45.7	9.7	0.57	0.08	4.5	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.8627	0.21 3	3.8	5.7	364	20	81.3	45.9	7.1	0.57	0.08	6.2	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.99285	0.21 1	1.6	5.8	153	20	81.9	46.0	28.2	0.57	0.08	1.5	4.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.12341	0.2 7	7.3	5.8	699	19	82.5	46.2	3.1	0.57	0.08	13.3	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.25314	0.19 4	4	5.9	383	18	83.0	46.4	6.1	0.57	0.08	6.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.54862	0.25 #	12	6.0	1149	24	84.3	46.8	2.2	0.57	0.08	22.8	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.67622	0.29 #	10.1	6.0	967	28	84.8	46.9	3.1	0.57	0.08	18.8	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.80382	0.3 #	11.5	6.0	1101	29	85.4	47.1	2.8	0.57	0.08	21.6	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.93142	0.28 #	16	6.1	1532	27	86.0	47.3	1.9	0.57	0.08	30.6	2.48	1.46	20.9	2.61	22.1	1.7	25.7	2.54	2.54	25.71	2.99	76.75	0.122	22.13	27	0.80	1.00	0.13	1.60
20.05988	0.27 #	13.8	6.1	1321	26	86.5	47.5	2.1	0.57	0.08	26.0	2.57	1.46	17.8	2.70	19.1	1.7	22.2	2.62	2.62	22.17	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.18578	0.29 #	12.4	6.2	1187	28	87.0	47.6	2.5	0.57	0.08	23.1	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.31169	0.31 #	18.3	6.2	1752	30	87.6	47.8	1.8	0.57	0.08	34.8	2.43	1.46	23.9	2.56	25.2	n/a	n/a	n/a	2.56	25.18	3.07	77.38	0.123	25.18	29	0.80	1.00	0.13	1.61
20.43844	0.31 #	16.5	6.2	1580	30	88.1	48.0	2.0	0.57	0.08	31.1	2.49	1.45	21.4	2.62	22.7	1.7	26.3	2.55	2.55	26.32	3.04	80.03	0.128	22.67	27	0.80	1.00	0.14	1.67
20.5635	0.33 #	10.4	6.3	996	32	88.7	48.1	3.5	0.57	0.08	18.9	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.68941	0.29 9	8.7	6.3	833	28	89.2	48.3	3.7	0.57	0.08	15.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.81659	0.28 7	7.1	6.3	680	27	89.8	48.5	4.5	0.57	0.08	12.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.94165	0.29 5	5.4	6.4	517	28	90.3	48.6	6.5	0.57	0.08	8.8	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.06713	0.27 6	6.4	6.4	613	26	90.8	48.8	5.0	0.57	0.08	10.7	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.19176	0.29 8	7.9	6.5	757	28	91.4	49.0	4.2	0.57	0.08	13.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ℄R(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
21.31852	0.25 9	9.2	6.5	881	24	91.9	49.1	3.0	0.57	0.08	16.1	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.444	0.2 4	4.1	6.5	393	19	92.5	49.3	6.4	0.57	0.08	6.1	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.56991	0.2 1	1.6	6.6	153	19	93.0	49.5	31.8	0.57	0.08	1.2	4.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.69539	0.17 5	5	6.6	479	16	93.6	49.6	4.2	0.57	0.08	7.8	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.8196	0.14 4	3.7	6.7	354	13	94.1	49.8	5.2	0.57	0.08	5.2	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.94509	0.18 1	1.2	6.7	115	17	94.6	50.0	85.0	0.57	0.08	0.4	4.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.07057	0.18 7	7	6.7	670	17	95.2	50.1	3.0	0.57	0.08	11.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.19605	0.17 4	4.8	6.8	460	16	95.7	50.3	4.5	0.57	0.08	7.2	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.32196	0.19 4	4	6.8	383	18	96.3	50.4	6.3	0.57	0.08	5.7	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.44702	0.27 5	4.9	6.8	469	26	96.8	50.6	6.9	0.57	0.08	7.4	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.53138	0.3 5	4.8	6.9	460	29	97.2	50.7	7.9	0.57	0.08	7.1	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.57123	0.31 7	7.6	6.9	728	30	97.3	50.8	4.7	0.57	0.08	12.4	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.7018	0.33 6	6.5	6.9	622	32	97.9	51.0	6.0	0.57	0.08	10.3	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.83321	0.33 5	5.4	7.0	517	32	98.5	51.1	7.5	0.57	0.08	8.2	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.96294	0.3 6	6	7.0	575	29	99.0	51.3	6.0	0.57	0.08	9.3	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.09435	0.31 5	5.6	7.0	536	30	99.6	51.5	6.8	0.57	0.08	8.5	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.22662	0.39 7	6.6	7.1	632	37	100.2	51.6	7.0	0.57	0.08	10.3	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.35761	0.45 6	6	7.1	575	43	100.7	51.8	9.1	0.57	0.08	9.1	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.48988	0.45 5	5.4	7.2	517	43	101.3	52.0	10.4	0.57	0.08	8.0	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.62299	0.4 8	8.4	7.2	804	38	101.9	52.2	5.5	0.57	0.08	13.5	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.75441	0.41 6	5.7	7.2	546	39	102.4	52.3	8.9	0.57	0.08	8.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.8871	0.35 3	3.4	7.3	326	34	103.0	52.5	15.1	0.57	0.08	4.2	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.02106	0.35 5	5.1	7.3	488	34	103.6	52.7	8.7	0.57	0.08	7.3	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.15375	0.39 5	5.1	7.4	488	37	104.2	52.9	9.7	0.57	0.08	7.3	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.28474	0.41 9	9.2	7.4	881	39	104.7	53.0	5.1	0.57	0.08	14.6	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.41659	0.41 6	5.7	7.4	546	39	105.3	53.2	8.9	0.57	0.08	8.3	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.55097	0.4 6	5.6	7.5	536	38	105.9	53.4	8.9	0.57	0.08	8.1	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.68324	0.39 4	3.9	7.5	373	37	106.4	53.6	14.0	0.57	0.08	5.0	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.81466	0.38 8	8.3	7.6	795	36	107.0	53.7	5.3	0.57	0.08	12.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.9465	0.36 7	6.9	7.6	661	34	107.6	53.9	6.2	0.57	0.08	10.3	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.07622	0.41 8	8.1	7.6	776	39	108.1	54.1	5.9	0.57	0.08	12.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.20806	0.43 6	6.2	7.7	594	41	108.7	54.3	8.5	0.57	0.08	8.9	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.33863	0.39 #	10.1	7.7	967	37	109.3	54.4	4.4	0.57	0.08	15.8	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.46793	0.43 8	8.5	7.8	814	41	109.8	54.6	5.8	0.57	0.08	12.9	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.59808	0.44 7	7.4	7.8	709	42	110.4	54.8	7.0	0.57	0.08	10.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.72313	0.4 8	7.8	7.8	747	38	110.9	54.9	6.0	0.57	0.09	11.6	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.7668	0.39 #	11.2	7.9	1073	37	111.1	55.0	3.9	0.57	0.09	17.5	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.89525	0.36 #	10.6	7.9	1015	34	111.7	55.2	3.8	0.57	0.09	16.4	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.0237	0.34 5	5.6	7.9	536	33	112.2	55.3	7.7	0.57	0.09	7.7	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.15173	0.35 5	5.4	8.0	517	34	112.8	55.5	8.3	0.57	0.09	7.3	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.2806	0.36 9	9.6	8.0	919	34	113.3	55.7	4.3	0.57	0.09	14.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.40947	0.38 8	8.4	8.0	804	36	113.9	55.9	5.3	0.57	0.09	12.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.53835	0.37 7	7.2	8.1	689	35	114.4	56.0	6.2	0.57	0.09	10.3	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.66383	0.36 7	7.7	8.1	737	34	115.0	56.2	5.5	0.57	0.09	11.1	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.79144	0.39 9	9.3	8.2	891	37	115.5	56.4	4.8	0.57	0.09	13.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.91862	0.41 8	8.1	8.2	776	39	116.1	56.5	6.0	0.57	0.09	11.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.04325	0.41 8	8.7	8.2	833	39	116.6	56.7	5.5	0.57	0.09	12.6	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.16958	0.45 #	10.7	8.3	1025	43	117.2	56.9	4.7	0.57	0.09	16.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
27.29591	0.5 8	8.5	8.3	814	48	117.7	57.0	6.9	0.57	0.09	12.2	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.41927	0.54 9	9.7	8.4	929	52	118.2	57.2	6.4	0.57	0.09	14.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.54306	0.56 9	9.2	8.4	881	54	118.8	57.4	7.0	0.57	0.09	13.3	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.66685	0.55 #	11.6	8.4	1111	53	119.3	57.5	5.3	0.57	0.09	17.2	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.79063	0.54 #	9.9	8.5	948	52	119.8	57.7	6.2	0.57	0.09	14.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.91315	0.55 8	8.1	8.5	776	53	120.4	57.8	8.0	0.57	0.09	11.3	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.03482	0.57 #	11.8	8.5	1130	55	120.9	58.0	5.4	0.57	0.09	17.4	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.15733	0.58 #	11.5	8.6	1101	56	121.4	58.2	5.7	0.57	0.09	16.8	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.27942	0.59 #	11.9	8.6	1140	56	121.9	58.3	5.6	0.57	0.09	17.4	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.40067	0.61 #	10.8	8.7	1034	58	122.5	58.5	6.4	0.57	0.09	15.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.52149	0.64 9	9.7	8.7	929	61	123.0	58.6	7.6	0.57	0.09	13.7	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.64104	0.67 #	13.5	8.7	1293	64	123.5	58.8	5.5	0.57	0.09	19.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.76058	0.68 9	9.4	8.8	900	65	124.0	59.0	8.4	0.57	0.09	13.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.87886	0.69 9	9	8.8	862	66	124.5	59.1	9.0	0.57	0.09	12.5	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.1701	0.64 #	11.4	8.9	1092	61	125.8	59.5	6.3	0.57	0.09	16.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.28625	0.64 9	9.5	8.9	910	61	126.3	59.7	7.8	0.57	0.09	13.1	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.40199	0.6 7	7.4	9.0	709	57	126.8	59.8	9.9	0.57	0.09	9.7	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.51772	0.58 7	7.2	9.0	689	56	127.3	60.0	9.9	0.57	0.09	9.4	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.6343	0.57 8	8	9.0	766	55	127.8	60.1	8.6	0.57	0.09	10.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.75003	0.55 7	7.4	9.1	709	53	128.3	60.3	9.1	0.57	0.09	9.6	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.86449	0.56 8	8.7	9.1	833	54	128.8	60.4	7.6	0.57	0.09	11.7	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.97938	0.57 #	10.1	9.1	967	55	129.3	60.6	6.5	0.57	0.09	13.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.09468	0.55 8	8	9.2	766	53	129.8	60.7	8.3	0.57	0.09	10.5	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.20914	0.52 8	7.8	9.2	747	50	130.3	60.9	8.1	0.57	0.09	10.1	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.32403	0.5 6	6.7	9.2	642	48	130.8	61.0	9.4	0.57	0.09	8.4	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.43892	0.47 6	6.6	9.3	632	45	131.3	61.2	9.0	0.57	0.09	8.2	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.55422	0.48 9	9.4	9.3	900	46	131.8	61.3	6.0	0.57	0.09	12.5	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.66868	0.51 7	7.7	9.3	737	49	132.3	61.5	8.1	0.57	0.09	9.8	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.78357	0.5 7	7	9.4	670	48	132.7	61.6	8.9	0.57	0.09	8.7	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.8993	0.53 7	7.4	9.4	709	51	133.2	61.8	8.8	0.57	0.09	9.3	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.01631	0.55 6	6.6	9.5	632	53	133.8	61.9	10.6	0.57	0.09	8.0	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.13204	0.57 #	10.1	9.5	967	55	134.3	62.1	6.6	0.57	0.09	13.4	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.24692	0.59 8	8.2	9.5	785	56	134.7	62.3	8.7	0.57	0.09	10.4	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.3635	0.6 7	7.2	9.6	689	57	135.2	62.4	10.4	0.57	0.09	8.9	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.47796	0.62 8	7.9	9.6	757	59	135.7	62.6	9.6	0.57	0.09	9.9	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.59412	0.64 #	11.1	9.6	1063	61	136.2	62.7	6.6	0.57	0.09	14.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.7107	0.65 9	9.2	9.7	881	62	136.7	62.9	8.4	0.57	0.09	11.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.82686	0.66 #	9.9	9.7	948	63	137.2	63.0	7.8	0.57	0.09	12.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.94217	0.69 #	10.1	9.7	967	66	137.7	63.2	8.0	0.57	0.09	13.1	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.05832	0.72 #	11	9.8	1053	69	138.2	63.3	7.5	0.57	0.09	14.5	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.17405	0.72 #	10.2	9.8	977	69	138.7	63.5	8.2	0.57	0.09	13.2	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.31607	0.74 #	11.2	9.8	1073	71	139.4	63.7	7.6	0.57	0.09	14.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.43053	0.76 #	10.5	9.9	1005	73	139.9	63.8	8.4	0.57	0.09	13.6	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.54329	0.77 #	14.3	9.9	1369	74	140.3	64.0	6.0	0.57	0.09	19.2	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.65691	0.76 #	12.6	10.0	1207	73	140.8	64.1	6.8	0.57	0.09	16.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.7701	0.74 #	11.6	10.0	1111	71	141.3	64.3	7.3	0.57	0.09	15.1	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.88329	0.75 #	12.5	10.0	1197	72	141.8	64.4	6.8	0.57	0.09	16.4	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.99435	0.72 #	10.7	10.1	1025	69	142.3	64.6	7.8	0.57	0.09	13.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

64 0.38671203

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
33.1067	0.68 #	13.4	10.1	1283	65	142.8	64.7	5.7	0.57	0.09	17.6	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.21904	0.7 #	11.6	10.1	1111	67	143.3	64.9	6.9	0.57	0.09	14.9	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.32926	0.72 #	12.8	10.2	1226	69	143.7	65.0	6.4	0.57	0.09	16.6	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.43948	0.7 #	12.4	10.2	1187	67	144.2	65.2	6.4	0.57	0.09	16.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.55013	0.71 #	10.9	10.2	1044	68	144.7	65.3	7.6	0.57	0.09	13.8	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.66289	0.72 #	12.8	10.3	1226	69	145.2	65.4	6.4	0.57	0.09	16.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.77226	0.73 #	10.1	10.3	967	70	145.6	65.6	8.5	0.57	0.09	12.5	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.88037	0.71 #	12.7	10.3	1216	68	146.1	65.7	6.4	0.57	0.09	16.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.99101	0.71 #	11.5	10.4	1101	68	146.6	65.9	7.1	0.57	0.09	14.5	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.1025	0.74 #	13.4	10.4	1283	71	147.1	66.0	6.2	0.57	0.09	17.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.21188	0.73 #	11.4	10.4	1092	70	147.5	66.2	7.4	0.57	0.09	14.3	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.3204	0.71 #	11.8	10.5	1130	68	148.0	66.3	6.9	0.57	0.09	14.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.43105	0.72 #	12.3	10.5	1178	69	148.5	66.5	6.7	0.57	0.09	15.5	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.54127	0.71 #	11.1	10.5	1063	68	149.0	66.6	7.4	0.57	0.09	13.7	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.64895	0.66 #	10.1	10.6	967	63	149.4	66.8	7.7	0.57	0.09	12.3	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.75917	0.66 8	8.2	10.6	785	63	149.9	66.9	9.9	0.57	0.09	9.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.86897	0.66 8	8.4	10.6	804	63	150.4	67.0	9.7	0.57	0.09	9.8	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.97834	0.67 #	10.8	10.7	1034	64	150.8	67.2	7.3	0.57	0.09	13.1	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.08772	0.66 #	10.3	10.7	986	63	151.3	67.3	7.6	0.57	0.09	12.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.19793	0.68 8	8.7	10.7	833	65	151.8	67.5	9.6	0.57	0.09	10.1	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.30688	0.72 9	9.3	10.8	891	69	152.3	67.6	9.3	0.57	0.09	10.9	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.3514	0.71 #	10.8	10.8	1034	68	152.4	67.7	7.7	0.57	0.09	13.0	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.46204	0.69 #	10.9	10.8	1044	66	152.9	67.8	7.4	0.57	0.09	13.1	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.57396	0.69 #	10.2	10.8	977	66	153.4	68.0	8.0	0.57	0.09	12.1	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.68546	0.7 9	9.2	10.9	881	67	153.9	68.1	9.2	0.57	0.09	10.7	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.79525	0.69 #	14.1	10.9	1350	66	154.4	68.3	5.5	0.57	0.09	17.5	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.9059	0.73 #	12.3	10.9	1178	70	154.8	68.4	6.8	0.57	0.09	15.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.01739	0.73 #	10.5	11.0	1005	70	155.3	68.6	8.2	0.57	0.09	12.4	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.12931	0.73 #	10.2	11.0	977	70	155.8	68.7	8.5	0.57	0.09	11.9	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.23741	0.73 #	10.9	11.0	1044	70	156.3	68.9	7.9	0.57	0.09	12.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.34848	0.73 #	14.6	11.1	1398	70	156.7	69.0	5.6	0.57	0.09	18.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.4587	0.74 #	10.6	11.1	1015	71	157.2	69.1	8.3	0.57	0.09	12.4	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.56892	0.74 #	10.3	11.1	986	71	157.7	69.3	8.6	0.57	0.09	12.0	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.67872	0.73 #	10.1	11.2	967	70	158.2	69.4	8.6	0.57	0.09	11.7	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.78894	0.73 #	9.8	11.2	938	70	158.6	69.6	9.0	0.57	0.09	11.2	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.89959	0.73 #	13.6	11.2	1302	70	159.1	69.7	6.1	0.57	0.09	16.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.00811	0.72 #	10.4	11.3	996	69	159.6	69.9	8.2	0.57	0.09	12.0	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.11749	0.71 #	13.6	11.3	1302	68	160.1	70.0	6.0	0.57	0.09	16.3	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.2294	0.7 #	12.2	11.3	1168	67	160.5	70.2	6.7	0.57	0.09	14.4	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.33878	0.73 #	12	11.4	1149	70	161.0	70.3	7.1	0.57	0.09	14.1	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.44984	0.75 #	11.4	11.4	1092	72	161.5	70.5	7.7	0.57	0.09	13.2	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.55667	0.76 #	12.1	11.4	1159	73	162.0	70.6	7.3	0.57	0.09	14.1	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.6669	0.74 #	12.1	11.5	1159	71	162.4	70.7	7.1	0.57	0.09	14.1	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.75295	0.74 #	13.7	11.5	1312	71	162.8	70.9	6.2	0.57	0.09	16.2	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.86021	0.73 #	11.1	11.5	1063	70	163.3	71.0	7.8	0.57	0.09	12.7	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.96916	0.78 #	13	11.6	1245	75	163.7	71.1	6.9	0.57	0.09	15.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.08107	0.77 #	13.5	11.6	1293	74	164.2	71.3	6.5	0.57	0.09	15.8	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.16967	0.77 #	13.1	11.6	1254	74	164.6	71.4	6.8	0.57	0.09	15.3	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{cl}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
38.27693	0.78	# 11.8	11.7	1130	75	165.1	71.5	7.7	0.57	0.09	13.5	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.38461	0.79	# 10.5	11.7	1005	76	165.5	71.7	9.0	0.57	0.09	11.7	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.46431	0.8	# 12.7	11.7	1216	77	165.9	71.8	7.3	0.57	0.09	14.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.73477	0.78	# 12.5	11.8	1197	75	167.0	72.2	7.3	0.57	0.09	14.3	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.84542	0.78	# 13.6	11.8	1302	75	167.5	72.3	6.6	0.57	0.09	15.7	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.93317	0.8	# 13	11.9	1245	77	167.9	72.4	7.1	0.57	0.09	14.9	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.01881	0.81	# 13.2	11.9	1264	78	168.3	72.5	7.1	0.57	0.09	15.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.1269	0.8	# 13.3	11.9	1274	77	168.7	72.7	6.9	0.57	0.09	15.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.20957	0.82	# 13.4	12.0	1283	79	169.1	72.8	7.0	0.57	0.09	15.3	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.31895	0.81	# 15.2	12.0	1456	78	169.6	72.9	6.0	0.57	0.09	17.6	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.42408	0.81	# 15.7	12.0	1503	78	170.0	73.1	5.8	0.57	0.09	18.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.53133	0.8	# 15.9	12.0	1523	77	170.5	73.2	5.7	0.57	0.09	18.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.63901	0.81	# 17.2	12.1	1647	78	170.9	73.3	5.3	0.57	0.09	20.1	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.74499	0.81	# 14.8	12.1	1417	78	171.4	73.5	6.2	0.57	0.09	17.0	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.8514	0.81	# 13.1	12.1	1254	78	171.9	73.6	7.2	0.57	0.09	14.7	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.95823	0.83	# 12.7	12.2	1216	79	172.3	73.8	7.6	0.57	0.09	14.1	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.06591	0.84	# 14.2	12.2	1360	80	172.8	73.9	6.8	0.57	0.09	16.1	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.17147	0.83	# 13.6	12.2	1302	79	173.2	74.1	7.0	0.57	0.09	15.2	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.27533	0.81	# 14.9	12.3	1427	78	173.7	74.2	6.2	0.57	0.09	16.9	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.38216	0.82	# 17.1	12.3	1637	79	174.1	74.3	5.4	0.57	0.09	19.7	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.48814	0.82	# 15.3	12.3	1465	79	174.6	74.5	6.1	0.57	0.09	17.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.59454	0.8	# 12.7	12.4	1216	77	175.1	74.6	7.4	0.57	0.09	14.0	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.69968	0.8	# 14.3	12.4	1369	77	175.5	74.8	6.4	0.57	0.09	16.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.80482	0.79	# 14	12.4	1341	76	176.0	74.9	6.5	0.57	0.09	15.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.9108	0.79	# 13.4	12.5	1283	76	176.4	75.0	6.8	0.57	0.09	14.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.01635	0.79	# 15.7	12.5	1503	76	176.9	75.2	5.7	0.57	0.09	17.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.12022	0.76	# 13.9	12.5	1331	73	177.3	75.3	6.3	0.57	0.09	15.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.2262	0.77	# 12.9	12.6	1235	74	177.8	75.4	7.0	0.57	0.09	14.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.33133	0.77	# 11.7	12.6	1120	74	178.2	75.6	7.8	0.57	0.09	12.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.43393	0.79	# 12.6	12.6	1207	76	178.7	75.7	7.4	0.57	0.09	13.6	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.53991	0.84	# 14.5	12.7	1389	80	179.1	75.9	6.7	0.57	0.09	15.9	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.64504	0.83	# 14.8	12.7	1417	79	179.6	76.0	6.4	0.57	0.09	16.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.74848	0.84	# 14.1	12.7	1350	80	180.0	76.1	6.9	0.57	0.09	15.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.83666	0.81	# 16.5	12.8	1580	78	180.4	76.3	5.5	0.57	0.09	18.4	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.94179	0.82	# 17.1	12.8	1637	79	180.9	76.4	5.4	0.57	0.09	19.1	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.04777	0.8	# 13.5	12.8	1293	77	181.3	76.5	6.9	0.57	0.09	14.5	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.15206	0.79	# 13.8	12.8	1321	76	181.8	76.7	6.6	0.57	0.09	14.9	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.25677	0.79	# 14.3	12.9	1369	76	182.2	76.8	6.4	0.57	0.09	15.5	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.36232	0.79	# 13.8	12.9	1321	76	182.7	77.0	6.6	0.57	0.09	14.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.46831	0.8	# 16	12.9	1532	77	183.1	77.1	5.7	0.57	0.09	17.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.57259	0.79	# 12.2	13.0	1168	76	183.6	77.2	7.7	0.57	0.09	12.8	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.67646	0.8	# 13.2	13.0	1264	77	184.0	77.4	7.1	0.57	0.09	14.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.78074	0.8	# 12.2	13.0	1168	77	184.5	77.5	7.8	0.57	0.09	12.7	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.88715	0.8	# 13.9	13.1	1331	77	184.9	77.6	6.7	0.57	0.09	14.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.99059	0.8	# 15.6	13.1	1494	77	185.4	77.8	5.9	0.57	0.09	16.8	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.09657	0.79	# 13.9	13.1	1331	76	185.8	77.9	6.6	0.57	0.09	14.7	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.20043	0.8	# 13.7	13.2	1312	77	186.3	78.1	6.8	0.57	0.09	14.4	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.30556	0.8	# 14	13.2	1341	77	186.7	78.2	6.6	0.57	0.09	14.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ℞(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
43.40901	0.77 #	13.9	13.2	1331	74	187.2	78.3	6.4	0.57	0.09	14.6	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.51329	0.77 #	16.8	13.3	1609	74	187.6	78.5	5.2	0.57	0.09	18.1	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.61588	0.79 #	12.7	13.3	1216	76	188.1	78.6	7.4	0.57	0.09	13.1	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.72271	0.81 #	14.9	13.3	1427	78	188.5	78.7	6.3	0.57	0.09	15.7	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.82658	0.8 #	13.4	13.4	1283	77	189.0	78.9	7.0	0.57	0.09	13.9	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.93044	0.79 #	11.5	13.4	1101	76	189.4	79.0	8.3	0.57	0.09	11.5	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.03473	0.79 #	15.5	13.4	1484	76	189.9	79.2	5.8	0.57	0.09	16.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.13901	0.8 #	13.7	13.5	1312	77	190.3	79.3	6.8	0.57	0.09	14.1	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.2416	0.77 #	15.2	13.5	1456	74	190.8	79.4	5.8	0.57	0.09	15.9	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.34589	0.8 #	11.8	13.5	1130	77	191.2	79.6	8.2	0.57	0.09	11.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.4489	0.81 #	12.1	13.5	1159	78	191.7	79.7	8.0	0.57	0.09	12.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.55361	0.79 #	11.9	13.6	1140	76	192.1	79.8	8.0	0.57	0.09	11.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.6562	0.78 #	12.3	13.6	1178	75	192.6	80.0	7.6	0.57	0.09	12.3	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.75964	0.79 #	14.6	13.6	1398	76	193.0	80.1	6.3	0.57	0.09	15.0	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.86223	0.8 #	14.3	13.7	1369	77	193.5	80.3	6.5	0.57	0.09	14.7	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.09497	0.77 #	12.7	13.7	1216	74	194.5	80.6	7.2	0.57	0.09	12.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.19883	0.78 #	12.6	13.8	1207	75	194.9	80.7	7.4	0.57	0.09	12.5	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.30397	0.77 #	13.6	13.8	1302	74	195.4	80.8	6.7	0.57	0.09	13.7	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.40698	0.78 #	13.5	13.8	1293	75	195.8	81.0	6.8	0.57	0.10	13.5	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.51127	0.75 #	10.6	13.9	1015	72	196.3	81.1	8.8	0.57	0.10	10.1	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.61514	0.78 #	11.2	13.9	1073	75	196.7	81.3	8.5	0.57	0.10	10.8	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.72026	0.77 #	10.8	13.9	1034	74	197.2	81.4	8.8	0.57	0.10	10.3	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.82285	0.74 #	11.3	14.0	1082	71	197.6	81.5	8.0	0.57	0.10	10.8	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.92587	0.78 #	11.1	14.0	1063	75	198.0	81.7	8.6	0.57	0.10	10.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.03016	0.77 #	12.9	14.0	1235	74	198.5	81.8	7.1	0.57	0.10	12.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.13486	0.76 #	13.6	14.1	1302	73	198.9	81.9	6.6	0.57	0.10	13.5	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.23746	0.76 #	11.3	14.1	1082	73	199.4	82.1	8.2	0.57	0.10	10.8	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.34132	0.76 #	14.6	14.1	1398	73	199.8	82.2	6.1	0.57	0.10	14.6	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.44518	0.77 #	11.3	14.2	1082	74	200.3	82.4	8.4	0.57	0.10	10.7	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.54819	0.8 #	12.5	14.2	1197	77	200.7	82.5	7.7	0.57	0.10	12.1	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.65206	0.81 #	13.9	14.2	1331	78	201.2	82.6	6.9	0.57	0.10	13.7	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.7555	0.79 #	14.1	14.3	1350	76	201.6	82.8	6.6	0.57	0.10	13.9	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.85809	0.78 #	15.7	14.3	1503	75	202.1	82.9	5.7	0.57	0.10	15.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.9628	0.8 #	12.4	14.3	1187	77	202.5	83.0	7.8	0.57	0.10	11.9	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.06539	0.82 #	13.2	14.3	1264	79	203.0	83.2	7.4	0.57	0.10	12.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.1684	0.81 #	13.6	14.4	1302	78	203.4	83.3	7.1	0.57	0.10	13.2	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.27142	0.8 #	13.2	14.4	1264	77	203.8	83.4	7.2	0.57	0.10	12.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.37444	0.81 #	17.3	14.4	1657	78	204.3	83.6	5.3	0.57	0.10	17.4	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.4766	0.8 #	14.5	14.5	1389	77	204.7	83.7	6.5	0.57	0.10	14.1	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.57961	0.83 #	16.1	14.5	1542	79	205.2	83.9	5.9	0.57	0.10	15.9	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.68263	0.81 #	12.7	14.5	1216	78	205.6	84.0	7.7	0.57	0.10	12.0	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.78522	0.85 #	13.6	14.6	1302	81	206.1	84.1	7.4	0.57	0.10	13.0	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.88739	0.84 #	13.1	14.6	1254	80	206.5	84.3	7.7	0.57	0.10	12.4	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.98997	0.89 #	16.6	14.6	1590	85	206.9	84.4	6.2	0.57	0.10	16.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.09087	0.88 #	13.1	14.7	1254	84	207.4	84.5	8.0	0.57	0.10	12.4	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.17481	0.88 #	12.7	14.7	1216	84	207.7	84.6	8.4	0.57	0.10	11.9	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.24179	0.87 #	16.1	14.7	1542	83	208.0	84.7	6.2	0.57	0.10	15.7	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.34396	0.89 #	15.6	14.7	1494	85	208.5	84.9	6.6	0.57	0.10	15.1	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{tcoil}: 90 lb/ft³
γ_{tsoil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
48.44698	0.87 #	16	14.8	1532	83	208.9	85.0	6.3	0.57	0.10	15.6	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.54999	0.9 #	16.1	14.8	1542	86	209.4	85.1	6.5	0.57	0.10	15.7	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.65131	0.89 #	18.8	14.8	1800	85	209.8	85.3	5.4	0.57	0.10	18.7	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.7539	0.91 #	17.2	14.9	1647	87	210.2	85.4	6.1	0.57	0.10	16.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.85649	0.9 #	19.7	14.9	1886	86	210.7	85.5	5.1	0.57	0.10	19.6	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.96077	0.88 #	16.9	14.9	1618	84	211.1	85.7	6.0	0.57	0.10	16.4	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.06167	0.9 #	19.9	15.0	1906	86	211.6	85.8	5.1	0.57	0.10	19.7	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.16299	0.91 #	17.2	15.0	1647	87	212.0	85.9	6.1	0.57	0.10	16.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.26516	0.91 #	18.9	15.0	1810	87	212.4	86.1	5.5	0.57	0.10	18.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.36817	0.85 #	16.9	15.0	1618	81	212.9	86.2	5.8	0.57	0.10	16.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.46949	0.89 #	18	15.1	1724	85	213.3	86.3	5.6	0.57	0.10	17.5	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.57166	0.89 #	14.9	15.1	1427	85	213.8	86.5	7.0	0.57	0.10	14.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.6734	0.9 #	14.7	15.1	1408	86	214.2	86.6	7.2	0.57	0.10	13.8	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.77514	0.89 #	14.7	15.2	1408	85	214.6	86.8	7.1	0.57	0.10	13.8	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.87646	0.86 #	16.5	15.2	1580	82	215.1	86.9	6.0	0.57	0.10	15.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.97693	0.9 #	15.7	15.2	1503	86	215.5	87.0	6.7	0.57	0.10	14.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.07825	0.89 #	15.6	15.3	1494	85	216.0	87.2	6.7	0.57	0.10	14.7	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.18084	0.91 #	17.2	15.3	1647	87	216.4	87.3	6.1	0.57	0.10	16.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.283	0.94 #	16.5	15.3	1580	90	216.8	87.4	6.6	0.57	0.10	15.6	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.38306	0.93 #	16.4	15.4	1570	89	217.3	87.6	6.6	0.57	0.10	15.5	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.48395	0.94 #	17.1	15.4	1637	90	217.7	87.7	6.3	0.57	0.10	16.2	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.58569	0.94 #	20.4	15.4	1954	90	218.1	87.8	5.2	0.57	0.10	19.8	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.68659	0.92 #	19.2	15.4	1839	88	218.6	88.0	5.4	0.57	0.10	18.4	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.78664	0.95 #	21.1	15.5	2021	91	219.0	88.1	5.0	0.57	0.10	20.5	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.88795	0.92 #	18.4	15.5	1762	88	219.4	88.2	5.7	0.57	0.10	17.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.988	0.93 #	21.9	15.5	2097	89	219.9	88.4	4.7	0.57	0.10	21.2	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.08847	0.93 #	18.9	15.6	1810	89	220.3	88.5	5.6	0.57	0.10	18.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.18852	0.94 #	21.3	15.6	2040	90	220.7	88.6	4.9	0.57	0.10	20.5	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.28984	0.96 #	16.6	15.6	1590	92	221.2	88.8	6.7	0.57	0.10	15.4	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.38988	0.95 #	20.5	15.7	1963	91	221.6	88.9	5.2	0.57	0.10	19.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.6133	0.97 #	21.9	15.7	2097	93	222.6	89.2	5.0	0.57	0.10	21.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.71461	0.97 #	20.1	15.8	1925	93	223.0	89.3	5.5	0.57	0.10	19.1	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.81424	0.94 #	19.5	15.8	1867	90	223.4	89.5	5.5	0.57	0.10	18.4	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.91598	0.99 #	17.8	15.8	1705	95	223.9	89.6	6.4	0.57	0.10	16.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.0173	0.98 #	18.4	15.9	1762	94	224.3	89.7	6.1	0.57	0.10	17.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.11777	1.04 #	19.6	15.9	1877	100	224.7	89.9	6.0	0.57	0.10	18.4	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.21909	1.03 #	18	15.9	1724	99	225.2	90.0	6.6	0.57	0.10	16.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.31871	1.02 #	19.6	15.9	1877	98	225.6	90.1	5.9	0.57	0.10	18.3	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.41919	1.02 #	18.7	16.0	1791	98	226.0	90.3	6.2	0.57	0.10	17.3	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.5205	1.03 #	20.8	16.0	1992	99	226.5	90.4	5.6	0.57	0.10	19.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.6197	1.04 #	22	16.0	2107	100	226.9	90.5	5.3	0.57	0.10	20.8	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.72017	1.02 #	22.2	16.1	2126	98	227.3	90.6	5.1	0.57	0.10	20.9	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.8198	1.05 #	21.3	16.1	2040	101	227.8	90.8	5.5	0.57	0.10	20.0	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.92112	1.06 #	22.6	16.1	2164	102	228.2	90.9	5.2	0.57	0.10	21.3	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.02116	1.07 #	22.5	16.2	2155	102	228.6	91.0	5.3	0.57	0.10	21.2	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.11994	1.07 #	24.1	16.2	2308	102	229.1	91.2	4.9	0.57	0.10	22.8	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.21999	1.06 #	23.3	16.2	2231	102	229.5	91.3	5.1	0.57	0.10	21.9	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.32046	1.06 #	23.6	16.3	2260	102	229.9	91.4	5.0	0.57	0.10	22.2	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.42093	1.05 #	23	16.3	2202	101	230.4	91.6	5.1	0.57	0.10	21.5	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.5197	1.06 #	24	16.3	2298	102	230.8	91.7	4.9	0.57	0.10	22.5	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

64 0.38671203

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF^1: 1.07 (lower bound)
MSF^2: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: łR(CPT-16)
GW Depth: 7.0 ft
GW Depth: 2.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d^3	CSR^4	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c^5	q_{c1N}	K_c^5	$(q_{c1N})_{cs}^5$	$CRR_{7.5}^5$	q_{c1}^6	D_r^6	f^7	K_σ^7	Corrected CRR	fos
53.61932	1.07 #	23.4	16.3	2241	102	231.2	91.8	5.1	0.57	0.10	21.9	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.72022	1.06 #	25.6	16.4	2451	102	231.7	92.0	4.6	0.57	0.10	24.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.81942	1.09 #	24.7	16.4	2365	104	232.1	92.1	4.9	0.57	0.10	23.2	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.91735	1.06 #	27.3	16.4	2614	102	232.5	92.2	4.3	0.57	0.10	25.8	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.01697	1.09 #	25.8	16.5	2471	104	232.9	92.4	4.7	0.57	0.10	24.2	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.1166	1.11 #	28.2	16.5	2700	106	233.4	92.5	4.3	0.57	0.10	26.7	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.21579	1.13 #	25.9	16.5	2480	108	233.8	92.6	4.8	0.57	0.10	24.3	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.31414	1.1 #	27.9	16.6	2672	105	234.2	92.8	4.3	0.57	0.10	26.3	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.41377	1.13 #	28.4	16.6	2720	108	234.6	92.9	4.4	0.57	0.10	26.8	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.5117	1.12 #	29.9	16.6	2863	107	235.1	93.0	4.1	0.57	0.10	28.3	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.57486	1.12 #	25.2	16.6	2413	107	235.3	93.1	4.9	0.57	0.10	23.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.67406	1.1 #	32.3	16.7	3093	105	235.8	93.2	3.7	0.57	0.10	30.6	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.77241	1.11 #	29.5	16.7	2825	106	236.2	93.4	4.1	0.57	0.10	27.7	2.73	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.87119	1.11 #	31.5	16.7	3016	106	236.6	93.5	3.8	0.57	0.10	29.7	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.96911	1.13 #	29.7	16.8	2844	108	237.0	93.6	4.2	0.57	0.10	27.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.23898	0.26 #	11.5	0.1	1101	25	1.0	1.0	2.3	0.57	0.07	1067.6	1.64	9.92	107.7	2.13	18.5	n/a	n/a	n/a	2.13	18.48	1.52	28.02	0.073	107.77	59	0.70	1.00	0.08	1.06
0.37627	0.28 #	18	0.1	1724	27	1.6	1.6	1.6	0.57	0.07	1061.3	1.48	7.90	134.3	1.95	28.9	n/a	n/a	n/a	1.95	28.92	1.24	35.80	0.080	134.43	66	0.67	1.00	0.09	1.15
0.51397	0.25 8	7.6	0.2	728	24	2.2	2.2	3.3	0.57	0.07	327.4	1.98	6.76	48.4	2.49	12.2	n/a	n/a	n/a	2.49	12.21	2.73	33.29	0.078	48.56	40	0.80	1.00	0.08	1.12
0.65126	0.19 #	16	0.2	1532	18	2.8	2.8	1.2	0.57	0.07	544.6	1.49	6.01	90.7	1.99	25.7	n/a	n/a	n/a	1.99	25.71	1.29	33.14	0.078	90.83	55	0.73	1.00	0.08	1.12
0.78812	0.23 9	9	0.2	862	22	3.4	3.4	2.6	0.57	0.07	252.6	1.95	5.46	46.3	2.43	14.5	n/a	n/a	n/a	2.43	14.46	2.45	35.35	0.079	46.44	39	0.80	1.00	0.09	1.15
0.92329	0.12 #	13.8	0.3	1321	11	4.0	4.0	0.9	0.57	0.07	330.9	1.50	5.04	65.6	2.02	22.2	n/a	n/a	n/a	2.02	22.17	1.33	29.42	0.075	65.79	46	0.77	1.00	0.08	1.08
1.061	0.12 7	6.8	0.3	651	11	4.6	4.6	1.8	0.57	0.07	141.3	1.98	4.71	30.0	2.48	10.9	n/a	n/a	n/a	2.48	10.93	2.65	28.94	0.074	30.24	31	0.80	1.00	0.08	1.07
1.19913	0.19 1	0.9	0.4	86	18	5.2	5.2	22.5	0.57	0.07	15.7	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.33388	0.16 6	6.2	0.4	594	15	5.8	5.8	2.6	0.57	0.07	102.2	2.19	4.20	24.4	2.65	10.0	7.4	10.0	2.96	2.96	9.96	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.46904	0.18 6	5.9	0.4	565	17	6.3	6.3	3.1	0.57	0.07	88.2	2.29	4.00	22.1	2.73	9.5	7.0	9.5	3.02	3.02	9.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.60421	0.17 3	3.1	0.5	297	16	6.9	6.9	5.6	0.57	0.07	41.9	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1.74023	0.1 8	8.4	0.5	804	10	7.5	7.5	1.2	0.57	0.07	106.2	1.94	3.67	28.9	2.39	13.5	n/a	n/a	n/a	2.39	13.50	2.28	30.82	0.076	29.17	31	0.80	1.00	0.08	1.09
1.87582	0.06 3	3.2	0.6	306	6	8.1	8.1	1.9	0.57	0.07	36.9	2.43	3.54	10.4	2.88	5.1	5.9	5.1	3.14	3.14	5.14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.00929	0.06 2	2.3	0.6	220	6	8.7	8.7	2.7	0.57	0.07	24.4	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.10802	0.07 2	1.6	0.6	153	7	9.1	9.1	4.7	0.57	0.07	15.9	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.23979	0.03 3	2.9	0.7	278	3	9.7	9.7	1.1	0.57	0.07	27.8	2.38	3.24	8.6	2.83	4.7	5.2	4.7	3.07	3.07	4.66	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.37157	0.02 2	2.4	0.7	230	2	10.2	10.2	0.9	0.57	0.07	21.5	2.43	3.15	6.8	2.88	3.9	5.0	3.9	3.11	3.11	3.86	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.63809	0.13 4	4.4	0.8	421	12	11.4	11.4	3.0	0.57	0.07	36.0	2.56	2.98	12.1	2.93	7.1	4.6	7.1	3.13	3.13	7.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.77072	0.21 2	2.2	0.8	211	20	11.9	11.9	10.1	0.57	0.07	16.6	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.90334	0.18 9	8.8	0.9	843	17	12.5	12.5	2.1	0.57	0.07	66.3	2.25	2.84	23.3	2.60	14.1	4.3	14.1	2.78	2.78	14.14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.03639	0.19 #	14	0.9	1341	18	13.1	13.1	1.4	0.57	0.07	101.4	2.00	2.78	36.4	2.34	22.5	n/a	n/a	n/a	2.34	22.49	2.09	46.99	0.089	36.81	35	0.80	1.00	0.10	1.29
3.16775	0.2 9	8.7	1.0	833	19	13.7	13.7	2.3	0.57	0.07	60.0	2.32	2.72	22.0	2.65	14.0	4.1	14.0	2.82	2.82	13.98	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.30037	0.17 9	9.3	1.0	891	16	14.2	14.2	1.9	0.57	0.07	61.6	2.25	2.67	23.1	2.58	14.9	n/a	n/a	n/a	2.58	14.94	3.21	47.90	0.090	23.45	28	0.80	1.00	0.10	1.30
3.43342	0.12 4	4.4	1.0	421	11	14.8	14.8	2.8	0.57	0.07	27.5	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.56647	0.19 1	1	1.1	96	18	15.4	15.4	22.6	0.57	0.07	5.2	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.69952	0.2 5	4.7	1.1	450	19	16.0	16.0	4.4	0.57	0.07	27.2	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3.83087	0.15 #	10.1	1.2	967	14	16.5	16.5	1.5	0.57	0.07	57.5	2.21	2.48	23.2	2.53	16.2	n/a	n/a	n/a	2.53	16.23	2.91	47.17	0.089	23.64	28	0.80	1.00	0.10	1.29
3.96392	0.18 2	2.4	1.2	230	17	17.1	17.1	8.1	0.57	0.07	12.4	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.09612	0.19 6	5.7	1.2	546	18	17.7	17.7	3.4	0.57	0.07	29.9	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.22832	0.14 #	9.7	1.3	929	13	18.2	18.2	1.5	0.57	0.07	49.9	2.25	2.36	21.2	2.55	15.6	n/a	n/a	n/a	2.55	15.58	3.06	47.64	0.090	21.61	27	0.80	1.00	0.10	1.30
4.36137	0.11 2	2.3	1.3	220	11	18.8	18.8	5.2	0.57	0.07	10.7	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.62535	0.22 4	4.2	1.4	402	21	19.9	19.9	5.5	0.57	0.07	19.2	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.7584	0.16 3	3.2	1.5	306	15	20.5	20.5	5.4	0.57	0.07	13.9	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.88933	0.17 6	6.6	1.5	632	16	21.1	21.1	2.7	0.57	0.07	29.0	2.60	2.19	13.2	2.87	10.6	3.0	10.6	2.95	2.95	10.60	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.01772	0.14 #	17.9	1.5	1714	13	21.6	21.6	0.8	0.57	0.07	78.2	1.93	2.16	36.1	2.22	28.8	n/a	n/a	n/a	2.22	28.76	1.70	49.03	0.091	36.61	35	0.80	1.00	0.10	1.31
5.19483	0.12 2	1.6	1.6	153	11	22.4	22.4	8.8	0.57	0.07	5.8	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.32958	0.09 5	4.8	1.6	460	9	23.0	23.0	2.0	0.57	0.07	19.0	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.73381	0.18 5	4.9	1.7	469	17	24.7	24.7	3.9	0.57	0.07	18.0	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.8677	0.14 7	7.3	1.8	699	13	25.3	25.3	2.0	0.57	0.07	26.6	2.55	2.00	13.3	2.79	11.7	2.6	11.7	2.84	2.84	11.73	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.0016	0.15 0	0.4	1.8	38	14	25.9	25.9	115.6	0.57	0.07	0.5	5.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.13634	0.18 3	3	1.9	287	17	26.5	26.5	6.6	0.57	0.07	9.9	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.26939	0.12 7	7.2	1.9	689	11	27.0	27.0	1.7	0.57	0.07	24.5	2.54	1.94	12.7	2.78	11.6	2.5	11.6	2.81	2.81	11.57	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.54015	0.2 5	5.4	2.0	517	19	28.2	28.2	3.9	0.57	0.07	17.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.67362	0.16 7	7.2	2.0	689	15	28.8	28.8	2.3	0.57	0.07	23.0	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.80752	0.17 1	0.7	2.1	67	16	29.4	29.4	43.2	0.57	0.07	1.3	4.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.94268	0.22 7	7.6	2.1	728	21	29.9	29.9	3.0	0.57	0.07	23.3	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.077	0.12 #	11.9	2.2	1140	11	30.5	30.5	1.0	0.57	0.07	36.3	2.27	1.82	19.9	2.50	19.1	n/a	n/a	n/a	2.50	19.12	2.75	52.66	0.094	20.49	26	0.80	1.00	0.10	1.35
7.21048	0.14 3	3.2	2.2	306	13	31.1	31.1	4.9	0.57	0.07	8.9	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: UR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
7.34522	0.17	3 2.9	2.2	278	16	31.7	31.7	6.6	0.57	0.07	7.8	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.47912	0.1	7 6.7	2.3	642	10	32.3	32.3	1.6	0.57	0.07	18.9	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.61344	0.14	4 3.7	2.3	354	13	32.8	32.8	4.2	0.57	0.07	9.8	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.74776	0.16	0 0.5	2.4	48	15	33.4	33.4	105.9	0.57	0.07	0.4	5.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.8825	0.1	4 4.1	2.4	393	10	34.0	34.0	2.7	0.57	0.07	10.6	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.21597	0.02	2 2.1	2.5	201	2	35.4	34.8	1.2	0.57	0.07	4.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.27402	0.06	7 6.8	2.5	651	6	35.7	34.9	0.9	0.57	0.07	17.7	2.52	1.70	10.4	2.73	10.9	2.1	10.9	2.71	2.71	10.93	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.3808	0.14	4 3.6	2.6	345	13	36.1	35.0	4.3	0.57	0.07	8.8	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.51808	0.11	7 6.9	2.6	661	11	36.7	35.2	1.7	0.57	0.07	17.7	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.65325	0.17	3 2.8	2.6	268	16	37.3	35.4	7.1	0.57	0.07	6.5	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.78842	0.22	6 5.7	2.7	546	21	37.9	35.5	4.1	0.57	0.07	14.3	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.89054	0.18	# 9.8	2.7	938	17	38.3	35.7	1.9	0.57	0.07	25.2	2.56	1.69	15.0	2.74	15.6	2.1	15.7	2.72	2.72	15.74	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.03036	0.16	9 9.6	2.8	919	15	38.9	35.9	1.7	0.57	0.07	24.5	2.54	1.68	14.6	2.73	15.3	2.1	15.4	2.71	2.71	15.42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.16426	0.15	3 3.5	2.8	335	14	39.5	36.0	4.9	0.57	0.07	8.2	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.43671	0.14	5 5.2	2.9	498	13	40.7	36.4	2.9	0.57	0.07	12.6	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.5723	0.14	3 2.7	2.9	259	13	41.3	36.6	6.2	0.57	0.08	5.9	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.84518	0.17	7 6.7	3.0	642	16	42.5	36.9	2.7	0.57	0.08	16.2	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.9795	0.15	9 9.4	3.0	900	14	43.0	37.1	1.7	0.57	0.08	23.1	2.55	1.65	14.0	2.74	14.7	2.0	15.1	2.71	2.71	15.10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.11552	0.17	3 3.1	3.1	297	16	43.6	37.3	6.4	0.57	0.08	6.8	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.25111	0.19	7 6.9	3.1	661	18	44.2	37.5	3.0	0.57	0.08	16.5	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.38924	0.1	6 5.6	3.2	536	10	44.8	37.7	1.9	0.57	0.08	13.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.52398	0.05	1 0.7	3.2	67	5	45.4	37.8	22.1	0.57	0.08	0.6	4.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.79644	0.14	3 2.7	3.3	259	13	46.6	38.2	6.3	0.57	0.08	5.6	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.9333	0.09	3 3.5	3.3	335	9	47.1	38.4	3.0	0.57	0.08	7.5	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.20279	0.14	5 5.2	3.4	498	13	48.3	38.7	3.0	0.57	0.08	11.6	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.33795	0.05	3 3.2	3.5	306	5	48.9	38.9	1.9	0.57	0.08	6.6	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.72905	0.12	4 3.8	3.6	364	11	50.6	39.4	3.7	0.57	0.08	7.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.86549	0.04	3 3.2	3.6	306	4	51.2	39.6	1.5	0.57	0.08	6.4	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.27353	0.03	3 3.1	3.7	297	3	52.9	40.1	1.2	0.57	0.08	6.1	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.41082	0.03	5 4.8	3.8	460	3	53.5	40.3	0.7	0.57	0.08	10.1	2.69	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.68242	0.1	3 3.1	3.9	297	10	54.7	40.7	4.0	0.57	0.08	6.0	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.82056	0.03	8 7.8	3.9	747	3	55.3	40.9	0.4	0.57	0.08	16.9	2.39	1.57	10.7	2.58	11.6	n/a	n/a	n/a	2.58	11.61	3.20	37.13	0.081	11.61	20	0.80	1.00	0.09	1.13
13.09301	0.08	1 1.5	4.0	144	8	56.5	41.2	8.8	0.57	0.08	2.1	3.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.2286	0.05	4 4	4.0	383	5	57.0	41.4	1.5	0.57	0.08	7.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.36631	0.02	2 2.5	4.1	239	2	57.6	41.6	1.1	0.57	0.08	4.4	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.63834	0.11	1 1.7	4.2	163	11	58.8	42.0	10.1	0.57	0.08	2.5	3.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.77605	0.05	6 6.6	4.2	632	5	59.4	42.1	0.8	0.57	0.08	13.6	2.60	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.18664	0.06	5 4.9	4.3	469	6	61.2	42.7	1.4	0.57	0.08	9.6	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.46248	0.05	7 7.1	4.4	680	5	62.4	43.0	0.8	0.57	0.08	14.3	2.57	1.53	9.4	2.73	10.3	1.8	11.4	2.66	2.66	11.41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.59002	0.09	4 4	4.4	383	9	62.9	43.2	2.7	0.57	0.08	7.4	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.86417	0.03	4 4	4.5	383	3	64.1	43.6	0.9	0.57	0.08	7.3	2.86	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.13662	0.1	4 4.5	4.6	431	10	65.3	43.9	2.6	0.57	0.08	8.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.24382	0.06	6 6.2	4.6	594	6	65.7	44.1	1.1	0.57	0.08	12.0	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.38111	0.03	3 3	4.7	287	3	66.3	44.3	1.3	0.57	0.08	5.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.65441	0.03	5 4.9	4.8	469	3	67.5	44.6	0.7	0.57	0.08	9.0	2.74	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.79043	0.05	4 4.2	4.8	402	5	68.1	44.8	1.4	0.57	0.08	7.5	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.92771	0.12	1 1.2	4.9	115	11	68.7	45.0	24.9	0.57	0.08	1.0	4.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.06542	0.06	4 4.7	4.9	450	6	69.3	45.2	1.5	0.57	0.08	8.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: ℝ(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
16.33576	0.14	2 2.1	5.0	201	13	70.4	45.5	10.3	0.57	0.08	2.9	3.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.47262	0.11	5 4.7	5.0	450	11	71.0	45.7	2.8	0.57	0.08	8.3	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.74634	0.12	1 1.3	5.1	124	11	72.2	46.1	22.0	0.57	0.08	1.1	4.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.88405	0.14	6 6.5	5.1	622	13	72.8	46.2	2.4	0.57	0.08	11.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.02007	0.05	3 3.6	5.2	345	5	73.4	46.4	1.8	0.57	0.08	5.8	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.15481	0.12	1 1.3	5.2	124	11	74.0	46.6	22.7	0.57	0.08	1.1	4.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.2921	0.07	5 4.8	5.3	460	7	74.6	46.8	1.7	0.57	0.08	8.2	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.4315	0.03	4 4.1	5.3	393	3	75.2	47.0	0.9	0.57	0.08	6.8	2.89	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.56752	0.05	1 1.3	5.4	124	5	75.8	47.2	9.8	0.57	0.08	1.0	4.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.70268	0.14	4 4.8	5.4	460	13	76.3	47.3	3.5	0.57	0.08	8.1	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.76667	0.18	2 1.8	5.4	172	17	76.6	47.4	18.0	0.57	0.08	2.0	4.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.90183	0.16	8 8.1	5.5	776	15	77.2	47.6	2.2	0.57	0.08	14.7	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.03912	0.18	3 3.5	5.5	335	17	77.8	47.8	6.7	0.57	0.08	5.4	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.17386	0.22	4 4	5.5	383	21	78.4	48.0	6.9	0.57	0.08	6.4	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.30945	0.19	8 8.1	5.6	776	18	79.0	48.1	2.6	0.57	0.08	14.5	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.44632	0.11	4 3.8	5.6	364	11	79.5	48.3	3.7	0.57	0.08	5.9	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.72343	0.16	4 4	5.7	383	15	80.7	48.7	5.1	0.57	0.08	6.2	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.86072	0.1	4 4.4	5.7	421	10	81.3	48.9	2.8	0.57	0.08	7.0	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.00097	0.11	2 2.1	5.8	201	11	81.9	49.0	8.8	0.57	0.08	2.4	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.13698	0.16	1 1.7	5.8	163	15	82.5	49.2	19.1	0.57	0.08	1.6	4.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.27384	0.11	5 4.9	5.9	469	11	83.1	49.4	2.7	0.57	0.08	7.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.54418	0.15	3 3.4	6.0	326	14	84.3	49.8	6.0	0.57	0.08	4.8	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.67977	0.23	7 7.1	6.0	680	22	84.9	49.9	3.7	0.57	0.08	11.9	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.78782	0.18	7 7.5	6.0	718	17	85.3	50.1	2.7	0.57	0.08	12.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.92129	0.23	# 34.4	6.1	3294	22	85.9	50.3	0.7	0.57	0.08	63.8	1.97	1.42	45.0	2.10	46.2	n/a	n/a	n/a	2.10	46.16	1.46	67.33	0.108	46.16	39	0.80	1.00	0.12	1.43
20.05392	0.25	# 20.7	6.1	1982	24	86.5	50.4	1.3	0.57	0.08	37.6	2.31	1.42	26.5	2.44	27.7	n/a	n/a	n/a	2.44	27.73	2.47	68.36	0.110	27.73	30	0.80	1.00	0.12	1.45
20.18654	0.2	# 14.3	6.2	1369	19	87.1	50.6	1.5	0.57	0.08	25.3	2.49	1.41	17.9	2.62	19.1	1.6	22.0	2.54	2.54	21.97	3.00	65.95	0.107	19.12	25	0.80	1.00	0.11	1.41
20.31874	0.26	4 3.8	6.2	364	25	87.6	50.8	9.0	0.57	0.08	5.4	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.45349	0.22	3 3.2	6.2	306	21	88.2	51.0	9.7	0.57	0.08	4.3	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.72425	0.17	5 5.6	6.3	536	16	89.4	51.3	3.6	0.57	0.08	8.7	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.85687	0.11	5 5.6	6.4	536	11	89.9	51.5	2.4	0.57	0.08	8.7	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.16958	0.14	3 3	6.5	287	13	91.3	51.9	6.8	0.57	0.08	3.8	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.30178	0.18	4 4.4	6.5	421	17	91.9	52.1	5.2	0.57	0.08	6.3	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.43144	0.17	5 5.2	6.5	498	16	92.4	52.3	4.0	0.57	0.08	7.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.56237	0.2	6 6.6	6.6	632	19	93.0	52.4	3.6	0.57	0.08	10.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.69415	0.27	7 7.7	6.6	737	26	93.6	52.6	4.0	0.57	0.08	12.2	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.82338	0.26	# 11.5	6.7	1101	25	94.1	52.8	2.5	0.57	0.08	19.1	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.95177	0.23	8 8.3	6.7	795	22	94.7	52.9	3.1	0.57	0.08	13.2	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.08312	0.25	2 2.4	6.7	230	24	95.2	53.1	17.8	0.57	0.08	2.5	3.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.21151	0.19	3 3.8	6.8	364	18	95.8	53.3	6.8	0.57	0.08	5.0	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.34202	0.2	9 9.1	6.8	871	19	96.3	53.5	2.5	0.57	0.08	14.5	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.60345	0.18	4 4.7	6.9	450	17	97.5	53.8	4.9	0.57	0.08	6.6	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.73311	0.23	5 5.9	6.9	565	22	98.0	54.0	4.7	0.57	0.08	8.7	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.99709	0.16	5 5.5	7.0	527	15	99.2	54.3	3.6	0.57	0.08	7.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.12844	0.15	1 1.2	7.0	115	14	99.7	54.5	94.7	0.57	0.08	0.3	5.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.2581	0.2	3 3.2	7.1	306	19	100.3	54.7	9.3	0.57	0.08	3.8	3.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.3903	0.19	2 2.3	7.1	220	18	100.9	54.9	15.2	0.57	0.08	2.2	3.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.52208	0.16	6 6.3	7.2	603	15	101.4	55.0	3.1	0.57	0.08	9.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
23.78436	0.17 4	4.7	7.2	450	16	102.6	55.4	4.7	0.57	0.08	6.3	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.91529	0.16 7	7.3	7.3	699	15	103.1	55.5	2.6	0.57	0.08	10.7	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.04665	0.18 1	1.4	7.3	134	17	103.7	55.7	56.8	0.57	0.08	0.5	4.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.17673	0.22 5	5.9	7.4	565	21	104.3	55.9	4.6	0.57	0.08	8.2	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.26656	0.27 1	1.8	7.4	172	26	104.6	56.0	38.2	0.57	0.08	1.2	4.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.40088	0.21 #	10.1	7.4	967	20	105.2	56.2	2.3	0.57	0.08	15.3	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.53478	0.23 8	8.7	7.5	833	22	105.8	56.4	3.0	0.57	0.08	12.9	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.66698	0.24 3	3.1	7.5	297	23	106.4	56.5	12.1	0.57	0.08	3.4	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.80088	0.18 9	9.6	7.6	919	17	106.9	56.7	2.1	0.57	0.08	14.3	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.9352	0.27 2	2.7	7.6	259	26	107.5	56.9	17.1	0.57	0.08	2.7	3.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.06824	0.26 7	7.8	7.6	747	25	108.1	57.1	3.9	0.57	0.08	11.2	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.20087	0.2 7	7	7.7	670	19	108.7	57.2	3.4	0.57	0.08	9.8	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.33392	0.3 8	8.4	7.7	804	29	109.2	57.4	4.1	0.57	0.08	12.1	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.46527	0.29 7	7.6	7.8	728	28	109.8	57.6	4.5	0.57	0.08	10.7	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.59705	0.23 #	10	7.8	958	22	110.4	57.8	2.6	0.57	0.08	14.7	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.7301	0.28 1	1.7	7.8	163	27	111.0	57.9	51.7	0.57	0.08	0.9	4.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.85976	0.25 9	9.6	7.9	919	24	111.5	58.1	3.0	0.57	0.08	13.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.99196	0.24 6	6.1	7.9	584	23	112.1	58.3	4.9	0.57	0.08	8.1	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.12119	0.28 8	8.5	8.0	814	27	112.6	58.5	3.8	0.57	0.08	12.0	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.25127	0.24 #	21.2	8.0	2030	23	113.2	58.6	1.2	0.57	0.08	32.7	2.35	1.31	24.9	2.45	26.3	n/a	n/a	n/a	2.45	26.34	2.52	66.28	0.107	26.34	29	0.80	1.00	0.11	1.36
26.37754	0.28 #	13.4	8.0	1283	27	113.7	58.8	2.3	0.57	0.08	19.9	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.50678	0.27 5	5.2	8.1	498	26	114.3	59.0	6.7	0.57	0.08	6.5	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.63474	0.21 8	8.2	8.1	785	20	114.9	59.1	3.0	0.57	0.08	11.3	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.76186	0.25 4	4	8.2	383	24	115.4	59.3	8.9	0.57	0.08	4.5	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.89067	0.26 5	5.6	8.2	536	25	116.0	59.5	5.9	0.57	0.08	7.1	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.01821	0.18 8	8.3	8.2	795	17	116.5	59.6	2.5	0.57	0.09	11.4	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.14745	0.16 2	2.4	8.3	230	15	117.1	59.8	13.6	0.57	0.09	1.9	3.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.27456	0.14 3	3.7	8.3	354	13	117.6	60.0	5.7	0.57	0.09	3.9	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.55168	0.22 2	2.9	8.4	278	21	118.8	60.4	13.3	0.57	0.09	2.6	3.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.68388	0.19 9	9.7	8.4	929	18	119.4	60.5	2.2	0.57	0.09	13.4	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.94701	0.18 #	10.8	8.5	1034	17	120.5	60.9	1.9	0.57	0.09	15.0	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.07794	0.23 3	3.6	8.6	345	22	121.1	61.1	9.8	0.57	0.09	3.7	3.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.2093	0.22 9	10	8.6	958	21	121.6	61.2	2.5	0.57	0.09	13.7	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.34065	0.25 6	6.4	8.6	613	24	122.2	61.4	4.9	0.57	0.09	8.0	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.47243	0.27 7	7.1	8.7	680	26	122.8	61.6	4.6	0.57	0.09	9.0	3.14	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.60124	0.23 #	26.1	8.7	2499	22	123.3	61.7	0.9	0.57	0.09	38.5	2.23	1.28	30.0	2.32	31.6	n/a	n/a	n/a	2.32	31.60	2.01	63.57	0.104	31.60	32	0.80	1.00	0.11	1.30
28.73047	0.3 #	16.8	8.8	1609	29	123.9	61.9	1.9	0.57	0.09	24.0	2.58	1.28	18.7	2.66	20.3	1.4	22.4	2.60	2.60	22.41	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.86098	0.26 #	17.6	8.8	1685	25	124.5	62.1	1.6	0.57	0.09	25.1	2.51	1.28	19.7	2.60	21.2	n/a	n/a	n/a	2.60	21.25	3.33	70.67	0.113	21.25	26	0.80	1.00	0.12	1.40
28.98979	0.29 #	11.9	8.8	1140	28	125.0	62.3	2.7	0.57	0.09	16.3	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.11903	0.32 #	12.5	8.9	1197	31	125.6	62.4	2.9	0.57	0.09	17.2	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.24826	0.27 #	22.9	8.9	2193	26	126.1	62.6	1.3	0.57	0.09	33.0	2.35	1.27	26.0	2.44	27.5	n/a	n/a	n/a	2.44	27.53	2.49	68.58	0.110	27.53	30	0.80	1.00	0.12	1.37
29.37877	0.33 #	15.8	9.0	1513	32	126.7	62.8	2.3	0.57	0.09	22.1	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.50631	0.35 #	19.4	9.0	1858	34	127.2	62.9	1.9	0.57	0.09	27.5	2.53	1.27	21.7	2.61	23.3	1.4	25.6	2.55	2.55	25.59	3.06	78.21	0.124	23.26	28	0.80	1.00	0.13	1.54
29.63427	0.38 #	13.7	9.0	1312	36	127.8	63.1	3.1	0.57	0.09	18.8	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.76224	0.37 #	9.8	9.1	938	35	128.3	63.3	4.4	0.57	0.09	12.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.88935	0.27 #	10	9.1	958	26	128.9	63.4	3.1	0.57	0.09	13.1	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.01774	0.23 1	1.8	9.1	172	22	129.4	63.6	51.3	0.57	0.09	0.7	4.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.1457	0.22 6	6.3	9.2	603	21	130.0	63.8	4.5	0.57	0.09	7.4	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
30.40036	0.17 5	5.4	9.3	517	16	131.1	64.1	4.2	0.57	0.09	6.0	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.52621	0.19 6	6.1	9.3	584	18	131.6	64.3	4.0	0.57	0.09	7.0	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.61604	0.22 4	4.2	9.3	402	21	132.0	64.4	7.8	0.57	0.09	4.2	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.74485	0.15 4	4.6	9.4	440	14	132.6	64.6	4.7	0.57	0.09	4.8	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.87451	0.15 5	5.6	9.4	536	14	133.1	64.7	3.6	0.57	0.09	6.2	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.12916	0.15 6	7	9.5	670	14	134.2	65.1	2.7	0.57	0.09	8.2	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.26094	0.18 4	4.2	9.5	402	17	134.8	65.3	6.4	0.57	0.09	4.1	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.39103	0.15 4	4.9	9.6	469	14	135.4	65.4	4.3	0.57	0.09	5.1	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.51984	0.12 5	5.2	9.6	498	11	135.9	65.6	3.2	0.57	0.09	5.5	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.78254	0.13 5	5.5	9.7	527	12	137.1	65.9	3.2	0.57	0.09	5.9	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.04864	0.18 5	5.4	9.8	517	17	138.2	66.3	4.5	0.57	0.09	5.7	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.18127	0.14 2	2.7	9.8	259	13	138.8	66.5	11.2	0.57	0.09	1.8	3.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.31432	0.16 6	6.2	9.8	594	15	139.3	66.7	3.4	0.57	0.09	6.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.44779	0.12 3	3.7	9.9	354	11	139.9	66.8	5.4	0.57	0.09	3.2	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.58253	0.17 5	6	9.9	575	16	140.5	67.0	3.8	0.57	0.09	6.5	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.71643	0.16 3	3.5	10.0	335	15	141.1	67.2	7.9	0.57	0.09	2.9	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.8499	0.13 7	7.4	10.0	709	12	141.7	67.4	2.2	0.57	0.09	8.4	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.98507	0.16 2	2.7	10.1	259	15	142.2	67.5	13.2	0.57	0.09	1.7	3.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.11811	0.16 6	7.2	10.1	689	15	142.8	67.7	2.8	0.57	0.09	8.1	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.25286	0.18 6	6.6	10.1	632	17	143.4	67.9	3.5	0.57	0.09	7.2	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.38676	0.28 4	5.1	10.2	488	27	144.0	68.1	7.8	0.57	0.09	5.1	3.48	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.52023	0.3 9	9.4	10.2	900	29	144.5	68.2	3.8	0.57	0.09	11.1	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.65412	0.32 3	4.1	10.3	393	31	145.1	68.4	12.4	0.57	0.09	3.6	3.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.09056	0.28 3	4.1	10.4	393	27	147.0	69.0	10.9	0.57	0.09	3.6	3.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.22149	0.33 8	8.2	10.4	785	32	147.6	69.2	5.0	0.57	0.09	9.2	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.35284	0.33 #	10.5	10.5	1005	32	148.1	69.3	3.7	0.57	0.09	12.4	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.48462	0.3 6	6.7	10.5	642	29	148.7	69.5	5.8	0.57	0.09	7.1	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.6147	0.34 #	11.1	10.6	1063	33	149.3	69.7	3.6	0.57	0.09	13.1	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.74521	0.29 3	3.3	10.6	316	28	149.8	69.9	16.7	0.57	0.09	2.4	3.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.87572	0.25 6	6.4	10.6	613	24	150.4	70.0	5.2	0.57	0.09	6.6	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.13503	0.28 #	12	10.7	1149	27	151.5	70.4	2.7	0.57	0.09	14.2	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.26427	0.32 9	9.5	10.7	910	31	152.1	70.6	4.0	0.57	0.09	10.7	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.39266	0.3 6	6.2	10.8	594	29	152.6	70.7	6.5	0.57	0.09	6.2	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.5202	0.28 9	9.4	10.8	900	27	153.2	70.9	3.6	0.57	0.09	10.5	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.64774	0.28 5	5	10.9	479	27	153.7	71.1	8.2	0.57	0.09	4.6	3.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.77867	0.23 6	6.2	10.9	594	22	154.3	71.2	5.0	0.57	0.09	6.2	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.03502	0.24 #	11.1	11.0	1063	23	155.4	71.6	2.5	0.57	0.09	12.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.16341	0.23 #	13.2	11.0	1264	22	155.9	71.7	2.0	0.57	0.09	15.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.29053	0.26 4	4.4	11.1	421	25	156.5	71.9	9.4	0.57	0.09	3.7	3.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.41933	0.22 7	7.7	11.1	737	21	157.1	72.1	3.6	0.57	0.09	8.1	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.5473	0.25 2	2.5	11.1	239	24	157.6	72.3	29.3	0.57	0.09	1.1	4.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.67442	0.21 9	9.4	11.2	900	20	158.2	72.4	2.7	0.57	0.09	10.2	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.8028	0.23 8	7.9	11.2	757	22	158.7	72.6	3.7	0.57	0.09	8.2	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.93077	0.17 2	2.2	11.3	211	16	159.3	72.8	31.7	0.57	0.09	0.7	4.53	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.20661	0.22 8	8.5	11.3	814	21	160.4	73.1	3.2	0.57	0.09	8.9	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.33627	0.26 #	10.3	11.4	986	25	161.0	73.3	3.0	0.57	0.09	11.3	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.4655	0.22 #	16.4	11.4	1570	21	161.6	73.5	1.5	0.57	0.09	19.2	2.59	1.17	16.3	2.65	18.2	1.3	19.4	2.59	2.59	19.41	3.26	63.35	0.104	18.20	24	0.80	1.00	0.11	1.23
37.59474	0.28 #	16.3	11.5	1561	27	162.1	73.6	1.9	0.57	0.09	19.0	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
37.72144	0.29	7 7.7	11.5	737	28	162.7	73.8	4.8	0.57	0.09	7.8	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.85024	0.22	# 10.9	11.5	1044	21	163.2	74.0	2.4	0.57	0.09	11.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.11168	0.19	3 3.9	11.6	373	18	164.3	74.3	8.7	0.57	0.09	2.8	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.24303	0.17	5 5.1	11.7	488	16	164.9	74.5	5.0	0.57	0.09	4.3	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.5049	0.12	6 6.7	11.7	642	11	166.0	74.8	2.4	0.57	0.09	6.4	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.76675	0.11	4 4.3	11.8	412	11	167.2	75.2	4.3	0.57	0.09	3.3	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.02819	0.1	5 5.4	11.9	517	10	168.3	75.5	2.7	0.57	0.09	4.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.1604	0.13	4 4.7	11.9	450	12	168.9	75.7	4.4	0.57	0.09	3.7	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.42353	0.14	7 7.2	12.0	689	13	170.0	76.1	2.6	0.57	0.09	6.8	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.68835	0.07	7 7.5	12.1	718	7	171.1	76.4	1.2	0.57	0.09	7.2	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.95275	0.11	6 6.3	12.2	603	11	172.3	76.8	2.4	0.57	0.09	5.6	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.04258	0.1	8 8.5	12.2	814	10	172.7	76.9	1.5	0.57	0.09	8.3	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.31377	0.12	9 9.4	12.3	900	11	173.8	77.2	1.6	0.57	0.09	9.4	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.58664	0.23	6 6.5	12.4	622	22	175.0	77.6	4.9	0.57	0.09	5.8	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.8591	0.29	6 6	12.5	575	28	176.2	78.0	7.0	0.57	0.09	5.1	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.99172	0.31	# 9.8	12.5	938	30	176.8	78.1	3.9	0.57	0.09	9.7	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.12816	0.35	5 5.5	12.5	527	34	177.4	78.3	9.6	0.57	0.09	4.5	3.58	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.26418	0.31	# 16	12.6	1532	30	177.9	78.5	2.2	0.57	0.09	17.3	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.40019	0.4	# 13.3	12.6	1274	38	178.5	78.7	3.5	0.57	0.09	13.9	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.53662	0.38	# 13.2	12.7	1264	36	179.1	78.8	3.4	0.57	0.09	13.8	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.67222	0.47	8 8.1	12.7	776	45	179.7	79.0	7.6	0.57	0.09	7.5	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.80611	0.4	# 12.6	12.7	1207	38	180.3	79.2	3.7	0.57	0.09	13.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.94043	0.47	9 9	12.8	862	45	180.9	79.4	6.6	0.57	0.09	8.6	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.0739	0.54	# 13.4	12.8	1283	52	181.4	79.6	4.7	0.57	0.09	13.8	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.20738	0.52	9 9.4	12.9	900	50	182.0	79.7	6.9	0.57	0.09	9.0	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.33958	0.57	# 12.8	12.9	1226	55	182.6	79.9	5.2	0.57	0.09	13.1	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.47178	0.56	# 11.9	12.9	1140	54	183.2	80.1	5.6	0.57	0.09	11.9	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.60229	0.62	# 17.5	13.0	1676	59	183.7	80.3	4.0	0.57	0.09	18.6	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.73279	0.63	# 13.3	13.0	1274	60	184.3	80.4	5.5	0.57	0.09	13.5	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.86076	0.66	# 16.8	13.1	1609	63	184.8	80.6	4.4	0.57	0.09	17.7	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.98745	0.63	# 11.2	13.1	1073	60	185.4	80.8	6.8	0.57	0.09	11.0	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.11457	0.7	# 17.6	13.1	1685	67	185.9	80.9	4.5	0.57	0.09	18.5	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.23956	0.74	# 13.9	13.2	1331	71	186.5	81.1	6.2	0.57	0.09	14.1	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.31287	0.72	# 15.3	13.2	1465	69	186.8	81.2	5.4	0.57	0.09	15.7	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.45185	0.71	# 17.8	13.2	1705	68	187.4	81.4	4.5	0.57	0.09	18.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.57176	0.72	# 12.2	13.3	1168	69	187.9	81.5	7.0	0.57	0.09	12.0	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.68998	0.7	# 17.4	13.3	1666	67	188.4	81.7	4.5	0.57	0.09	18.1	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.80735	0.7	# 11.3	13.4	1082	67	188.9	81.9	7.5	0.57	0.09	10.9	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.92472	0.73	# 15.7	13.4	1503	70	189.4	82.0	5.3	0.57	0.09	16.0	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.04167	0.74	# 15.1	13.4	1446	71	189.9	82.2	5.6	0.57	0.09	15.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.15734	0.73	# 13.1	13.5	1254	70	190.4	82.3	6.6	0.57	0.09	12.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.27217	0.74	# 10.1	13.5	967	71	190.9	82.5	9.1	0.57	0.09	9.4	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.38658	0.74	# 15.2	13.5	1456	71	191.4	82.6	5.6	0.57	0.09	15.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.49929	0.75	# 10.8	13.6	1034	72	191.9	82.8	8.5	0.57	0.09	10.2	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.61242	0.78	# 14.6	13.6	1398	75	192.4	82.9	6.2	0.57	0.09	14.5	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.72598	0.77	# 10.5	13.6	1005	74	192.9	83.1	9.1	0.57	0.09	9.8	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.83784	0.78	# 16.9	13.7	1618	75	193.4	83.2	5.2	0.57	0.09	17.1	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.94844	0.81	# 15	13.7	1436	78	193.8	83.4	6.2	0.57	0.09	14.9	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
45.05945	0.82 #	14.9	13.7	1427	79	194.3	83.5	6.4	0.57	0.09	14.8	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.17089	0.81 #	17.1	13.8	1637	78	194.8	83.7	5.4	0.57	0.09	17.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.28317	0.79 #	11.5	13.8	1101	76	195.3	83.8	8.4	0.57	0.09	10.8	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.39334	0.81 #	17	13.8	1628	78	195.8	83.9	5.4	0.57	0.09	17.1	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.50309	0.78 #	10.7	13.9	1025	75	196.2	84.1	9.0	0.57	0.09	9.9	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.61325	0.8 #	16.5	13.9	1580	77	196.7	84.2	5.5	0.57	0.09	16.4	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.72342	0.81 #	12.4	13.9	1187	78	197.2	84.4	7.8	0.57	0.09	11.7	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.83274	0.78 #	12.8	14.0	1226	75	197.6	84.5	7.3	0.57	0.09	12.2	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.94291	0.77 #	15.4	14.0	1475	74	198.1	84.7	5.8	0.57	0.09	15.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.05223	0.71 8	8.4	14.0	804	68	198.6	84.8	11.2	0.57	0.09	7.1	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.16198	0.73 #	15.5	14.1	1484	70	199.1	85.0	5.4	0.57	0.09	15.1	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.27129	0.72 8	8.8	14.1	843	69	199.5	85.1	10.7	0.57	0.09	7.6	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.38146	0.74 #	12.4	14.1	1187	71	200.0	85.3	7.2	0.57	0.09	11.6	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.49036	0.68 7	7.6	14.2	728	65	200.5	85.4	12.3	0.57	0.09	6.2	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.57383	0.67 #	10.1	14.2	967	64	200.8	85.5	8.4	0.57	0.09	9.0	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.68485	0.69 #	16.3	14.2	1561	66	201.3	85.7	4.9	0.57	0.09	15.9	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.79756	0.69 8	8.9	14.3	852	66	201.8	85.8	10.2	0.57	0.10	7.6	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.90815	0.69 #	15	14.3	1436	66	202.3	86.0	5.4	0.57	0.10	14.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.01916	0.69 #	11.3	14.3	1082	66	202.8	86.1	7.5	0.57	0.10	10.2	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.1306	0.68 #	14.6	14.4	1398	65	203.2	86.2	5.4	0.57	0.10	13.9	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.24289	0.71 8	8.9	14.4	852	68	203.7	86.4	10.5	0.57	0.10	7.5	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.35348	0.7 #	14.8	14.4	1417	67	204.2	86.5	5.5	0.57	0.10	14.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.46323	0.73 #	10.5	14.5	1005	70	204.7	86.7	8.7	0.57	0.10	9.2	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.57551	0.77 #	18.5	14.5	1772	74	205.2	86.8	4.7	0.57	0.10	18.0	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.6861	0.75 #	12.6	14.5	1207	72	205.6	87.0	7.2	0.57	0.10	11.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.7967	0.74 #	20.5	14.6	1963	71	206.1	87.1	4.0	0.57	0.10	20.2	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.90813	0.74 #	12.1	14.6	1159	71	206.6	87.3	7.4	0.57	0.10	10.9	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.01957	0.76 #	17	14.6	1628	73	207.1	87.4	5.1	0.57	0.10	16.3	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.12889	0.72 #	11.4	14.7	1092	69	207.5	87.6	7.8	0.57	0.10	10.1	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.23991	0.71 #	16	14.7	1532	68	208.0	87.7	5.1	0.57	0.10	15.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.3505	0.68 9	9.9	14.7	948	65	208.5	87.9	8.8	0.57	0.10	8.4	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.46109	0.73 #	14.2	14.8	1360	70	209.0	88.0	6.1	0.57	0.10	13.1	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.57211	0.77 #	11	14.8	1053	74	209.5	88.2	8.7	0.57	0.10	9.6	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.68185	0.82 #	18.7	14.8	1791	79	209.9	88.3	5.0	0.57	0.10	17.9	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.79117	0.86 #	21.2	14.9	2030	82	210.4	88.4	4.5	0.57	0.10	20.6	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.90218	0.91 #	23.1	14.9	2212	87	210.9	88.6	4.4	0.57	0.10	22.6	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.01023	0.89 #	15.3	14.9	1465	85	211.3	88.7	6.8	0.57	0.10	14.1	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.1204	0.85 #	16.8	15.0	1609	81	211.8	88.9	5.8	0.57	0.10	15.7	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.22845	0.84 #	15.5	15.0	1484	80	212.3	89.0	6.3	0.57	0.10	14.3	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.33777	0.82 #	13.2	15.0	1264	79	212.8	89.2	7.5	0.57	0.10	11.8	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.44709	0.96 #	16.2	15.1	1551	92	213.2	89.3	6.9	0.57	0.10	15.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.55556	0.94 #	13.9	15.1	1331	90	213.7	89.5	8.1	0.57	0.10	12.5	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.66361	0.92 #	17.7	15.1	1695	88	214.2	89.6	5.9	0.57	0.10	16.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.71743	0.88 #	20.3	15.2	1944	84	214.4	89.7	4.9	0.57	0.10	19.3	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.8242	0.89 #	14.2	15.2	1360	85	214.9	89.8	7.4	0.57	0.10	12.7	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.93268	0.85 #	17.9	15.2	1714	81	215.3	90.0	5.4	0.57	0.10	16.7	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.04073	0.88 #	11	15.3	1053	84	215.8	90.1	10.1	0.57	0.10	9.3	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.14793	0.86 #	18.3	15.3	1752	82	216.3	90.2	5.4	0.57	0.10	17.0	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0 0
8 0
8 9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
50.2547	0.83	#	16.4	15.3	1570	79	216.7	90.4	5.9	0.57	0.10	15.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.36487	0.82	#	14.3	15.4	1369	79	217.2	90.5	6.8	0.57	0.10	12.7	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.47207	0.84	#	14.5	15.4	1389	80	217.7	90.7	6.9	0.57	0.10	12.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.57843	0.8	#	12.9	15.4	1235	77	218.1	90.8	7.5	0.57	0.10	11.2	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.68605	0.85	#	17.6	15.4	1685	81	218.6	90.9	5.5	0.57	0.10	16.1	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.79453	0.85	#	12.9	15.5	1235	81	219.0	91.1	8.0	0.57	0.10	11.2	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.90088	0.85	#	16.4	15.5	1570	81	219.5	91.2	6.0	0.57	0.10	14.8	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.00723	0.82	#	11.5	15.5	1101	79	220.0	91.4	8.9	0.57	0.10	9.6	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.11444	0.85	#	17.9	15.6	1714	81	220.4	91.5	5.4	0.57	0.10	16.3	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.22206	0.82	#	11.4	15.6	1092	79	220.9	91.7	9.0	0.57	0.10	9.5	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.32757	0.8	#	15.5	15.6	1484	77	221.3	91.8	6.1	0.57	0.10	13.8	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.4335	0.79	#	10.7	15.7	1025	76	221.8	91.9	9.4	0.57	0.10	8.7	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.53985	0.84	#	17.3	15.7	1657	80	222.3	92.1	5.6	0.57	0.10	15.6	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.64833	0.83	#	11.7	15.7	1120	79	222.7	92.2	8.9	0.57	0.10	9.7	3.29	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.75553	0.86	#	17.4	15.8	1666	82	223.2	92.4	5.7	0.57	0.10	15.6	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.86061	0.83	#	12.6	15.8	1207	79	223.6	92.5	8.1	0.57	0.10	10.6	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.96612	0.88	#	16.6	15.8	1590	84	224.1	92.6	6.2	0.57	0.10	14.7	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.07247	0.86	#	13.1	15.9	1254	82	224.6	92.8	8.0	0.57	0.10	11.1	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.17755	0.85	#	17.3	15.9	1657	81	225.0	92.9	5.7	0.57	0.10	15.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.28349	0.87	#	13.2	15.9	1264	83	225.5	93.1	8.0	0.57	0.10	11.2	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.39026	0.82	#	16.9	16.0	1618	79	225.9	93.2	5.6	0.57	0.10	14.9	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.49577	0.85	#	13.5	16.0	1293	81	226.4	93.3	7.6	0.57	0.10	11.4	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.60085	0.75	#	17.1	16.0	1637	72	226.8	93.5	5.1	0.57	0.10	15.1	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.70679	0.95	#	14.9	16.1	1427	91	227.3	93.6	7.6	0.57	0.10	12.8	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.81102	0.89	#	13.6	16.1	1302	85	227.7	93.8	7.9	0.57	0.10	11.5	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.8911	0.89	#	13.6	16.1	1302	85	228.1	93.9	7.9	0.57	0.10	11.4	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.00424	0.83	#	13.6	16.2	1302	79	228.6	94.0	7.4	0.57	0.10	11.4	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.10975	0.84	#	16.7	16.2	1599	80	229.0	94.2	5.9	0.57	0.10	14.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.2144	0.83	#	11.5	16.2	1101	79	229.5	94.3	9.1	0.57	0.10	9.2	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.31907	0.85	#	14.1	16.3	1350	81	229.9	94.4	7.3	0.57	0.10	11.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.42457	0.89	#	14.7	16.3	1408	85	230.4	94.6	7.2	0.57	0.10	12.4	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.5288	0.83	#	11.1	16.3	1063	79	230.8	94.7	9.6	0.57	0.10	8.8	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.63431	0.83	#	18.8	16.3	1800	79	231.3	94.8	5.1	0.57	0.10	16.5	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.7394	0.85	#	11.4	16.4	1092	81	231.7	95.0	9.5	0.57	0.10	9.1	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.84278	0.85	#	17.3	16.4	1657	81	232.2	95.1	5.7	0.57	0.10	15.0	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.94829	0.87	#	12.4	16.4	1187	83	232.6	95.3	8.7	0.57	0.10	10.0	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.05379	0.93	#	19.5	16.5	1867	89	233.1	95.4	5.4	0.57	0.10	17.1	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.15804	0.92	#	16.7	16.5	1599	88	233.5	95.5	6.5	0.57	0.10	14.3	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.26184	0.97	#	22.2	16.5	2126	93	234.0	95.7	4.9	0.57	0.10	19.8	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.36735	0.97	#	16.1	16.6	1542	93	234.4	95.8	7.1	0.57	0.10	13.6	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.47116	1.01	#	21	16.6	2011	97	234.9	96.0	5.4	0.57	0.10	18.5	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.57413	0.96	#	17.1	16.6	1637	92	235.3	96.1	6.6	0.57	0.10	14.6	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.67794	1.01	#	19.9	16.7	1906	97	235.8	96.2	5.8	0.57	0.10	17.4	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.78006	0.96	#	16.8	16.7	1609	92	236.2	96.4	6.7	0.57	0.10	14.2	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.88556	1	#	20.2	16.7	1934	96	236.7	96.5	5.6	0.57	0.10	17.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.99022	0.95	#	15.8	16.8	1513	91	237.1	96.6	7.1	0.57	0.10	13.2	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.09276	1	#	19.2	16.8	1839	96	237.6	96.8	6.0	0.57	0.10	16.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.19573	0.96	#	18.4	16.8	1762	92	238.0	96.9	6.0	0.57	0.10	15.7	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0	
8	0	
8	9999	

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-17)
GW Depth: 8.0 ft
GW Depth: 2.4 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
55.29954	1.02 #	17.7	16.9	1695	98	238.5	97.0	6.7	0.57	0.10	15.0	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.40166	0.98 #	19.2	16.9	1839	94	238.9	97.2	5.9	0.57	0.10	16.5	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.50335	1.03 #	20.3	16.9	1944	99	239.3	97.3	5.8	0.57	0.10	17.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.60674	1.01 #	17.3	16.9	1657	97	239.8	97.5	6.8	0.57	0.10	14.5	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: LR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
0.28658	0.16	8.5	8.5	0.1	814	15	1.2	1.2	1.9	0.57	0.07	657.6	1.63	9.05	72.6	2.20	13.7	n/a	n/a	n/a	2.20	13.66	1.66	22.65	0.069	72.74	49	0.76	1.00	0.07	1.00
0.37505	0.18	10	10.4	0.1	996	17	1.6	1.6	1.7	0.57	0.07	614.8	1.61	7.92	77.7	2.15	16.7	n/a	n/a	n/a	2.15	16.71	1.55	25.96	0.072	77.80	51	0.75	1.00	0.08	1.04
0.50501	0.22	5.7	5.8	0.2	555	21	2.2	2.2	3.8	0.57	0.07	254.0	2.09	6.82	37.2	2.62	9.3	14.7	9.3	3.08	3.08	9.32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0.6375	0.18	9.6	9.6	0.2	919	17	2.7	2.7	1.9	0.57	0.07	333.4	1.77	6.07	54.9	2.29	15.4	n/a	n/a	n/a	2.29	15.42	1.91	29.39	0.074	55.08	42	0.79	1.00	0.08	1.08
0.77127	0.16	8.3	8.4	0.2	804	15	3.3	3.3	1.9	0.57	0.07	240.9	1.85	5.52	43.6	2.37	13.5	n/a	n/a	n/a	2.37	13.50	2.18	29.47	0.075	43.82	38	0.80	1.00	0.08	1.08
0.90334	0.22	7.3	7.4	0.3	709	21	3.9	3.9	3.0	0.57	0.07	180.9	2.08	5.10	35.5	2.56	11.9	n/a	n/a	n/a	2.56	11.89	3.10	36.85	0.081	35.67	34	0.80	1.00	0.09	1.17
1.03626	0.18	12	11.8	0.3	1130	17	4.5	4.5	1.5	0.57	0.07	251.9	1.77	4.76	52.9	2.24	19.0	n/a	n/a	n/a	2.24	18.96	1.77	33.65	0.078	53.10	42	0.79	1.00	0.08	1.13
1.17087	0.18	8.9	9	0.4	862	17	5.0	5.0	2.0	0.57	0.07	169.7	1.96	4.48	37.9	2.43	14.5	n/a	n/a	n/a	2.43	14.46	2.43	35.20	0.079	38.10	35	0.80	1.00	0.08	1.15
1.30125	0.21	12	12.2	0.4	1168	20	5.6	5.6	1.7	0.57	0.07	207.2	1.86	4.25	48.8	2.30	19.6	n/a	n/a	n/a	2.30	19.60	1.96	38.35	0.082	48.99	40	0.80	1.00	0.09	1.18
1.4329	0.24	15	15	0.4	1436	23	6.2	6.2	1.6	0.57	0.07	231.5	1.80	4.05	57.2	2.23	24.1	n/a	n/a	n/a	2.23	24.10	1.74	41.94	0.085	57.41	43	0.78	1.00	0.09	1.23
1.56455	0.21	18	18.4	0.5	1762	20	6.7	6.7	1.1	0.57	0.07	260.2	1.66	3.88	67.1	2.08	29.6	n/a	n/a	n/a	2.08	29.56	1.42	42.08	0.085	67.39	47	0.76	1.00	0.09	1.23
1.69408	0.22	14	14	0.5	1341	21	7.3	7.3	1.6	0.57	0.07	182.5	1.86	3.72	49.0	2.28	22.5	n/a	n/a	n/a	2.28	22.49	1.87	42.15	0.085	49.28	40	0.80	1.00	0.09	1.23
1.82531	0.26	13	12.7	0.6	1216	25	7.9	7.9	2.1	0.57	0.07	153.5	2.00	3.59	42.8	2.39	20.4	n/a	n/a	n/a	2.39	20.40	2.29	46.73	0.089	43.06	38	0.80	1.00	0.10	1.29
1.95484	0.22	19	19.1	0.6	1829	21	8.4	8.4	1.2	0.57	0.07	216.0	1.71	3.47	62.3	2.11	30.7	n/a	n/a	n/a	2.11	30.69	1.47	45.24	0.088	62.58	45	0.77	1.00	0.09	1.27
2.0831	0.21	15	14.9	0.6	1427	20	9.0	9.0	1.4	0.57	0.07	157.8	1.87	3.36	47.0	2.26	23.9	n/a	n/a	n/a	2.26	23.94	1.83	43.83	0.087	47.29	39	0.80	1.00	0.09	1.25
2.21179	0.27	14	14.5	0.7	1389	26	9.5	9.5	1.9	0.57	0.07	144.6	1.99	3.26	44.4	2.36	23.3	n/a	n/a	n/a	2.36	23.30	2.14	49.92	0.092	44.66	38	0.80	1.00	0.10	1.32
2.33836	0.24	16	16.2	0.7	1551	23	10.1	10.1	1.5	0.57	0.07	152.8	1.90	3.17	48.2	2.27	26.0	n/a	n/a	n/a	2.27	26.03	1.84	48.00	0.090	48.53	40	0.80	1.00	0.10	1.30
2.39212	0.24	13	13	0.7	1245	23	10.3	10.3	1.9	0.57	0.07	119.7	2.04	3.13	38.2	2.41	20.9	n/a	n/a	n/a	2.41	20.89	2.33	48.74	0.091	38.51	36	0.80	1.00	0.10	1.31
2.49583	0.25	13	13.5	0.8	1293	24	10.8	10.8	1.9	0.57	0.07	119.1	2.04	3.07	38.8	2.40	21.7	n/a	n/a	n/a	2.40	21.69	2.31	50.19	0.092	39.15	36	0.80	1.00	0.10	1.33
2.61944	0.29	10	10.3	0.8	986	28	11.3	11.3	2.8	0.57	0.07	86.3	2.27	3.00	28.8	2.62	16.5	4.6	16.5	2.81	2.81	16.55	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2.74177	0.3	16	15.9	0.8	1523	29	11.8	11.8	1.9	0.57	0.07	127.8	2.03	2.93	43.6	2.37	25.5	n/a	n/a	n/a	2.37	25.55	2.18	55.63	0.096	43.99	38	0.80	1.00	0.10	1.39
2.86326	0.29	18	17.6	0.9	1685	28	12.3	12.3	1.7	0.57	0.07	135.5	1.97	2.86	47.3	2.30	28.3	n/a	n/a	n/a	2.30	28.28	1.95	55.23	0.096	47.65	40	0.80	1.00	0.10	1.38
2.98433	0.31	13	13	0.9	1245	30	12.9	12.9	2.4	0.57	0.07	95.7	2.19	2.81	34.1	2.51	20.9	n/a	n/a	n/a	2.51	20.89	2.84	59.28	0.099	34.47	34	0.80	1.00	0.11	1.44
3.10624	0.28	15	15.4	0.9	1475	27	13.4	13.4	1.8	0.57	0.07	109.1	2.06	2.75	39.7	2.39	24.7	n/a	n/a	n/a	2.39	24.74	2.27	56.05	0.096	40.03	36	0.80	1.00	0.10	1.39
3.22519	0.26	21	21.2	1.0	2030	25	13.9	13.9	1.2	0.57	0.07	145.0	1.85	2.70	53.7	2.18	34.1	n/a	n/a	n/a	2.18	34.06	1.62	55.07	0.096	54.08	42	0.79	1.00	0.10	1.38
3.34372	0.26	22	21.6	1.0	2068	25	14.4	14.4	1.2	0.57	0.07	142.4	1.85	2.65	53.7	2.17	34.7	n/a	n/a	n/a	2.17	34.70	1.61	55.71	0.096	54.11	42	0.79	1.00	0.10	1.39
3.46394	0.3	18	17.9	1.1	1714	29	14.9	14.9	1.7	0.57	0.07	113.8	2.02	2.60	43.7	2.33	28.8	n/a	n/a	n/a	2.33	28.76	2.06	59.26	0.099	44.06	38	0.80	1.00	0.11	1.44
3.58119	0.29	23	22.6	1.1	2164	28	15.4	15.4	1.3	0.57	0.07	139.1	1.88	2.56	54.3	2.19	36.3	n/a	n/a	n/a	2.19	36.31	1.64	59.39	0.099	54.71	42	0.79	1.00	0.11	1.44
3.6667	0.29	23	22.9	1.1	2193	28	15.8	15.8	1.3	0.57	0.07	137.7	1.88	2.53	54.4	2.18	36.8	n/a	n/a	n/a	2.18	36.79	1.63	59.84	0.100	54.79	42	0.79	1.00	0.11	1.44
3.79031	0.3	18	18	1.2	1724	29	16.3	16.3	1.7	0.57	0.07	104.5	2.05	2.49	42.0	2.35	28.9	n/a	n/a	n/a	2.35	28.92	2.10	60.87	0.101	42.36	37	0.80	1.00	0.11	1.46
3.90757	0.3	16	16.4	1.2	1570	29	16.9	16.9	1.8	0.57	0.07	92.2	2.12	2.45	37.6	2.41	26.3	n/a	n/a	n/a	2.41	26.35	2.35	61.86	0.102	38.01	35	0.80	1.00	0.11	1.47
4.0227	0.28	18	17.5	1.2	1676	27	17.3	17.3	1.6	0.57	0.07	95.6	2.06	2.42	39.6	2.36	28.1	n/a	n/a	n/a	2.36	28.12	2.14	60.16	0.100	39.97	36	0.80	1.00	0.11	1.45
4.14081	0.25	11	11.1	1.3	1063	24	17.9	17.9	2.3	0.57	0.07	58.5	2.32	2.38	24.6	2.61	17.8	3.4	17.8	2.72	2.72	17.83	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.25806	0.25	14	13.8	1.3	1321	24	18.4	18.4	1.8	0.57	0.07	71.0	2.20	2.35	30.2	2.48	22.2	n/a	n/a	n/a	2.48	22.17	2.68	59.44	0.100	30.64	32	0.80	1.00	0.11	1.44
4.37574	0.24	7.5	7.5	1.3	718	23	18.9	18.9	3.3	0.57	0.07	37.1	2.57	2.32	16.0	2.86	12.0	3.2	12.0	2.95	2.95	12.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.46591	0.27	11	10.8	1.4	1034	26	19.3	19.3	2.5	0.57	0.07	52.7	2.39	2.29	23.0	2.66	17.4	3.2	17.4	2.76	2.76	17.35	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4.58147	0.31	19	19	1.4	1819	30	19.8	19.8	1.6	0.57	0.07	91.1	2.09	2.26	40.2	2.36	30.5	n/a	n/a	n/a	2.36	30.53	2.14	65.26	0.106	40.67	37	0.80	1.00	0.11	1.53
4.67587	0.34	16	16.4	1.4	1570	33	20.2	20.2	2.1	0.57	0.07	76.9	2.21	2.24	34.3	2.47	26.3	n/a	n/a	n/a	2.47	26.35	2.64	69.60	0.111	34.74	34	0.80	1.00	0.12	1.61
4.79397	0.28	18	18.1	1.5	1733	27	20.7	20.7	1.6	0.57	0.07	82.8	2.10	2.21	37.4	2.37	29.1	n/a	n/a	n/a	2.37	29.08	2.18	63.40	0.104	37.87	35	0.80	1.00	0.11	1.50
4.90869	0.31	11	11.3	1.5	1082	30	21.2	21.2	2.8	0.57	0.07	50.1	2.43	2.19	22.9	2.69	18.2	3.0	18.2	2.77	2.77	18.15	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.00055	0.28	8.7	8.7	1.5	833	27	21.6	21.6	3.3	0.57	0.07	37.6	2.57	2.17	17.4	2.83	14.0	3.0	14.0	2.90	2.90	13.98	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.11611	0.21	10	10.1	1.6	967	20	22.1	22.1	2.1	0.57	0.07	42.8	2.40	2.14	20.0	2.66	16.2	2.9	16.2	2.74	2.74	16.23	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.20966	0.26	8.7	8.8	1.6	843	25	22.5	22.5	3.0	0.57	0.07	36.5	2.56	2.12	17.2	2.81	14.1	2.9	14.1	2.88	2.88	14.14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.29644	0.24	9.7	9.8	1.6	938	23	22.8	22.8	2.5	0.57	0.07	40.1	2.47	2.11	19.0	2.72	15.7	2.8	15.7	2.79	2.79	15.74	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.41962	0.14	9	9	1.7	862	13	23.4	23.4	1.6	0.57	0.07	35.9	2.39	2.08	17.2	2.65	14.5	2.8	14.5	2.71	2.71	14.46	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.51233	0.11	8.5	8.5	1.7	814	11	23.8	23.8	1.3	0.57	0.07	33.2	2.37	2.06	16.1	2.63	13.7	2.8	13.7	2.69	2.69	13.66	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.58006	0.12	1.7	1.8	1.7	172	11	24.1	24.1	7.7	0.57	0.07	6.2	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.82558	0.07	5	5.1	1.8	488	7	25.1	25.1	1.4	0.57	0.07	18.4	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5.94918	0.11	1.4	1.5	1.8	144	11	25.7	25.7	8.9	0.57	0.07	4.6	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
6.19682	0.16	5	5	1.9	479	15	26.7	26.7	3.4	0.57	0.07	16.9	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.44572	0.28	6.2	6.5	2.0	622	27	27.8	27.8	4.5	0.57	0.07	21.4	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6.56891	0.34	32	32.2	2.0	3083	33	28.3	28.3	1.1	0.57	0.07	107.9	1.90	1.89	57.0	2.12	51.7	n/a	n/a	n/a	2.12	51.73	1.49	77.19	0.123	57.55	43	0.78	1.00	0.13	1.77
6.68955	0.41	35	35.2	2.0	3371	39	28.8	28.8	1.2	0.57	0.07	115.8	1.91	1.87	61.8	2.12	56.6	n/a	n/a	n/a	2.12	56.55	1.49	84.09	0.135	62.35	45	0.77	1.00	0.14	1.96
6.81146	0.44	32	32.5	2.1	3112	42	29.4	29.4	1.4	0.57	0.07	105.0	1.98	1.86	56.5	2.19	52.2	n/a	n/a	n/a	2.19	52.22	1.64	85.57	0.138	57.05	43	0.78	1.00	0.15	2.00
6.9338	0.38	37	36.8	2.1	3524	36	29.9	29.9	1.0	0.57	0.07	116.9	1.87	1.84	63.5	2.08	59.1	n/a	n/a	n/a	2.08	59.12	1.41	83.59	0.134	64.02	46	0.77	1.00	0.14	1.94
7.05444	0.36	28	28.4	2.2	2720	34	30.4	30.4	1.3	0.57	0.07	88.4	2.02	1.83	48.4	2.22	45.6	n/a	n/a	n/a	2.22	45.63	1.73	78.90	0.126	48.98	40	0.80	1.00	0.13	1.82
7.17509	0.37	24	23.7	2.2	2270	35	30.9	30.9	1.6	0.57	0.07	72.3	2.15	1.81	40.0	2.35	38.1	n/a	n/a	n/a	2.35	38.08	2.11	80.19	0.128	40.53	36	0.80	1.00	0.14	1.85
7.29784	0.33	22	21.6	2.2	2068	32	31.5	31.5	1.6	0.57	0.07	64.7	2.18	1.79	36.1	2.38	34.7	n/a	n/a	n/a	2.38	34.70	2.22	77.04	0.123	36.63	35	0.80	1.00	0.13	1.77
7.42357	0.28	14	14.5	2.3	1389	27	32.0	32.0	2.0	0.57	0.07	42.4	2.39	1.78	23.8	2.58	23.3	n/a	n/a	n/a	2.58	23.30	3.23	75.30	0.120	24.38	28	0.80	1.00	0.13	1.73
7.54718	0.25	1.1	1.2	2.3	115	24	32.5	32.5	29.1	0.57	0.07	2.5	4.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.67163	0.24	3.1	3.2	2.3	306	23	33.1	33.1	8.4	0.57	0.07	8.3	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.79862	0.27	0.7	0.8	2.4	77	26	33.6	33.6	60.2	0.57	0.07	1.3	4.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
7.9218	0.26	6.5	6.6	2.4	632	25	34.2	34.2	4.2	0.57	0.07	17.5	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.0471	0.27	3.9	4	2.5	383	26	34.7	34.7	7.4	0.57	0.07	10.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.17071	0.27	0.9	1	2.5	96	26	35.2	35.2	42.7	0.57	0.07	1.7	4.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.29305	0.26	12	11.9	2.5	1140	25	35.8	35.8	2.3	0.57	0.07	30.9	2.53	1.68	18.3	2.71	18.9	2.1	19.1	2.70	2.70	19.12	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.41623	0.18	3	3.1	2.6	297	17	36.3	36.3	6.6	0.57	0.07	7.2	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.50935	0.18	3.5	3.6	2.6	345	17	36.7	36.7	5.6	0.57	0.07	8.4	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.5919	0.23	1.5	1.6	2.6	153	22	37.1	37.1	19.0	0.57	0.07	3.1	3.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.74641	0.15	10	10.2	2.7	977	14	37.7	37.7	1.5	0.57	0.07	24.9	2.50	1.64	15.2	2.69	15.8	2.0	16.4	2.66	2.66	16.39	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8.87001	0.15	4.8	4.9	2.7	469	14	38.3	38.3	3.3	0.57	0.07	11.3	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.11892	0.11	7.2	7.3	2.8	699	11	39.3	39.3	1.6	0.57	0.07	16.8	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.24549	0.14	5.4	5.5	2.8	527	13	39.9	39.9	2.8	0.57	0.07	12.2	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.37079	0.17	1.8	1.8	2.9	172	16	40.4	40.4	12.3	0.57	0.07	3.3	3.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.49947	0.14	3.4	3.4	2.9	326	13	41.0	41.0	4.7	0.57	0.07	6.9	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
9.62943	0.06	0.7	0.7	2.9	67	6	41.5	41.5	22.5	0.57	0.07	0.6	4.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.02226	0.15	3.2	3.3	3.1	316	14	43.2	43.2	5.3	0.57	0.07	6.3	3.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.15094	0.11	3.2	3.2	3.1	306	11	43.8	43.8	4.0	0.57	0.07	6.0	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.54462	0.16	3.4	3.4	3.2	326	15	45.5	45.5	5.5	0.57	0.07	6.2	3.32	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10.67458	0.13	3.1	3.1	3.3	297	12	46.0	46.0	5.0	0.57	0.07	5.4	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.06783	0.17	3	3	3.4	287	16	47.7	47.7	6.8	0.57	0.07	5.0	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.20118	0.12	2.8	2.8	3.4	268	11	48.3	48.3	5.2	0.57	0.07	4.6	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
11.59401	0.1	4.8	4.8	3.5	460	10	50.0	50.0	2.3	0.57	0.07	8.2	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.03044	0.13	4.4	4.4	3.7	421	12	51.9	51.9	3.4	0.57	0.07	7.1	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.16039	0.09	6.2	6.2	3.7	594	9	52.4	52.4	1.6	0.57	0.07	10.3	2.84	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.68572	0.12	2.2	2.2	3.9	211	11	54.7	54.7	7.4	0.57	0.07	2.9	3.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
12.81864	0.04	1.8	1.8	3.9	172	4	55.3	55.3	3.3	0.57	0.07	2.1	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.21316	0.1	3.1	3.1	4.0	297	10	57.0	57.0	4.0	0.57	0.07	4.2	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.34354	0.04	3.6	3.6	4.1	345	4	57.5	57.5	1.3	0.57	0.07	5.0	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.73891	0.07	3.7	3.7	4.2	354	7	59.2	59.2	2.3	0.57	0.07	5.0	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
13.86929	0.08	2	2	4.2	192	8	59.8	59.8	5.8	0.57	0.07	2.2	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.13344	0.11	3.2	3.3	4.3	316	11	60.9	60.9	4.1	0.57	0.07	4.2	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.26509	0.06	0.9	0.9	4.3	86	6	61.5	61.5	23.3	0.57	0.07	0.4	4.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.66088	0.14	3.3	3.4	4.5	326	13	63.2	63.2	5.1	0.57	0.07	4.1	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
14.79253	0.14	2.1	2.2	4.5	211	13	63.8	63.8	9.1	0.57	0.07	2.3	3.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.08419	0.09	3.3	3.4	4.6	326	9	65.0	65.0	3.3	0.57	0.07	4.0	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.21668	0.13	1.1	1.2	4.6	115	12	65.6	65.6	25.3	0.57	0.07	0.8	4.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.34791	0.11	4.6	4.7	4.7	450	11	66.2	66.2	2.7	0.57	0.07	5.8	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
15.48041	0.06	0.9	0.9	4.7	86	6	66.8	66.8	29.6	0.57	0.07	0.3	4.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
15.87705	0.06	3	3	4.8	287	6	68.5	68.5	2.6	0.57	0.07	3.2	3.39	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.00996	0.05	2	2	4.9	192	5	69.0	69.0	3.9	0.57	0.07	1.8	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.40915	0.09	3.8	3.8	5.0	364	9	70.8	70.8	2.9	0.57	0.07	4.1	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.54037	0.08	3	3.1	5.0	297	8	71.3	71.3	3.4	0.57	0.07	3.2	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.80494	0.13	4	4.1	5.1	393	12	72.5	72.5	3.9	0.57	0.07	4.4	3.35	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16.93871	0.06	5.1	5.2	5.2	498	6	73.0	73.0	1.4	0.57	0.07	5.8	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.06993	0.04	0.9	1	5.2	96	4	73.6	73.6	17.3	0.57	0.07	0.3	4.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.33577	0.17	2.8	3	5.3	287	16	74.8	74.8	7.7	0.57	0.07	2.8	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.46657	0.13	9.3	9.5	5.3	910	12	75.3	75.3	1.5	0.57	0.07	11.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.59991	0.1	7.5	7.6	5.4	728	10	75.9	75.9	1.5	0.57	0.07	8.6	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.73241	0.13	2.4	2.5	5.4	239	12	76.5	76.5	7.6	0.57	0.07	2.1	3.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.86406	0.15	3.2	3.3	5.4	316	14	77.0	77.0	6.0	0.57	0.07	3.1	3.59	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17.99528	0.12	9.2	9.3	5.5	891	11	77.6	77.6	1.4	0.57	0.07	10.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.09137	0.18	7.5	7.6	5.5	728	17	78.0	78.0	2.7	0.57	0.07	8.3	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.16588	0.19	3	3.2	5.5	306	18	78.3	78.3	8.0	0.57	0.07	2.9	3.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.29795	0.11	3.3	3.4	5.6	326	11	78.9	78.9	4.3	0.57	0.07	3.1	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18.69332	0.11	2.5	2.6	5.7	249	11	80.6	80.6	6.3	0.57	0.07	2.1	3.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.08742	0.09	3.9	4.1	5.8	393	9	82.3	82.3	2.8	0.57	0.07	3.8	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.35157	0.17	3.9	4.3	5.9	412	16	83.4	83.4	5.0	0.57	0.07	3.9	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.48237	0.1	6.3	6.6	5.9	632	10	84.0	84.0	1.7	0.57	0.07	6.5	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.61359	0.15	1.5	1.9	6.0	182	14	84.6	84.6	14.8	0.57	0.07	1.2	4.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.74397	0.17	8	8.1	6.0	776	16	85.1	85.1	2.4	0.57	0.07	8.1	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19.87393	0.12	7.7	7.9	6.1	757	11	85.7	85.7	1.7	0.57	0.07	7.8	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.00473	0.17	11	10.8	6.1	1034	16	86.3	86.3	1.7	0.57	0.07	11.0	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.13511	0.18	15	15.3	6.1	1465	17	86.8	86.4	1.3	0.57	0.07	15.9	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.26337	0.13	18	18.2	6.2	1743	12	87.4	86.6	0.8	0.57	0.07	19.1	2.45	1.08	17.7	2.48	18.6	n/a	n/a	n/a	2.48	18.61	2.66	49.51	0.091	18.61	25	0.80	1.00	0.10	1.32
20.39248	0.19	7.2	7.3	6.2	699	18	87.9	86.8	3.0	0.57	0.07	7.0	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.52328	0.24	7.3	7.5	6.3	718	23	88.5	86.9	3.6	0.57	0.07	7.2	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.65239	0.17	13	13.5	6.3	1293	16	89.1	87.1	1.4	0.57	0.07	13.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20.78108	0.18	17	17.4	6.3	1666	17	89.6	87.3	1.1	0.57	0.07	18.1	2.55	1.08	16.8	2.57	17.7	n/a	n/a	n/a	2.57	17.72	3.17	56.22	0.097	17.72	24	0.80	1.00	0.10	1.39
20.90765	0.18	23	23.3	6.4	2231	17	90.2	87.4	0.8	0.57	0.07	24.5	2.37	1.08	22.7	2.39	23.7	n/a	n/a	n/a	2.39	23.70	2.29	54.26	0.095	23.70	28	0.80	1.00	0.10	1.36
21.03295	0.1	26	25.7	6.4	2461	10	90.7	87.6	0.4	0.57	0.07	27.1	2.20	1.08	25.2	2.23	26.1	n/a	n/a	n/a	2.23	26.12	1.74	45.42	0.088	26.12	29	0.80	1.00	0.09	1.26
21.15782	0.11	20	20.5	6.4	1963	11	91.2	87.8	0.6	0.57	0.07	21.3	2.35	1.07	19.8	2.38	20.8	n/a	n/a	n/a	2.38	20.82	2.23	46.40	0.089	20.82	26	0.80	1.00	0.09	1.27
21.2772	0.11	16	15.7	6.5	1503	11	91.8	87.9	0.7	0.57	0.07	16.1	2.51	1.07	15.0	2.54	15.9	n/a	n/a	n/a	2.54	15.93	2.99	47.63	0.090	15.93	23	0.80	1.00	0.10	1.28
21.42747	0.17	4.5	4.6	6.5	440	16	92.4	88.1	4.7	0.57	0.07	3.9	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.55616	0.16	7.2	7.3	6.6	699	15	93.0	88.3	2.5	0.57	0.07	6.9	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.68315	0.13	3.4	3.5	6.6	335	12	93.5	88.5	5.2	0.57	0.08	2.7	3.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.81141	0.15	1.5	1.8	6.6	172	14	94.1	88.6	18.3	0.57	0.08	0.9	4.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21.93756	0.14	2.2	2.5	6.7	239	13	94.6	88.8	9.3	0.57	0.08	1.6	3.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.06286	0.11	5.4	5.6	6.7	536	11	95.1	89.0	2.4	0.57	0.08	5.0	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.43664	0.09	4.6	4.9	6.8	469	9	96.8	89.5	2.3	0.57	0.08	4.2	3.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.55982	0.08	1	1.3	6.9	124	8	97.3	89.6	28.2	0.57	0.08	0.3	4.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.81042	0.1	3.2	3.5	7.0	335	10	98.4	90.0	4.0	0.57	0.08	2.6	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
22.93487	0.05	7.4	7.8	7.0	747	5	98.9	90.1	0.7	0.57	0.08	7.2	2.83	NOTE 1	NOTE 1	NOTE 1	NOTE 1	n/a	n/a	n/a	NOTE 1	NOTE 1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.31289	0.11	3.3	3.7	7.1	354	11	100.5	90.6	4.2	0.57	0.08	2.8	3.54	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23.69556	0.13	21	21.1	7.2	2021	12	102.2	91.1	0.6	0.57	0.08	21.0	2.38	1.05	20.0	2.40	21.0	n/a	n/a	n/a	2.40	21.03	2.32	48.86	0.091	21.03	26	0.80	1.00	0.10	1.28
23.82044	0.18	26	26.1	7.3	2499	17	102.7	91.3	0.7	0.57	0.08	26.3	2.32	1.05	24.9	2.34	26.0	n/a	n/a	n/a	2.34	25.99	2.07	53.82	0.095	25.99	29	0.80	1.00	0.10	1.33
23.94912	0.25	14	14.3	7.3	1369	24	103.3	91.5	1.9	0.57	0.08	13.8	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{fill}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: BR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
24.07738	0.18	10.7	7.3	1025	17	103.8	91.6	1.9	0.57	0.08	10.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.20565	0.17	6.9	7.4	661	16	104.4	91.8	2.9	0.57	0.08	6.1	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.33518	0.19	7.3	7.4	699	18	104.9	92.0	3.1	0.57	0.08	6.5	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.7115	0.18	6.4	7.5	613	17	106.6	92.5	3.4	0.57	0.08	5.5	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24.83892	0.14	6.2	7.6	594	13	107.1	92.6	2.8	0.57	0.08	5.3	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.09459	0.15	3.2	7.6	306	14	108.2	93.0	7.2	0.57	0.08	2.1	3.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.2237	0.14	2.2	7.7	211	13	108.8	93.2	13.2	0.57	0.08	1.1	4.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.47769	0.1	1.8	7.8	172	10	109.9	93.5	15.3	0.57	0.08	0.7	4.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.86036	0.13	4.9	7.9	469	12	111.5	94.0	3.5	0.57	0.08	3.8	3.38	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25.98989	0.15	2.5	7.9	239	14	112.1	94.2	11.3	0.57	0.08	1.4	4.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.24261	0.17	9.5	8.0	910	16	113.2	94.5	2.0	0.57	0.08	8.4	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.37045	0.18	5.8	8.0	555	17	113.7	94.7	3.9	0.57	0.08	4.7	3.34	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.62782	0.17	3.1	8.1	297	16	114.8	95.0	8.9	0.57	0.08	1.9	3.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.75651	0.15	9.4	8.2	900	14	115.4	95.2	1.8	0.57	0.08	8.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26.88519	0.21	8.6	8.2	824	20	115.9	95.4	2.8	0.57	0.08	7.4	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.01218	0.21	6.4	8.2	613	20	116.5	95.5	4.1	0.57	0.08	5.2	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.14129	0.18	10.6	8.3	1015	17	117.0	95.7	1.9	0.57	0.08	9.4	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.39697	0.19	2.2	8.4	211	18	118.1	96.0	19.7	0.57	0.08	1.0	4.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.52608	0.13	4.1	8.4	393	12	118.7	96.2	4.5	0.57	0.08	2.8	3.55	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.65307	0.21	1.4	8.4	134	20	119.2	96.4	135.7	0.57	0.08	0.2	5.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27.94135	0.12	5.1	8.5	488	11	120.5	96.7	3.1	0.57	0.08	3.8	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.32402	0.12	7.7	8.6	737	11	122.1	97.3	1.9	0.57	0.08	6.3	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.45016	0.17	1.8	8.7	172	16	122.7	97.4	32.8	0.57	0.08	0.5	4.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.57716	0.13	4.4	8.7	421	12	123.2	97.6	4.2	0.57	0.08	3.1	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.70584	0.11	3.8	8.7	364	11	123.8	97.8	4.4	0.57	0.08	2.5	3.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28.96067	0.14	4.8	8.8	460	13	124.9	98.1	4.0	0.57	0.08	3.4	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.08851	0.14	7.2	8.9	689	13	125.4	98.3	2.4	0.57	0.08	5.7	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.21381	0.22	20.2	8.9	1934	21	126.0	98.4	1.2	0.57	0.08	18.4	2.55	1.01	18.1	2.56	19.4	n/a	n/a	n/a	2.56	19.37	3.08	59.74	0.100	19.37	25	0.80	1.00	0.11	1.36
29.33911	0.23	18.5	8.9	1772	22	126.5	98.6	1.3	0.57	0.08	16.7	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.46526	0.22	11.8	9.0	1130	21	127.1	98.8	2.1	0.57	0.08	10.2	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.5931	0.28	7	9.0	670	27	127.6	98.9	4.9	0.57	0.08	5.5	3.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.71882	0.27	19.8	9.1	1896	26	128.2	99.1	1.5	0.57	0.08	17.8	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29.84369	0.23	25.4	9.1	2432	22	128.7	99.3	1.0	0.57	0.08	23.2	2.42	1.01	23.0	2.43	24.3	n/a	n/a	n/a	2.43	24.25	2.42	58.80	0.099	24.25	28	0.80	1.00	0.11	1.34
29.96984	0.2	25.8	9.1	2471	19	129.2	99.4	0.8	0.57	0.08	23.5	2.38	1.01	23.3	2.39	24.6	n/a	n/a	n/a	2.39	24.61	2.26	55.72	0.096	24.61	28	0.80	1.00	0.10	1.30
30.06678	0.23	29.1	9.2	2787	22	129.7	99.6	0.8	0.57	0.08	26.7	2.34	1.01	26.5	2.34	27.7	n/a	n/a	n/a	2.34	27.74	2.09	58.09	0.098	27.74	30	0.80	1.00	0.11	1.33
30.18996	0.22	34.6	9.2	3313	21	130.2	99.7	0.7	0.57	0.08	31.9	2.22	1.01	31.7	2.23	33.0	n/a	n/a	n/a	2.23	32.96	1.74	57.25	0.097	32.96	33	0.80	1.00	0.10	1.31
30.30976	0.23	38.6	9.2	3696	22	130.7	99.9	0.6	0.57	0.08	35.7	2.17	1.01	35.4	2.17	36.7	n/a	n/a	n/a	2.17	36.74	1.60	58.67	0.099	36.74	35	0.80	1.00	0.11	1.33
30.42955	0.25	27.3	9.3	2614	24	131.2	100.0	1.0	0.57	0.08	24.8	2.40	1.01	24.7	2.40	26.0	n/a	n/a	n/a	2.40	25.97	2.32	60.22	0.100	25.97	29	0.80	1.00	0.11	1.35
30.55486	0.14	24.2	9.3	2317	13	131.8	100.2	0.6	0.57	0.08	21.8	2.36	1.01	21.7	2.36	23.0	n/a	n/a	n/a	2.36	23.00	2.16	49.57	0.091	23.00	27	0.80	1.00	0.10	1.23
30.67507	0.17	13.8	9.3	1321	16	132.3	100.4	1.4	0.57	0.08	11.8	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.75085	0.22	13	9.4	1245	21	132.6	100.5	1.9	0.57	0.08	11.1	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.83974	0.25	14.5	9.4	1389	24	133.0	100.6	1.9	0.57	0.08	12.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30.96292	0.21	12.9	9.4	1235	20	133.5	100.7	1.8	0.57	0.08	10.9	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.08103	0.2	14.9	9.5	1427	19	134.0	100.9	1.5	0.57	0.08	12.8	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.19998	0.2	14	9.5	1341	19	134.5	101.1	1.6	0.57	0.08	11.9	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.31766	0.17	20	9.5	1915	16	135.1	101.2	0.9	0.57	0.08	17.6	2.52	1.00	17.6	2.52	18.9	n/a	n/a	n/a	2.52	18.91	2.87	54.22	0.095	18.91	25	0.80	1.00	0.10	1.27
31.43364	0.2	20.8	9.6	1992	19	135.6	101.4	1.0	0.57	0.08	18.3	2.53	1.00	18.3	2.53	19.7	n/a	n/a	n/a	2.53	19.65	2.92	57.32	0.098	19.65	25	0.80	1.00	0.10	1.31
31.54921	0.17	14.2	9.6	1360	16	136.0	101.5	1.3	0.57	0.08	12.1	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.66689	0.16	15.4	9.7	1475	15	136.6	101.7	1.1	0.57	0.08	13.2	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
31.78457	0.21	11	9.7	1053	20	137.1	101.8	2.2	0.57	0.08	9.0	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31.90098	0.22	15	9.7	1494	21	137.6	102.0	1.6	0.57	0.08	13.3	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.01866	0.16	18	9.8	1752	15	138.1	102.1	0.9	0.57	0.08	15.8	2.57	1.00	15.9	2.57	17.2	n/a	n/a	n/a	2.57	17.23	3.12	53.82	0.094	17.23	24	0.80	1.00	0.10	1.26
32.13676	0.19	11	9.8	1073	18	138.6	102.3	1.9	0.57	0.08	9.1	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.25402	0.21	12	9.8	1120	20	139.1	102.5	2.0	0.57	0.08	9.6	2.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.37085	0.19	15	9.9	1494	18	139.6	102.6	1.3	0.57	0.08	13.2	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.49065	0.21	14	9.9	1379	20	140.1	102.8	1.6	0.57	0.08	12.1	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.61087	0.18	9	9.9	881	17	140.6	102.9	2.3	0.57	0.08	7.2	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.73278	0.18	9.7	10.0	938	17	141.2	103.1	2.2	0.57	0.08	7.7	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.85342	0.23	5.4	10.0	536	22	141.7	103.2	5.6	0.57	0.08	3.8	3.49	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32.9766	0.21	11	10.1	1082	20	142.2	103.4	2.1	0.57	0.08	9.1	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.09767	0.21	5.3	10.1	536	20	142.7	103.6	5.1	0.57	0.08	3.8	3.47	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.22001	0.2	5.6	10.1	575	19	143.3	103.7	4.4	0.57	0.08	4.2	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.34235	0.23	9	10.2	900	22	143.8	103.9	2.9	0.57	0.08	7.3	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.46553	0.21	6	10.2	622	20	144.3	104.1	4.2	0.57	0.08	4.6	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.58702	0.22	12	10.2	1216	21	144.8	104.2	2.0	0.57	0.08	10.3	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.70893	0.21	1.5	10.3	192	20	145.4	104.4	43.6	0.57	0.08	0.4	4.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.80841	0.16	2.4	10.3	278	15	145.8	104.5	11.6	0.57	0.08	1.3	4.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.83888	0.16	8.6	10.3	881	15	145.9	104.5	2.1	0.57	0.08	7.0	3.04	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33.96291	0.17	2.4	10.4	287	16	146.5	104.7	11.6	0.57	0.08	1.3	4.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.08652	0.19	1.8	10.4	239	18	147.0	104.9	19.7	0.57	0.08	0.9	4.33	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.21097	0.15	5.9	10.4	632	14	147.5	105.0	3.0	0.57	0.08	4.6	3.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.33542	0.16	1.2	10.5	172	15	148.1	105.2	63.0	0.57	0.08	0.2	5.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.46199	0.14	1.6	10.5	220	13	148.6	105.4	18.7	0.57	0.08	0.7	4.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.5856	0.13	5.9	10.5	642	12	149.1	105.5	2.5	0.57	0.08	4.7	3.24	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.83705	0.15	6.8	10.6	728	14	150.2	105.9	2.5	0.57	0.08	5.5	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34.96107	0.17	4.7	10.7	527	16	150.8	106.0	4.3	0.57	0.08	3.5	3.46	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.21463	0.14	9.1	10.7	938	13	151.9	106.4	1.7	0.57	0.08	7.4	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.33909	0.19	3.5	10.8	393	18	152.4	106.5	7.6	0.57	0.08	2.3	3.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.46481	0.24	8	10.8	824	23	152.9	106.7	3.4	0.57	0.08	6.3	3.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.59096	0.2	12	10.8	1216	19	153.5	106.9	1.8	0.57	0.08	9.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.71668	0.21	16	10.9	1570	20	154.0	107.0	1.4	0.57	0.08	13.2	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35.8386	0.25	25	10.9	2413	24	154.5	107.2	1.1	0.57	0.08	21.1	2.48	0.97	21.7	2.47	23.2	n/a	n/a	n/a	2.47	23.16	2.63	60.79	0.101	23.16	28	0.80	0.99	0.11	1.30
35.96178	0.24	23	11.0	2193	23	155.1	107.4	1.1	0.57	0.08	19.0	2.53	0.97	19.5	2.52	21.0	n/a	n/a	n/a	2.52	21.03	2.89	60.74	0.101	21.03	26	0.80	0.99	0.11	1.30
36.08708	0.3	9.3	11.0	910	29	155.6	107.5	3.8	0.57	0.08	7.0	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.21153	0.28	10	11.0	1015	27	156.2	107.7	3.1	0.57	0.08	8.0	3.09	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.33598	0.22	24	11.1	2337	21	156.7	107.8	1.0	0.57	0.08	20.2	2.48	0.97	20.9	2.47	22.4	n/a	n/a	n/a	2.47	22.35	2.60	58.11	0.098	22.35	27	0.80	0.99	0.10	1.26
36.45917	0.22	23	11.1	2183	21	157.2	108.0	1.0	0.57	0.08	18.8	2.52	0.97	19.4	2.51	20.9	n/a	n/a	n/a	2.51	20.87	2.81	58.74	0.099	20.87	26	0.80	0.99	0.10	1.27
36.57939	0.21	22	11.1	2107	20	157.7	108.2	1.0	0.57	0.08	18.0	2.53	0.97	18.6	2.52	20.1	n/a	n/a	n/a	2.52	20.12	2.88	58.03	0.098	20.12	26	0.80	0.99	0.10	1.26
36.7013	0.19	16	11.2	1570	18	158.3	108.3	1.3	0.57	0.08	13.0	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36.82109	0.18	11	11.2	1092	17	158.8	108.5	1.8	0.57	0.08	8.6	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.11572	0.23	9.3	11.3	910	22	160.1	108.9	2.9	0.57	0.08	6.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.23552	0.22	13	11.3	1226	21	160.6	109.0	2.0	0.57	0.08	9.8	2.91	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.35574	0.22	9.7	11.4	958	21	161.1	109.2	2.6	0.57	0.08	7.3	3.08	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.47468	0.18	15	11.4	1456	17	161.6	109.4	1.3	0.57	0.08	11.8	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.59364	0.22	23	11.5	2260	21	162.1	109.5	1.0	0.57	0.08	19.2	2.51	0.96	19.9	2.49	21.5	n/a	n/a	n/a	2.49	21.45	2.72	58.43	0.099	21.45	27	0.80	0.98	0.10	1.25
37.70919	0.26	16	11.5	1551	25	162.6	109.7	1.8	0.57	0.08	12.7	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.8256	0.27	16	11.5	1542	26	163.1	109.8	1.9	0.57	0.08	12.6	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37.94286	0.25	8.3	11.6	824	24	163.6	110.0	3.6	0.57	0.08	6.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)		z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
38.06097	0.22	18	18.4	11.6	1762	21	164.1	110.1	1.3	0.57	0.08	14.5	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.17822	0.28	16	16.2	11.6	1551	27	164.6	110.3	1.9	0.57	0.08	12.6	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.29548	0.3	8.3	8.6	11.7	824	29	165.1	110.4	4.4	0.57	0.08	6.0	3.27	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.41443	0.29	12	12.1	11.7	1159	28	165.7	110.6	2.8	0.57	0.08	9.0	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.53253	0.3	6.4	7	11.7	670	29	166.2	110.8	5.7	0.57	0.08	4.6	3.44	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.65191	0.28	3.1	3.9	11.8	373	27	166.7	110.9	13.0	0.57	0.08	1.9	3.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.77213	0.23	8.2	8.9	11.8	852	22	167.2	111.1	3.2	0.57	0.08	6.2	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38.8932	0.25	2.2	3	11.9	287	24	167.7	111.2	20.0	0.57	0.08	1.1	4.26	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.01214	0.27	2.8	3.6	11.9	345	26	168.2	111.4	14.6	0.57	0.08	1.6	4.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.13152	0.25	7.8	8.7	11.9	833	24	168.7	111.5	3.6	0.57	0.08	6.0	3.23	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.25216	0.27	6.6	7.4	12.0	709	26	169.3	111.7	4.8	0.57	0.08	4.8	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.37196	0.23	1.3	2.1	12.0	201	22	169.8	111.9	70.3	0.57	0.08	0.3	5.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.49387	0.22	4.7	5.6	12.0	536	21	170.3	112.0	5.8	0.57	0.08	3.3	3.56	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.61493	0.25	2.2	3	12.1	287	24	170.8	112.2	20.6	0.57	0.08	1.0	4.28	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.736	0.18	7.1	8	12.1	766	17	171.4	112.3	2.9	0.57	0.08	5.3	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39.85791	0.17	4.7	5.5	12.1	527	16	171.9	112.5	4.6	0.57	0.08	3.2	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.06237	0.09	4.6	5.3	12.2	508	9	172.8	112.8	2.6	0.57	0.08	3.0	3.41	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.21519	0.15	5.2	5.9	12.3	565	14	173.4	113.0	3.7	0.57	0.08	3.5	3.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.34176	0.14	2.7	3.4	12.3	326	13	174.0	113.1	8.8	0.57	0.08	1.3	3.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.46663	0.12	8.2	8.9	12.3	852	11	174.5	113.3	1.7	0.57	0.08	6.0	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.71765	0.15	3.5	4.2	12.4	402	14	175.6	113.6	6.3	0.57	0.08	2.0	3.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.84718	0.18	3.1	3.8	12.5	364	17	176.1	113.8	9.2	0.57	0.08	1.6	3.92	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40.97375	0.16	8.2	8.9	12.5	852	15	176.7	114.0	2.3	0.57	0.08	5.9	3.12	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.22943	0.18	9.1	9.9	12.6	948	17	177.8	114.3	2.2	0.57	0.08	6.7	3.07	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.35558	0.23	5.9	6.6	12.6	632	22	178.3	114.5	4.9	0.57	0.08	4.0	3.45	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.48426	0.23	6.2	6.8	12.6	651	22	178.9	114.7	4.7	0.57	0.08	4.1	3.42	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.6121	0.19	8.6	9.3	12.7	891	18	179.4	114.8	2.6	0.57	0.08	6.2	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.73867	0.22	2.1	2.8	12.7	268	21	180.0	115.0	23.9	0.57	0.09	0.8	4.43	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.86524	0.18	3.5	4.3	12.8	412	17	180.5	115.2	7.5	0.57	0.09	2.0	3.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41.99266	0.2	5.2	5.9	12.8	565	19	181.1	115.3	5.0	0.57	0.09	3.3	3.52	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.12177	0.2	4.1	4.8	12.8	460	19	181.6	115.5	6.9	0.57	0.09	2.4	3.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.24664	0.2	9.2	10	12.9	958	19	182.2	115.7	2.5	0.57	0.09	6.7	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.37364	0.16	2.1	3.1	12.9	297	15	182.7	115.8	13.4	0.57	0.09	1.0	4.20	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.50147	0.16	7.5	8.4	13.0	804	15	183.3	116.0	2.5	0.57	0.09	5.4	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.6272	0.19	2.5	3.4	13.0	326	18	183.8	116.2	12.8	0.57	0.09	1.2	4.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.75462	0.17	7.7	8.5	13.0	814	16	184.4	116.3	2.6	0.57	0.09	5.4	3.19	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42.87992	0.22	3	3.8	13.1	364	21	184.9	116.5	11.8	0.57	0.09	1.5	4.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.00479	0.18	3.9	4.8	13.1	460	17	185.5	116.7	6.3	0.57	0.09	2.4	3.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.13178	0.13	7.9	8.8	13.1	843	12	186.0	116.8	1.9	0.57	0.09	5.6	3.11	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.32227	0.12	5.3	6	13.2	575	11	186.8	117.1	3.0	0.57	0.09	3.3	3.40	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.57414	0.1	6.8	7.6	13.3	728	10	187.9	117.4	1.8	0.57	0.09	4.6	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.69859	0.1	5.1	6	13.3	575	10	188.4	117.6	2.5	0.57	0.09	3.3	3.37	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.82516	0.13	2	2.9	13.4	278	12	189.0	117.8	14.0	0.57	0.09	0.8	4.30	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43.95046	0.12	6.9	7.9	13.4	757	11	189.5	117.9	2.0	0.57	0.09	4.8	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.0783	0.16	2.4	3.4	13.4	326	15	190.1	118.1	11.3	0.57	0.09	1.1	4.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.20233	0.11	4.4	5.3	13.5	508	11	190.6	118.3	3.3	0.57	0.09	2.7	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.32933	0.16	3.6	4.5	13.5	431	15	191.2	118.4	6.4	0.57	0.09	2.0	3.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.45674	0.12	5.4	6.4	13.6	613	11	191.7	118.6	2.7	0.57	0.09	3.6	3.36	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.58331	0.11	8.1	9.1	13.6	871	11	192.3	118.8	1.6	0.57	0.09	5.7	3.06	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information

Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters

M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters

γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: UR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
44.83899	0.15	6.3	7.2	13.7	689	14	193.4	119.1	2.9	0.57	0.09	4.2	3.31	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
44.96386	0.22	5.4	6.3	13.7	603	21	193.9	119.3	5.1	0.57	0.09	3.4	3.51	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.09128	0.26	5.5	6.7	13.7	642	25	194.4	119.4	5.6	0.57	0.09	3.7	3.50	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.21954	0.43	11	11.9	13.8	1140	41	195.0	119.6	4.4	0.57	0.09	7.9	3.17	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.34526	0.6	24	24.5	13.8	2346	57	195.5	119.8	2.7	0.57	0.09	18.0	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
45.4676	0.7	41	40.9	13.9	3917	67	196.1	119.9	1.8	0.57	0.09	31.0	2.47	0.92	33.8	2.44	35.5	n/a	n/a	n/a	2.44	35.53	2.48	88.04	0.143	35.53	34	0.80	0.97	0.15	1.71
45.58867	0.78	42	42.1	13.9	4031	75	196.6	120.1	1.9	0.57	0.09	31.9	2.48	0.92	34.8	2.45	36.5	n/a	n/a	n/a	2.45	36.55	2.53	92.29	0.153	36.55	35	0.80	0.97	0.16	1.83
45.71058	0.8	48	48	13.9	4596	77	197.1	120.2	1.7	0.57	0.09	36.6	2.40	0.92	39.9	2.37	41.6	n/a	n/a	n/a	2.37	41.64	2.20	91.78	0.152	41.64	37	0.80	0.97	0.16	1.81
45.82784	0.83	43	43.3	14.0	4146	79	197.6	120.4	2.0	0.57	0.09	32.8	2.48	0.92	35.8	2.45	37.5	n/a	n/a	n/a	2.45	37.54	2.52	94.67	0.159	37.54	35	0.80	0.97	0.16	1.89
45.94679	0.86	47	46.8	14.0	4482	82	198.1	120.6	1.9	0.57	0.09	35.5	2.44	0.92	38.8	2.41	40.5	n/a	n/a	n/a	2.41	40.55	2.35	95.23	0.160	40.55	36	0.80	0.97	0.17	1.91
46.06362	0.9	44	44.2	14.0	4233	86	198.6	120.7	2.1	0.57	0.09	33.4	2.49	0.92	36.5	2.46	38.3	n/a	n/a	n/a	2.46	38.27	2.57	98.17	0.168	38.27	35	0.80	0.97	0.17	2.00
46.18088	0.78	40	39.4	14.1	3773	75	199.1	120.9	2.1	0.57	0.09	29.6	2.52	0.92	32.3	2.49	34.1	n/a	n/a	n/a	2.49	34.09	2.74	93.26	0.155	34.09	33	0.80	0.97	0.16	1.85
46.29771	0.96	46	46	14.1	4405	92	199.7	121.0	2.2	0.57	0.09	34.7	2.48	0.92	38.0	2.45	39.8	n/a	n/a	n/a	2.45	39.78	2.53	100.72	0.175	39.78	36	0.80	0.97	0.18	2.08
46.41158	0.99	38	37.4	14.1	3581	95	200.1	121.2	2.8	0.57	0.09	27.9	2.62	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.47084	0.99	33	32.9	14.2	3151	95	200.4	121.3	3.2	0.57	0.09	24.3	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.55212	0.95	36	35.6	14.2	3409	91	200.7	121.4	2.8	0.57	0.09	26.4	2.64	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.65921	1.02	40	39.9	14.2	3821	98	201.2	121.5	2.7	0.57	0.09	29.8	2.59	0.91	32.6	2.56	34.4	n/a	n/a	n/a	2.56	34.44	3.09	106.44	0.192	34.44	34	0.80	0.96	0.20	2.27
46.7642	1.01	33	32.8	14.3	3141	97	201.7	121.6	3.3	0.57	0.09	24.2	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.86876	1.05	38	38.1	14.3	3648	101	202.1	121.8	2.9	0.57	0.09	28.3	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
46.97373	1.06	37	36.9	14.3	3534	102	202.6	121.9	3.0	0.57	0.09	27.3	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.07787	1.05	37	36.4	14.3	3486	101	203.0	122.1	3.1	0.57	0.09	26.9	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.18158	1.15	36	36.3	14.4	3476	110	203.5	122.2	3.4	0.57	0.09	26.8	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.28275	1.18	32	32.1	14.4	3074	113	203.9	122.3	3.9	0.57	0.09	23.5	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.38392	1.31	37	36.7	14.4	3514	125	204.3	122.5	3.8	0.57	0.09	27.0	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.4834	1.33	40	40.2	14.5	3850	127	204.8	122.6	3.5	0.57	0.09	29.7	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.58457	1.35	36	35.4	14.5	3390	129	205.2	122.7	4.1	0.57	0.09	25.9	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.68405	1.34	39	38.9	14.5	3725	128	205.6	122.9	3.6	0.57	0.09	28.6	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.78437	1.4	40	40	14.6	3830	134	206.1	123.0	3.7	0.57	0.09	29.5	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.88258	1.43	40	39.8	14.6	3811	137	206.5	123.1	3.8	0.57	0.09	29.3	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
47.98163	1.37	36	36.2	14.6	3467	131	206.9	123.3	4.0	0.57	0.09	26.4	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.07857	1.45	41	41.3	14.7	3955	139	207.3	123.4	3.7	0.57	0.09	30.4	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.17678	1.46	36	35.8	14.7	3428	140	207.8	123.5	4.3	0.57	0.09	26.1	2.77	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.27541	1.41	39	39.1	14.7	3744	135	208.2	123.6	3.8	0.57	0.09	28.6	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.37447	1.46	44	43.4	14.7	4156	140	208.6	123.8	3.5	0.57	0.09	31.9	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.47394	1.33	39	39.1	14.8	3744	127	209.0	123.9	3.6	0.57	0.09	28.5	2.69	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.57088	1.37	47	46.8	14.8	4482	131	209.5	124.0	3.1	0.57	0.09	34.4	2.58	0.90	38.1	2.55	40.0	n/a	n/a	n/a	2.55	39.98	3.01	120.45	0.243	39.98	36	0.80	0.96	0.25	2.83
48.66866	1.39	44	43.6	14.8	4175	133	209.9	124.2	3.4	0.57	0.09	31.9	2.63	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.76687	1.37	45	44.4	14.9	4252	131	210.3	124.3	3.2	0.57	0.09	32.5	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.86381	1.46	46	45.7	14.9	4376	140	210.7	124.4	3.4	0.57	0.09	33.5	2.61	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
48.96075	1.38	39	38.6	14.9	3696	132	211.1	124.5	3.8	0.57	0.09	28.0	2.71	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.05895	1.35	42	41.5	15.0	3974	129	211.6	124.7	3.4	0.57	0.09	30.2	2.65	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.15631	1.27	39	38.6	15.0	3696	122	212.0	124.8	3.5	0.57	0.09	27.9	2.68	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.25368	1.15	36	36.3	15.0	3476	110	212.4	124.9	3.4	0.57	0.09	26.1	2.70	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.35061	1.07	37	36.8	15.0	3524	102	212.8	125.1	3.1	0.57	0.09	26.5	2.67	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.44882	0.98	26	26.2	15.1	2509	94	213.2	125.2	4.1	0.57	0.09	18.3	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.54576	0.99	26	25.8	15.1	2471	95	213.7	125.3	4.2	0.57	0.09	18.0	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.61137	1	24	24.1	15.1	2308	96	213.9	125.4	4.6	0.57	0.09	16.7	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.68418	0.93	21	21	15.1	2011	89	214.3	125.5	5.0	0.57	0.09	14.3	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.78281	1.01	26	25.4	15.2	2432	97	214.7	125.6	4.4	0.57	0.09	17.7	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[1]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)		qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
49.88144	0.95	17	16.4	15.2	1570	91	215.1	125.8	6.7	0.57	0.09	10.8	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
49.97923	0.95	22	22.2	15.2	2126	91	215.5	125.9	4.8	0.57	0.09	15.2	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.07743	1.02	16	16.2	15.3	1551	98	215.9	126.0	7.3	0.57	0.09	10.6	3.21	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.17564	0.94	16	15.6	15.3	1494	90	216.4	126.2	7.0	0.57	0.09	10.1	3.22	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.27427	0.98	22	21.6	15.3	2068	94	216.8	126.3	5.1	0.57	0.09	14.7	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.37248	1.03	17	17	15.4	1628	99	217.2	126.4	7.0	0.57	0.09	11.2	3.18	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.46984	0.96	17	17.3	15.4	1657	92	217.6	126.5	6.4	0.57	0.09	11.4	3.15	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.56847	1	21	20.9	15.4	2001	96	218.1	126.7	5.4	0.57	0.09	14.1	3.03	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.66753	1.02	16	15.5	15.4	1484	98	218.5	126.8	7.7	0.57	0.09	10.0	3.25	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.76574	1	18	18.2	15.5	1743	96	218.9	126.9	6.3	0.57	0.09	12.0	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.86395	1.05	22	21.9	15.5	2097	101	219.3	127.1	5.4	0.57	0.09	14.8	3.01	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50.963	1	18	18.1	15.5	1733	96	219.8	127.2	6.3	0.57	0.09	11.9	3.13	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.06205	1.1	25	24.4	15.6	2337	105	220.2	127.3	5.0	0.57	0.09	16.6	2.96	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.16195	1.04	18	17.8	15.6	1705	100	220.6	127.5	6.7	0.57	0.09	11.6	3.16	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.25932	1.08	23	23.4	15.6	2241	103	221.0	127.6	5.1	0.57	0.09	15.8	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.35794	1.04	23	22.8	15.7	2183	100	221.5	127.7	5.1	0.57	0.09	15.4	2.99	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.45742	1.03	22	21.6	15.7	2068	99	221.9	127.8	5.3	0.57	0.09	14.4	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.55817	1.1	25	25.3	15.7	2423	105	222.3	128.0	4.8	0.57	0.09	17.2	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.65638	1.04	20	19.5	15.7	1867	100	222.8	128.1	6.1	0.57	0.09	12.8	3.10	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.75543	1.13	26	25.6	15.8	2451	108	223.2	128.2	4.9	0.57	0.09	17.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.85491	1.1	26	25.6	15.8	2451	105	223.6	128.4	4.7	0.57	0.09	17.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
51.95523	1.14	26	25.7	15.8	2461	109	224.0	128.5	4.9	0.57	0.09	17.4	2.93	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.05386	1.18	22	21.9	15.9	2097	113	224.5	128.6	6.0	0.57	0.09	14.6	3.05	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.15334	1.14	24	23.4	15.9	2241	109	224.9	128.8	5.4	0.57	0.09	15.7	3.00	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.25282	1.21	29	28.9	15.9	2767	116	225.3	128.9	4.6	0.57	0.09	19.7	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.35187	1.18	23	23	16.0	2202	113	225.8	129.0	5.7	0.57	0.09	15.3	3.02	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.45135	1.15	28	27.9	16.0	2672	110	226.2	129.2	4.5	0.57	0.09	18.9	2.88	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.54913	1.2	25	24.6	16.0	2356	115	226.6	129.3	5.4	0.57	0.09	16.5	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.64904	1.18	31	30.6	16.0	2930	113	227.0	129.4	4.2	0.57	0.09	20.9	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.74682	1.18	26	25.7	16.1	2461	113	227.5	129.6	5.1	0.57	0.09	17.2	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.8391	1.26	33	32.5	16.1	3112	121	227.9	129.7	4.2	0.57	0.09	22.2	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
52.93689	1.27	27	26.8	16.1	2566	122	228.3	129.8	5.2	0.57	0.09	18.0	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.01859	1.28	33	32.7	16.2	3131	123	228.6	129.9	4.2	0.57	0.09	22.3	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.11637	1.28	29	28.7	16.2	2748	123	229.1	130.0	4.9	0.57	0.09	19.4	2.90	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.21289	1.32	36	36.2	16.2	3467	126	229.5	130.2	3.9	0.57	0.09	24.9	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.30982	1.26	30	30.3	16.2	2902	121	229.9	130.3	4.5	0.57	0.09	20.5	2.86	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.40803	1.3	36	35.5	16.3	3399	124	230.3	130.4	3.9	0.57	0.09	24.3	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.50454	1.34	34	34	16.3	3256	128	230.7	130.6	4.2	0.57	0.09	23.2	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.59979	1.28	33	33.1	16.3	3170	123	231.1	130.7	4.2	0.57	0.09	22.5	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.6963	1.4	37	37.1	16.4	3553	134	231.6	130.8	4.0	0.57	0.09	25.4	2.76	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.79366	1.34	30	30	16.4	2873	128	232.0	130.9	4.9	0.57	0.09	20.2	2.89	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.8906	1.49	37	36.8	16.4	3524	143	232.4	131.1	4.3	0.57	0.09	25.1	2.78	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
53.98542	1.46	36	35.4	16.5	3390	140	232.8	131.2	4.4	0.57	0.09	24.1	2.80	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.08236	1.51	39	39	16.5	3735	145	233.2	131.3	4.1	0.57	0.09	26.7	2.75	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.17929	1.55	41	41	16.5	3926	148	233.6	131.4	4.0	0.57	0.09	28.1	2.72	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.27454	1.65	37	36.9	16.5	3534	158	234.0	131.6	4.8	0.57	0.09	25.1	2.81	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.36936	1.57	41	40.5	16.6	3878	150	234.5	131.7	4.1	0.57	0.09	27.7	2.74	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.46461	1.46	48	48.2	16.6	4616	140	234.9	131.8	3.2	0.57	0.09	33.2	2.60	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.55859	1.51	45	44.4	16.6	4252	145	235.3	131.9	3.6	0.57	0.09	30.4	2.66	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.65425	1.59	36	35.8	16.7	3428	152	235.7	132.1	4.8	0.57	0.09	24.2	2.82	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.75119	1.54	34	33.7	16.7	3227	147	236.1	132.2	4.9	0.57	0.09	22.6	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.84558	1.56	38	37.5	16.7	3591	149	236.5	132.3	4.5	0.57	0.09	25.3	2.79	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
54.94041	1.59	30	30.1	16.7	2882	152	236.9	132.5	5.8	0.57	0.09	20.0	2.94	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.03608	1.56	34	34.1	16.8	3265	149	237.3	132.6	4.9	0.57	0.09	22.8	2.85	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

CPT LIQUEFACTION POTENTIAL CALCULATION SHEET (11/12/01)

S&ME

* Areas of user input are shaded in green
* Data needed for user calculation are in red

0	0
20.1	0
20.1	9999

Project Information
Date: 1/29/2008
Name: Plant Allen
Location:
Project Number: 1356-06-825

Quake Parameters
M_w: 7.3
MSF[1]: 1.07 (lower bound)
MSF[2]: 1.09 (upper bound)
a: 0.2 %g

General Parameters
γ_{soil}: 90 lb/ft³
γ_{soil}: 14.1 kN/m³
γ_{water}: 62.4 lb/ft³
γ_{water}: 9.81 kN/m³
Pa: 101.33 kPa

Boring: tR(CPT-18)
GW Depth: 20.0 ft
GW Depth: 6.1 m

Depth (ft)	fs (tsf)	qc	qc (tsf)	z (m)	q_c (kPa)	f_s (kPa)	σ_{vo} (kPa)	σ'_{vo} (kPa)	F (%)	r_d[3]	CSR[4]	Q n=1	I_c n=1	C_Q n=.5	Q n=.5	I_c n=.5	q_{c1N} n=.5	C_Q n=.7	q_{c1N} n=.7	I_c n=.7	I_c[5]	q_{c1N}	K_c[5]	$(q_{c1N})_{cs}$[5]	$CRR_{7.5}$[5]	q_{c1}[6]	D_r[6]	f[7]	K_σ[7]	Corrected CRR	fos
55.13089	1.55	28	28.3	16.8	2710	148	237.7	132.7	6.0	0.57	0.09	18.6	2.97	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.22445	1.52	35	34.6	16.8	3313	146	238.1	132.8	4.7	0.57	0.09	23.2	2.83	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.31969	1.51	28	27.8	16.9	2662	145	238.6	133.0	6.0	0.57	0.09	18.2	2.98	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.41451	1.53	33	33	16.9	3160	147	239.0	133.1	5.0	0.57	0.09	22.0	2.87	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
55.50891	1.49	29	29	16.9	2777	143	239.4	133.2	5.6	0.57	0.09	19.1	2.95	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	not liq	not liq	not liq	not liq	n/a	n/a	n/a	not liq	not liq	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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				0.0	0	0	0.0	0.0	#DIV/0!	0.57	0.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
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S&ME

PROJECT NO. 1356-06-825

SHEET NO. 1 / 15

DATE March 3, 2008

JOB NAME Duke Energy – Allen Steam Station Ash Landfill

COMPUTED BY ZDS

SUBJECT Global Slope Stability Calculation

CHECKED BY KB

COMPUTATIONS BY:

Signature Zachary Scarboro

Date

Name Zach Scarboro, E.I.

Title Staff Professional

ASSUMPTIONS AND PROCEDURES CHECKED BY:

Signature Kenneth R. Daly

Date 3/4/08

Name Kenneth Daly, P.E.

Title Sr. Project Engineer

COMPUTATIONS CHECKED BY:

Signature Kyle Baucom

Date 3/4/08

Name Kyle Baucom, E.I.

Title Staff Professional

REVIEWED BY:

Signature Billy Camp

Date 3/5/08

Name Billy Camp, P.E.

Title Technical Principal/Vice President

REVIEW NOTES / COMMENTS:

OBJECTIVE:
Evaluate the global slope stability of the proposed ash landfill over the Retired Ash Basin (RAB) at Allen Steam Station.

METHOD:
Analyze the static and seismic slope stability of two representative sections identified as the north-south cross-section and the east-west cross-section. The seismic stability was analyzed using a pseudo-static approach (i.e., static with the addition of a seismic force coefficient). Three conditions were analyzed: Construction Static, Post-Construction Static, and Post-Construction Pseudo-Static. Geostudio's SLOPE/W computer program was used, running Spencer's Method, to analyze the static and pseudo-static slope stability.

CALCULATIONS:

Design Criterion
The target factor of safety for Post-Construction Static (final, long-term) analyses was adapted from USACE (2003) documents as 1.5. The target factor of safety for Construction Static (short-term) analyses was adapted from Duncan (1992) as 1.3. For the Post-Construction Pseudo-Static analyses, the maximum acceleration generated by the design earthquake was compared to the yield acceleration computed for the post-construction geometry and properties. In accordance with the Seismic Design Guidance for Municipal Solid Waste Landfills manual from EPA (1995), performance was acceptable if the yield acceleration was less than the maximum acceleration.

Cross Sections

Subsurface data including stratigraphy and location of the water table were obtained from soil test boring logs and observation well logs developed by S&ME (2007). Supplemental data was obtained from previous reports conducted at the site [LAW (1982, 1998), MACTEC (2003) and Shield (2004)].

Two general cross sections were developed for slope stability analyses and the locations are illustrated on Figure 1. The sections are indentified as the North-South section (or A-A') and the East-West section (or B-B'). The North-South cross section is shown in Figure 2. The East-West cross section is shown in Figure 3. The proposed ash fill will be placed on top of the RAB. The RAB contains fly and bottom ash ranging in thickness from about 15 to 55 feet.

The RAB is surrounded by earthen dikes on the North, East, South and West sides. During ash basin operations, the dikes were constructed in sequential stages. Each new stage was constructed on top of the previous stage adding fill to both the upstream and downstream sides and raising the dike elevations by approximately 20 feet. Dikes to the North and East consist of two stages. The dike to the South consists of a third stage. A cross section illustrating the south dike stratigraphy (C-C') is provided in figure 4. We understand the West dike consists of only a single stage.

The RAB is underlain by saprolite. The East dike is partially underlain with saprolite, partially underlain with alluvium, and buttressed by fill. The alluvium borders the Catawba River and is underlain by saprolite. For the

East-West cross section the water table was assumed to start approximately 12 feet below the surface of the RAB and decrease in elevation until it reaches the river water surface elevation. The South dike is underlain by saprolite.

For the North-South cross section the water table was assumed to start at the surface of the active ash basin (located south of the RAB), decrease in elevation through the South dike, and reach a constant depth of approximately 12 ft.

Material Parameters

The generalized cross-sections consist of 8 material types: ash fill (in the active landfill), RAB ash (existing in-place ash), Dike I, Dike II, Dike III, fill, alluvium, and saprolite. The unit weight, effective strength cohesion and effective stress friction angle were estimated for each material. In addition, the undrained shear strength of RAB ash with respect to depth was estimated to account for consolidation strength gain.

Unit Weight:

Laboratory unit weight measurements made by S&ME (2007) as well as values presented in previous reports (MACTEC, 2003), are summarized in Table 1 below.

TABLE 1: UNIT WEIGHT LABORATORY RESULTS

Material	Sample	γ_d (pcf)	ω_{moist} (%)	γ_{moist} (pcf)
RAB Ash	B-6 (20-22')	61.8	49.9	92.6
	OW-12 (15-17')	60.5	41.6	85.7
	B-13 (20-22')	77.2	20.7	93.2
	OW-18 (8.5-10.5')	72.5	37.6	99.8
	OW-19 (40-42')	91.8	30.7	120.0
	B-32 (31.2')	77	40.1	107.9
	Average	**73.5**	**36.8**	**99.9**
Dike I	B-29 (10-12')	96.5	25.1	120.7
Dike II	B-27 (40-42')	83	37.5	114.1
Alluvium	OW-16 (10-12')	97.4	25.1	121.8
Saprolite	B-6 (76-77')	114	16.9	133.3
	OW-8 (20-22')	62.4	32.3	82.6
	OW-20 (60-62')	93.9	21.2	113.8
	B-22 (30-32')	81.4	35.6	110.4
	B-24 (40-42')	91	25.9	114.6
	Average	**88.5**	**26.4**	**110.9**

Based on the above testing and other typical correlations, the moist unit weights listed in Table 2 were selected for use in the stability analyses.

TABLE 2: MATERIAL UNIT WEIGHTS	
Material	**γ_{moist} (pcf)**
Ash Fill	90
RAB Ash	90
Dike I	120
Dike II	115
Dike III	120
Fill	110
Alluvium	110
Saprolite	110

Shear Strength:

Consolidated undrained triaxial shear strength testing performed for this study on undisturbed samples yielded the effective stress strength parameters summarized in Table 3.

TABLE 3: SHEAR STRENGTH LABORATORY RESULTS			
Material	**Sample**	**c' (psf)**	**Φ' (degrees)**
RAB Ash	B-6 (20-22')	140	33.0
	OW-12 (15-17')	90	29.5
	OW-18 (8.5-10.5')	140	29.3
	B-13 (20-22')	190	25.2
	Average	**140**	**29**
Dike I	B-29 (10-12')	600	25.9
Dike II	B-27 (40-42')	40	33.8
Saprolite	OW-20 (60-62')	420	29.8
	B-22 (30-32')	70	31.8
	B-28 (61-63')	310	28.9
	Average	**266.7**	30.2

Based on the above laboratory strength test results and parameters reported in literature for similar soils, the effective stress shear strength parameters presented in Table 4 were selected for use in the stability analyses.

TABLE 4: MATERIAL SHEAR STRENGTHS			
Material	Effective Strength		Source or Comment
	c' (psf)	Φ' (degrees)	
Ash Fill	0	34	Table 5.2 Oweis et. Al. 1998
RAB Ash	0	25	Lower Bound of B-6, OW-12, OW-18, B-13
Dike I	600	26	B-29
Dike II	0	34	B-27
Dike III	0	34	Assumed similar to Dike II
Fill	100	32	NAVFAC 7.2-39
Alluvium	100	32	NAVFAC 7.2-39
Saprolite	70	32	OW-20, B-22, B-28

Undrained Shear Strength:

Based on its predominantly fine-grained characteristics, the RAB Ash is expected to have no time to drain under rapid earthquake loading. An undrained shear strength of RAB Ash was therefore used during pseudo-static loading to evaluate seismic stability. The RAB Ash beneath the proposed landfill will consolidate and thereby gain strength as the overburden stresses increase as a result of filling. The ratio of the undrained shear strength to overburden stress can be calculated based on CU Triaxial test results by using the following equation:

$$\frac{S_u}{\sigma'_c} = \frac{\sigma_1 - \sigma_3}{2\sigma_3} \qquad \text{(Equation 1)}$$

Where
S_u = undrained shear strength (psf)
σ'_c = isotropic consolidation stress (psf)
σ_1 = normal stress at failure for a triaxial shear test (psf)
σ_3 = confining stress at failure for a triaxial shear test (psf)

The confining stresses and normal stresses at failure measured during our CU triaxial testing of RAB ash samples (S&ME, 2007) are summarized in Table 5.

TABLE 5: S_u/σ'_c RATIO			
Sample	**σ_1**	**σ_3**	**S_u/σ'_c**
B-6 UD-1	2.8	1.4	0.50
B-6 UD-1	9.7	4.3	0.63
OW-12 UD-1	2.4	1.4	0.36
OW-12 UD-1	9	4.3	0.55
B-13	2.5	1.4	0.39
B-13	7.5	4.3	0.37
OW-18 UD-1	4.4	1.4	1.07
OW-18 UD-1	8.65	4.3	0.51
		mean	0.55
		median	0.50
		std. dev	0.23
		median - 1 std. dev.	**0.27**

As a check on the reasonableness of our laboratory testing results, the SHANSEP method (Ladd, 1996) was considered. According to the SHANSEP method, the undrained strength to overburden stress ratio can be estimated as:

$$\frac{S_u}{\sigma'_c} = S(OCR)^m \qquad \text{(Equation 2)}$$

Where
S_u = undrained shear strength (psf)
σ'_c = effective vertical consolidation stress (psf)
S, m = material-dependent variables
OCR = over consolidation ratio

For normally consolidated (OCR=1), sedimentary deposit of silts and organic soils Ladd (1996) reports:

$$\frac{s_u}{\sigma'_c} = (0.25 \pm 0.05)(1)^{0.8} = 0.25 \pm 0.05 \qquad \text{(Equation 3)}$$

We note that the lower bound S_u/σ'_c ratio based on our RAB Ash CU laboratory data (0.27 for the median – 1 standard deviation) is similar to the SHANSEP estimate for normally consolidated silts and organic soils (Ladd, 1996). Therefore, the lower bound S_u/σ'_c value for the median – 1 standard deviation of 0.27 was used to estimate the undrained shear strength of the RAB Ash for pseudo-static slope stability.

Pseudo-static analyses were performed for final long-term conditions only. The initial undrained strength at the time of seismic loading was calculated assuming that the RAB Ash was fully consolidated under the weight of new landfill. Using the S_u/σ'_c ratio of 0.27, the initial undrained shear strength value was calculated for the long term condition as 5078.7 psf.

Since the effective stress increases with depth, the undrained shear strength of the normally consolidated RAB Ash will also increase with depth. For the modeling conditions summarized in Table 6, the RAB ash shear strength will increase at a rate of 7.5 psf/ft below a depth of 13 ft, which corresponds to the depth to the water table.

TABLE 6: SHEAR STRENGTH RATE OF INCREASE

Depth to Water (ft):	13
Total Unit Weight of RAB Ash (pcf):	90
S_u/σ'_c value:	0.27
Fill Unit Weight (pcf):	90

Depth Below RAB Surface (feet)	Total Stress (psf)	Initial Effective Stress (psf)	Initial Undrained Shear Strength (psf)	Rate change per 5-ft	Rate Change per 1-ft
13	1170	1170	315.9		
15	1350	1225.2	330.8	87.8	17.6
20	1800	1363.2	368.1	37.3	7.5
25	2250	1501.2	405.3	37.3	7.5
30	2700	1639.2	442.6	37.3	7.5
35	3150	1777.2	479.8	37.3	7.5
40	3600	1915.2	517.1	37.3	7.5
45	4050	2053.2	554.4	37.3	7.5
50	4500	2191.2	591.6	37.3	7.5
55	4950	2329.2	628.9	37.3	7.5

A value of 7.5 psf/ft was used to model the increase in undrained shear strength with respect to depth for the RAB ash below the water table. This value is used in the analysis by SLOPE/W as the user inputs the starting cohesion and the rate of increase with depth, as defined above, and if appropriate, a maximum or limiting cohesion value. After inputting both of these parameters a datum point is selected and the program starts at the initial cohesion value and increases it at the specified rate until the maximum permissible value is achieved.

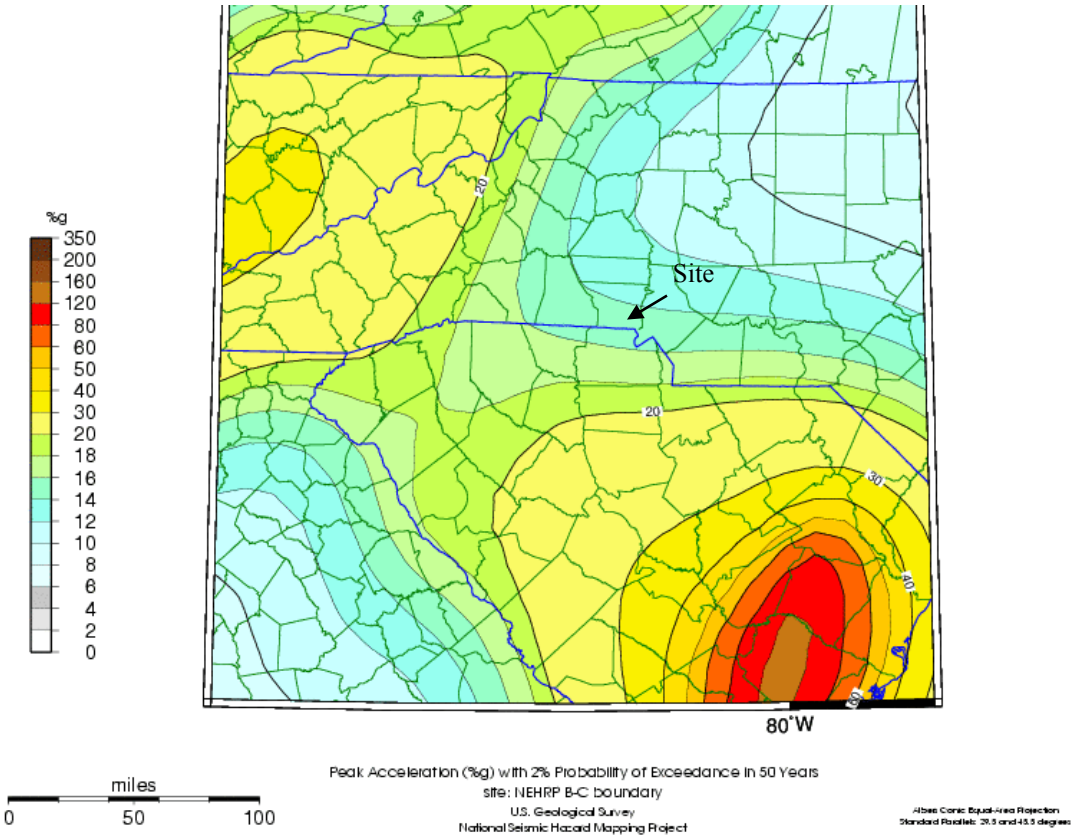
Pseudo-static Analysis

In a pseudo-static analysis, the cyclic loading generated by an earthquake is simplified to one horizontal force, which is represented by a seismic coefficient. The seismic coefficient is taken as the acceleration (expressed as a fraction of gravity) of the potential failure mass. To evaluate the appropriate seismic coefficient or maximum horizontal acceleration of the failure mass, a three step process is used. The first step is to evaluate the rock motion or the peak horizontal ground acceleration (PHGA) at the rock to soil interface (i.e., the B/C boundary). This value is plotted on USGS seismic hazard maps. The next step is to account for site specific amplification or attenuation that will occur as the seismic waves propagate upward from the rock through the soils encountered at the site. This can be estimated by performing dynamic site response analyses or by use of published empirical amplification factors. For this study, the amplification factors for Site Class D conditions, as defined in the 2003 NEHRP Seismic Design Provisions, were used to estimate the site peak ground acceleration (PGA) or free-field acceleration. The final step is to modify the free-field acceleration to account for the three-dimensional nature of the landfill or large earthen embankment.

The PHGA at the rock surface (or B/C boundary) was selected in accordance with North Carolina Solid Waste Rules and RCRA Subtitle D regulation Part 258.14 (40 CFR Part 258), summarized below:

> Section 258.14: landfills must be designed for seismic conditions if they are within a seismic impact zone defined as having a peak horizontal acceleration exceeding 0.10 g based on a 90% probability of non-exceedance over a 250 year period (corresponding to a 2,500 year return period, or a 2% probability of exceedance over a 50 year period). [EPA, 1995]

The PHGA of 0.15g (B/C boundary) for an event having a 2% probability of exceedance over a 50 year period was interpolated from the U.S. Geological Survey 2002 National Seismic Hazard Maps based on the approximate project location coordinates. The peak ground acceleration map and interpolated peak ground acceleration value are shown below.




```
LOCATION                    35.183 Lat.  -81.009 Long.
The interpolated Probabilistic ground motion values, in %g,
at the requested point are:
              10%PE in 50 yr   2%PE in 50 yr
   PGA            5.42            14.65
0.2 sec SA       12.45            32.25
1.0 sec SA        3.95            10.64
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

SEISMIC HAZARD: Hazard by Lat/Lon, 2002

NEHRP 2002 provides a widely used empirical method to estimate the site specific spectral accelerations based on the B/C boundary values. The method uses the 0.2 second and 1.0 second B/C boundary spectral acceleration (SA) values and site amplification factors based on 5 site classifications. The B/C boundary SA

values combined with the amplification factors can be used to generate a site specific response spectrum, from which the free-field PGA value can be taken. Based on shear wave velocity data, the RAB site was assigned a Site Class D classification. The site class D amplification factors corresponding the mapped B/C boundary SA values are summarized in Table 7.

TABLE 7: SPECTRAL ACCELERATION AND AMPLIFICATION FACTOR SUMMARY

0.2 Second Spectral Acceleration	1.0 Second Spectral Acceleration	Amplification Factor, Fa	Amplification Factor, Fv
0.322g	0.106g	1.542	2.374

A Java Ground Motion Parameter Calculator available from the USGS website, which incorporates the information and procedure presented above, was used to compute a ground surface response spectrum. The output file from the Java program is included in attachment 2. A ground surface, free-field acceleration value of 0.20g was computed in this manner.

Once the free-field acceleration is known the acceleration of the potential failure mass (i.e., the new landfill) can then be calculated by using the procedure outlined by Bray (1998). Bray relates the initial fundamental period of the waste fill ($T_{m-waste}$) divided by the normalized mean period of the input rock motion to the maximum horizontal equivalent acceleration of the failure mass. The figures associated with the Bray procedure are shown in attachment 2.

The fundamental period of the waste fill is estimated as:

$$T_{m-waste} = \frac{4H}{V_s} \qquad \text{Equation (4)}$$

Where

$T_{m-waste}$ = Initial fundamental period of the waste fill (s^{-1})
H = Height of the failure surface (ft)
V_s = Shear Wave velocity of the ash (ft/sec)

Once the initial period of the waste fill ($T_{m-waste}$) is calculated it is divided by the mean period of the input rock motion (T_{m-EQ}) from Rathje (1998), which is provided in attachment 2. Once this ratio is calculated the maximum horizontal acceleration of the failure mass can be calculated based on Figure 7a from Bray (1998), which is included in attachment 2. More specifically, for the RAB landfill, Figure 7a yields the following:

$$\frac{MHEA}{MHA * NRF} = 0.22 = \qquad \text{Equation (5)}$$

Where
MHEA = Maximum Horizontal Equivalent Acceleration of the failure mass
MHA = Maximum Horizontal acceleration or free-field acceleration, 0.20g as presented above (Figure 6a (Bray, 1998))
NRF = Non-Linear Response Factor, 1.2 (Figure 6b (Bray, 1998))

Substituting the appropriate values for NRF and MHA, the maximum horizontal equivalent acceleration of the failure mass (i.e., the seismic coefficient or k_{max} for the pseudo-static analysis) is computed to be 0.053g.

Analyses

Static and Pseudo-Static

Slope stability analyses were performed on the north-south and the east-west cross sections using SLOPE/W for the construction condition and the final (post-construction) condition. For the construction condition only static analyses were performed due to the minimal seismic exposure period of the landfill. Both static and pseudo-static conditions were evaluated for the final condition. In most instances, the auto locate feature was used to randomly generate 1,000 potential failure surfaces. After these potential failure surfaces were analyzed, the critical surface was then refined by running an optimization algorithm for 2,000 iterations. In some instances the auto locate feature produced unrealistic results and a potential failure surface with user-defined entrance and exit ranges was analyzed.

The post-construction condition was modeled by assuming a deep-seated circular potential failure surface passing through the dike. The construction condition was modeled assuming the ash landfill would be constructed in stages with a circular potential failure surface passing through the RAB ash.

Results

The slope stability analysis results for post-construction and construction conditions are summarized in Tables 8 and 9, respectively. The output figures and files for the slope stability analyses are provided in Attachment 1.

TABLE 8: POST-CONSTRUCTION STABILITY					
Cross Section	**Condition**	**Safety Factor**	**Design Criteria Safety Factor**		**Results Figure**
East / West	Static	1.99	1.5	**OK**	5
North / South	Static	1.72	1.5	**OK**	6
		k_{max}	**k_y**		
East / West	Pseudo-static	0.053	0.25	**OK**	7
North / South	Pseudo-static	0.053	0.25	**OK**	8

TABLE 9: CONSTRUCTION STABILITY						
Cross Section	**Fill Stage**	**Condition**	**Safety Factor**	**Design Criteria Safety Factor**		**Results Figure**
North / South	1	Static	2.08	1.3	**OK**	9
North / South	2	Static	1.45	1.3	**OK**	10
North / South	3	Static	1.92	1.3	**OK**	11
North / South	4	Static	1.90	1.3	**OK**	12
North / South	5	Static	1.80	1.3	**OK**	13

CONCLUSIONS

Results indicate that static slope stability factors of safety for construction and post-construction conditions exceed the minimum factor of safety. Results also indicate that since the seismic coefficient, k_{max}, is less than yield acceleration, k_y, the slope will be stable and seismic deformations are expected to be insignificant.

DISCUSSION

Long-term (final) and interim slope stability conditions are acceptable.

During construction the duration of exposure at the anticipated filling rates is on the order of 15 years. In the context of a design seismic event corresponding to an approximate 2,500 year return period the probability of the design seismic event occurring during the construction period is low. Therefore short term pseudo-static conditions were not considered herein.

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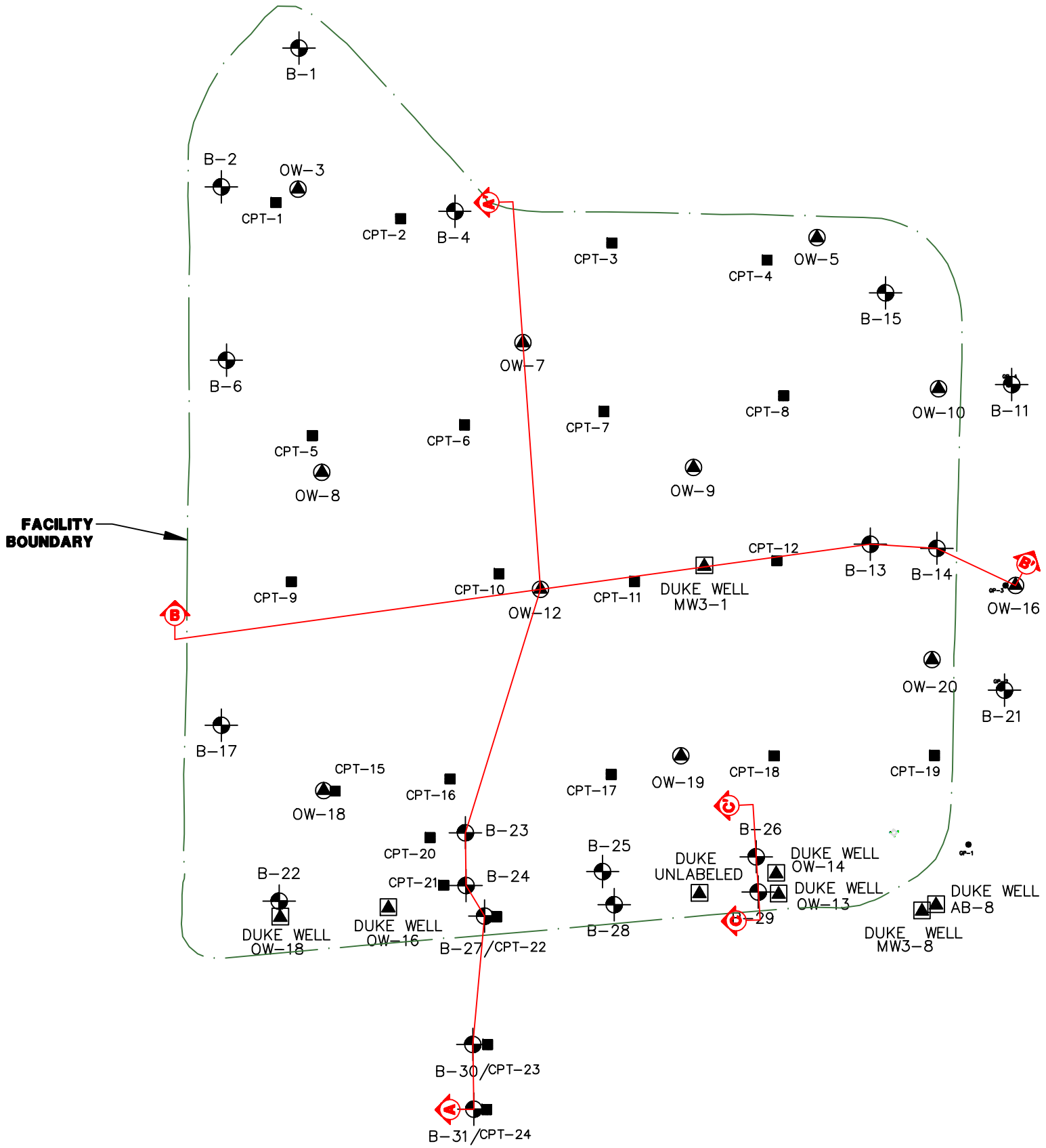
FIGURES

- CROSS-SECTION LOCATIONS
- SLOPE/W OUTPUTS

CROSS-SECTION LOCATIONS



LEGEND

KEY TO BORING LOG (BL)

TOPSOIL	ORGANIC	CLAYEY SAND
GRAVEL	SANDY	SANDY SILT
SAND	SILTY	CLAYEY SILT
SILT	CLAYEY	SANDY CLAY
CLAY	SILTY SAND	SILTY CLAY

KEY TO WELL LOG (WL)

FILTER SAND	GROUT
BENTONITE	
ASH	PARTILLAY WEATHERED ROCK
FILL	BEDROCK
SAPROLITE	

DATE: 1/05/08
DRAWN BY: CLD
CHECKED BY: ZDS
SCALE: N.T.S.
PROJECT NO. 1356-06-825

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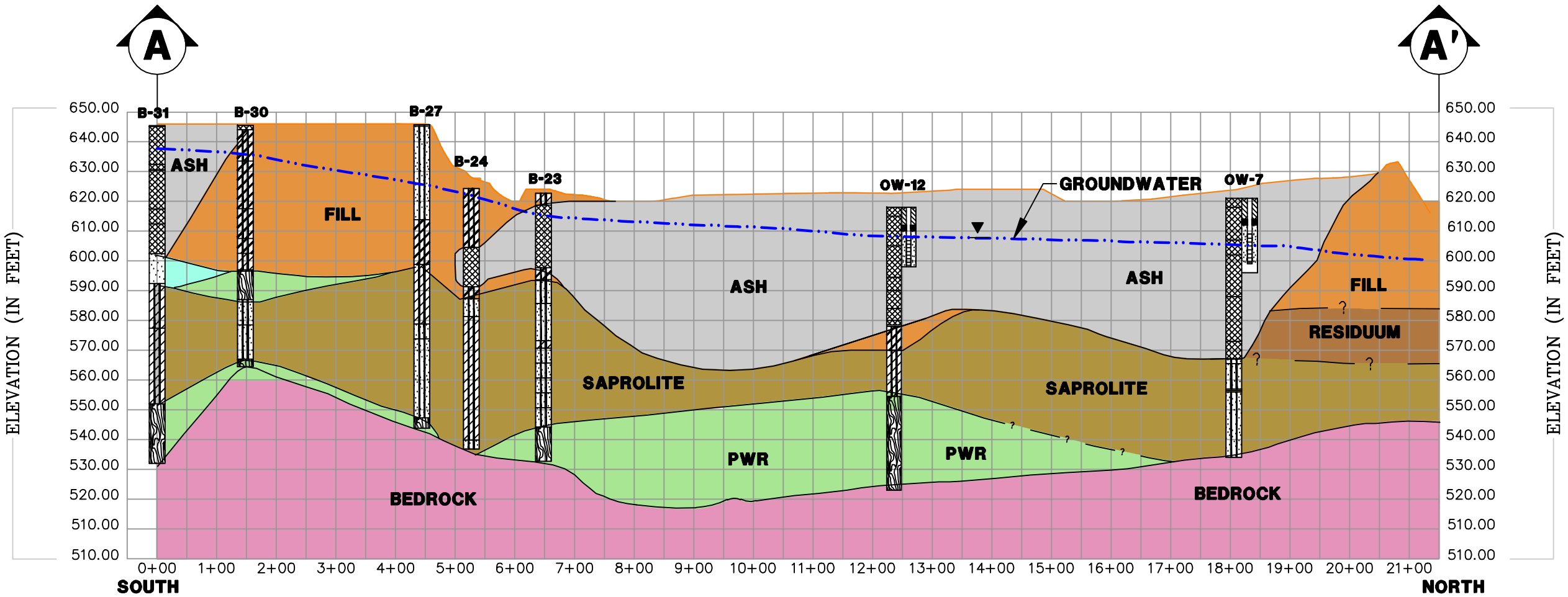
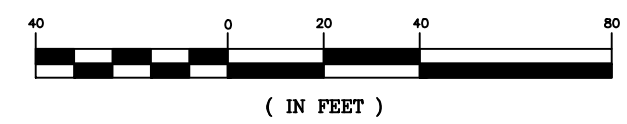
CROSS SECTION LOCATION

ALLEN STEAM STATION – RETIRED ASH BASIN
BELMONT, NORTH CAROLINA

FIGURE NO.
1



VERTICAL
GRAPHIC SCALE



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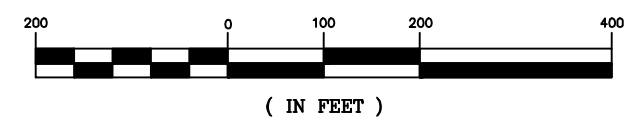

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PROJECT NO. 1356-06-825
DATE: 1/05/08
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CHECKED BY: ZDS

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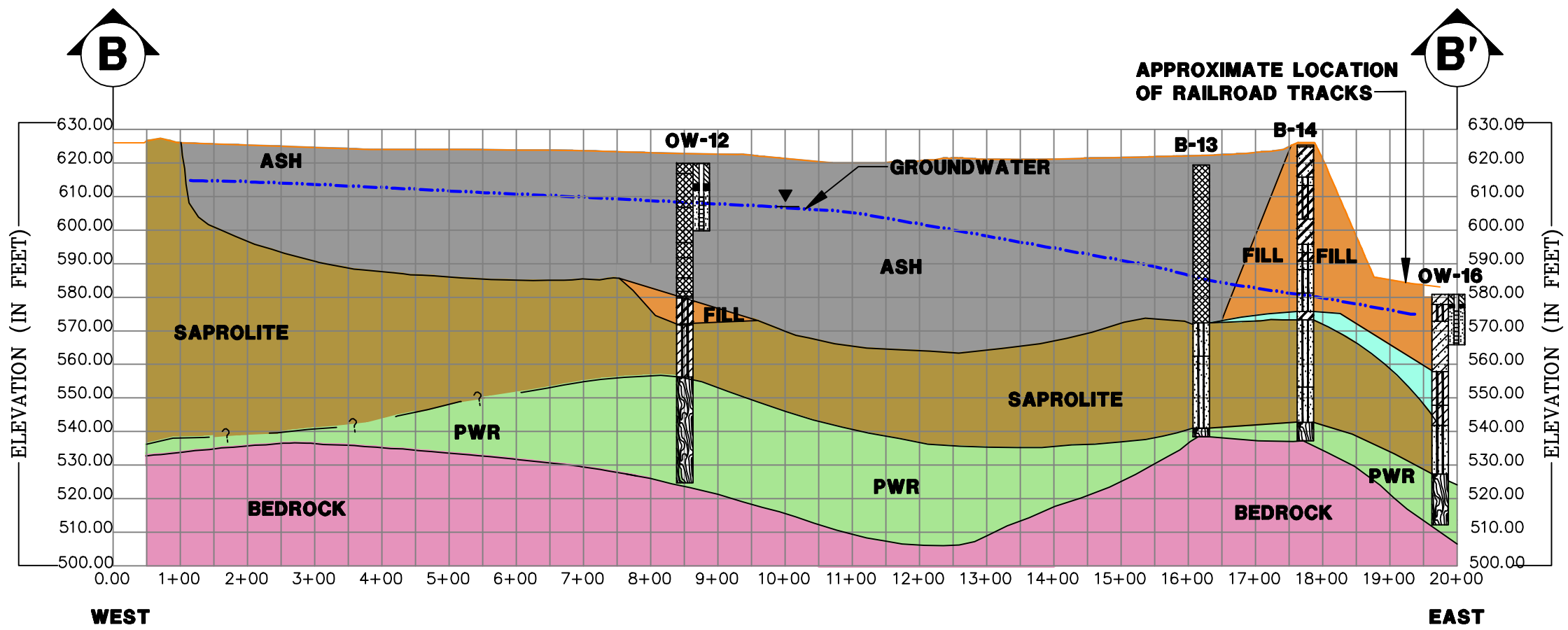
CROSS SECTION A - A'
NORTH - SOUTH

ALLEN STEAM STATION – RETIRED ASH BASIN
BELMONT, NORTH CAROLINA

FIGURE NO.
2



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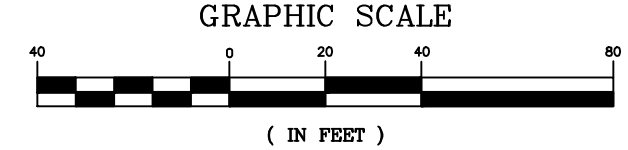
GRAPHIC SCALE



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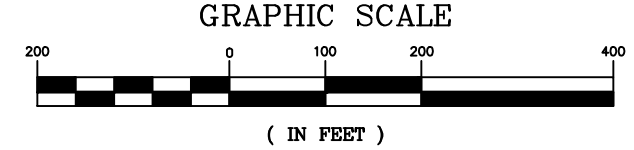
GRAPHIC SCALE



SCALE: AS SHOWN
PROJECT NO. 1356-06-825
DATE: 1/05/08
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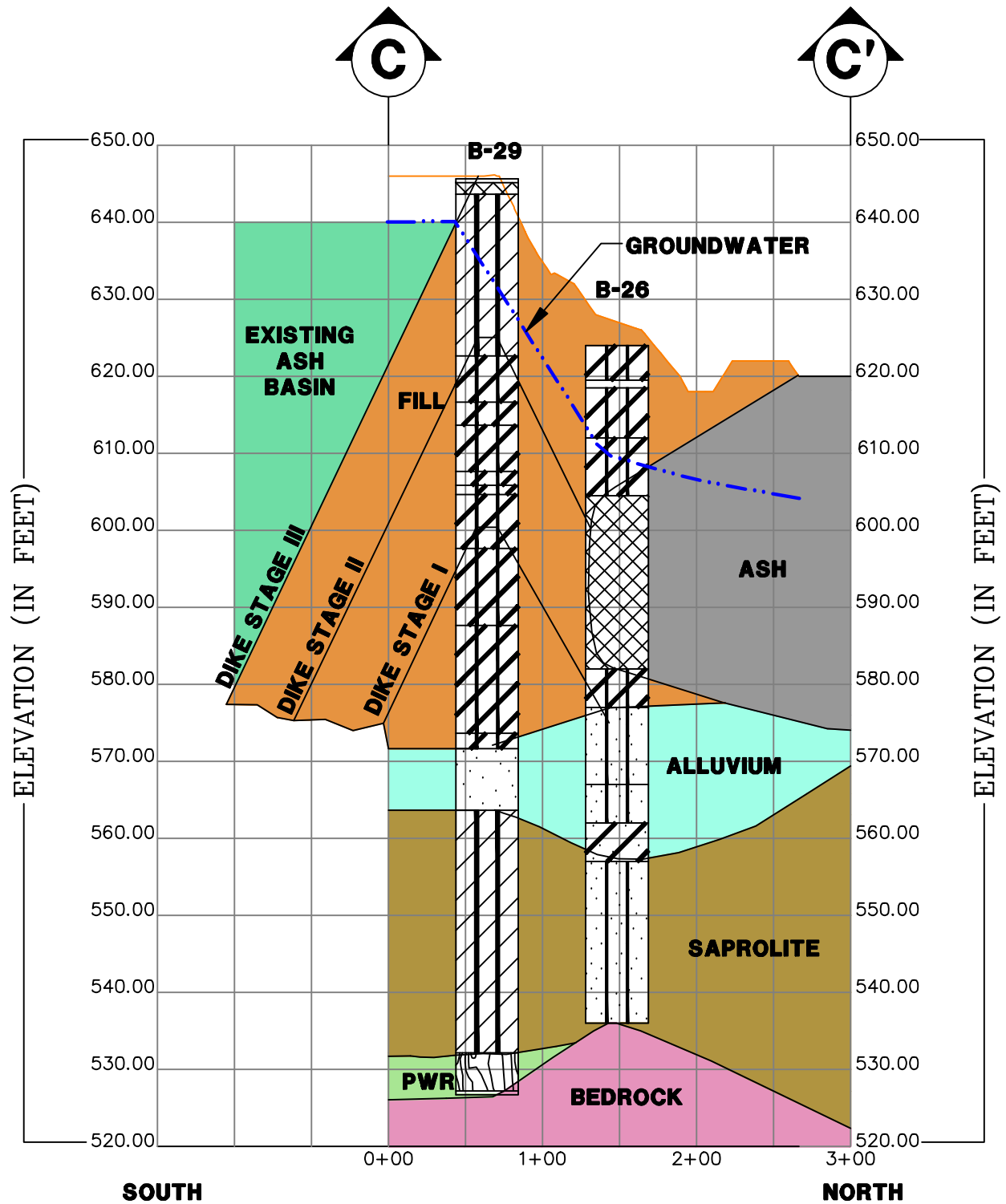
CROSS SECTION B - B'
EAST - WEST

ALLEN STEAM STATION – RETIRED ASH BASIN
BELMONT, NORTH CAROLINA

FIGURE NO.
3



VERTICAL GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

HORIZONTAL GRAPHIC SCALE

100 0 50 100 200

(IN FEET)

SCALE: AS SHOWN

PROJECT NO. 1356-06-825

DATE: 1/05/08

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CROSS SECTION C - C'
SOUTH DIKE STRATIGRAPHY

ALLEN STEAM STATION – RETIRED ASH BASIN
BELMONT, NORTH CAROLINA

FIGURE NO.

4

SLOPE/W OUTPUTS

Name: Ash Fill Model: MohrCoulomb Weight: 90 Cohesion: 0 Phi: 34 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: RAB Ash Model: MohrCoulomb Weight: 90 Cohesion: 0 Phi: 25 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Dike I Model: MohrCoulomb Weight: 120 Cohesion: 600 Phi: 26 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Dike II Model: MohrCoulomb Weight: 115 Cohesion: 0 Phi: 34 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Fill Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Alluvium Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
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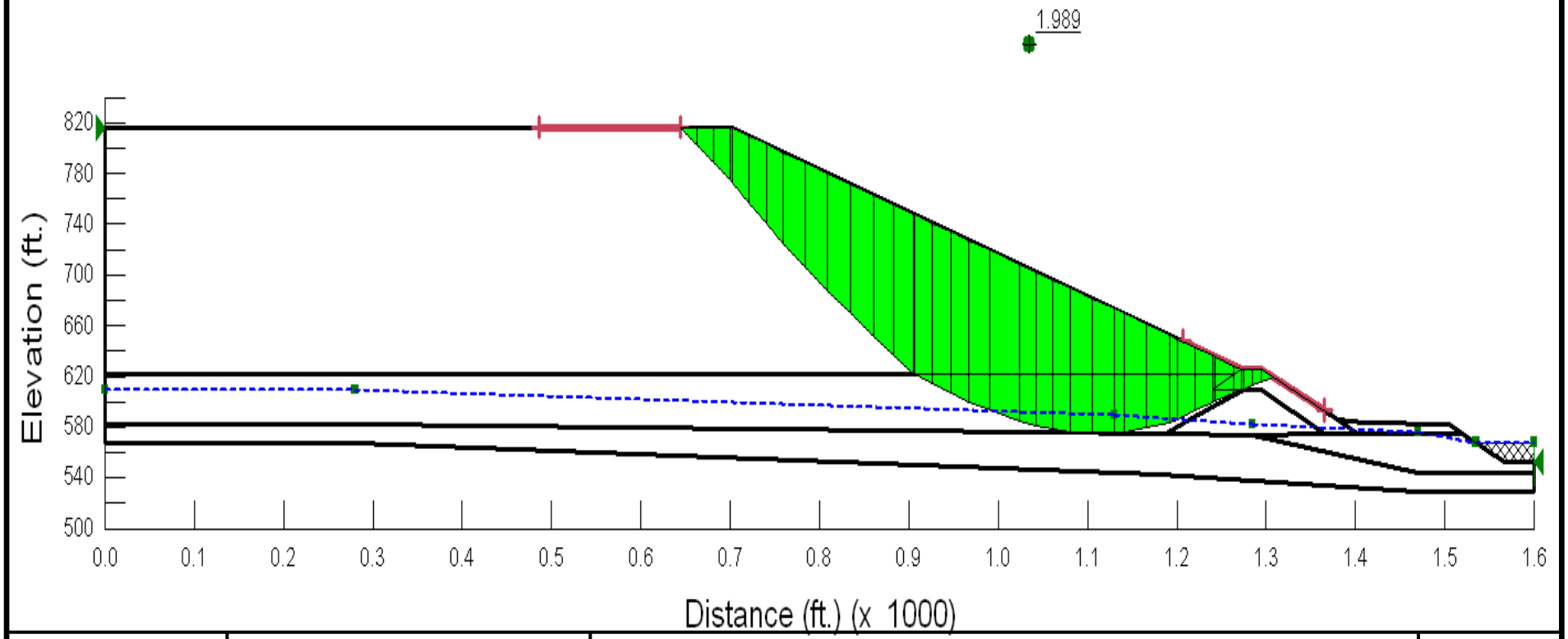

SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Global Slope Stability Analysis (EW LtoR Static Deep Failure)**	FIGURE NO.
DRAWN BY: ZDS		**Allen Steam Station**	5
CHECKED BY:		253 Plant Allen Rd. BELMONT, NORTH CAROLINA	
DATE: 10/26/2007		JOB NO.: 1356-06-825	

Name: RAB Ash Model: MohrCoulomb Weight: 90 Cohesion: 0 Phi: 25 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Ash Fill Model: MohrCoulomb Weight: 90 Cohesion: 0 Phi: 34 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
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Name: Dike I Model: MohrCoulomb Weight: 120 Cohesion: 600 Phi: 26 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Fill Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Alluvium Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Saprolite Model: MohrCoulomb Weight: 110 Cohesion: 70 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: PWR Model: MohrCoulomb Weight: 120 Cohesion: 500 Phi: 45 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
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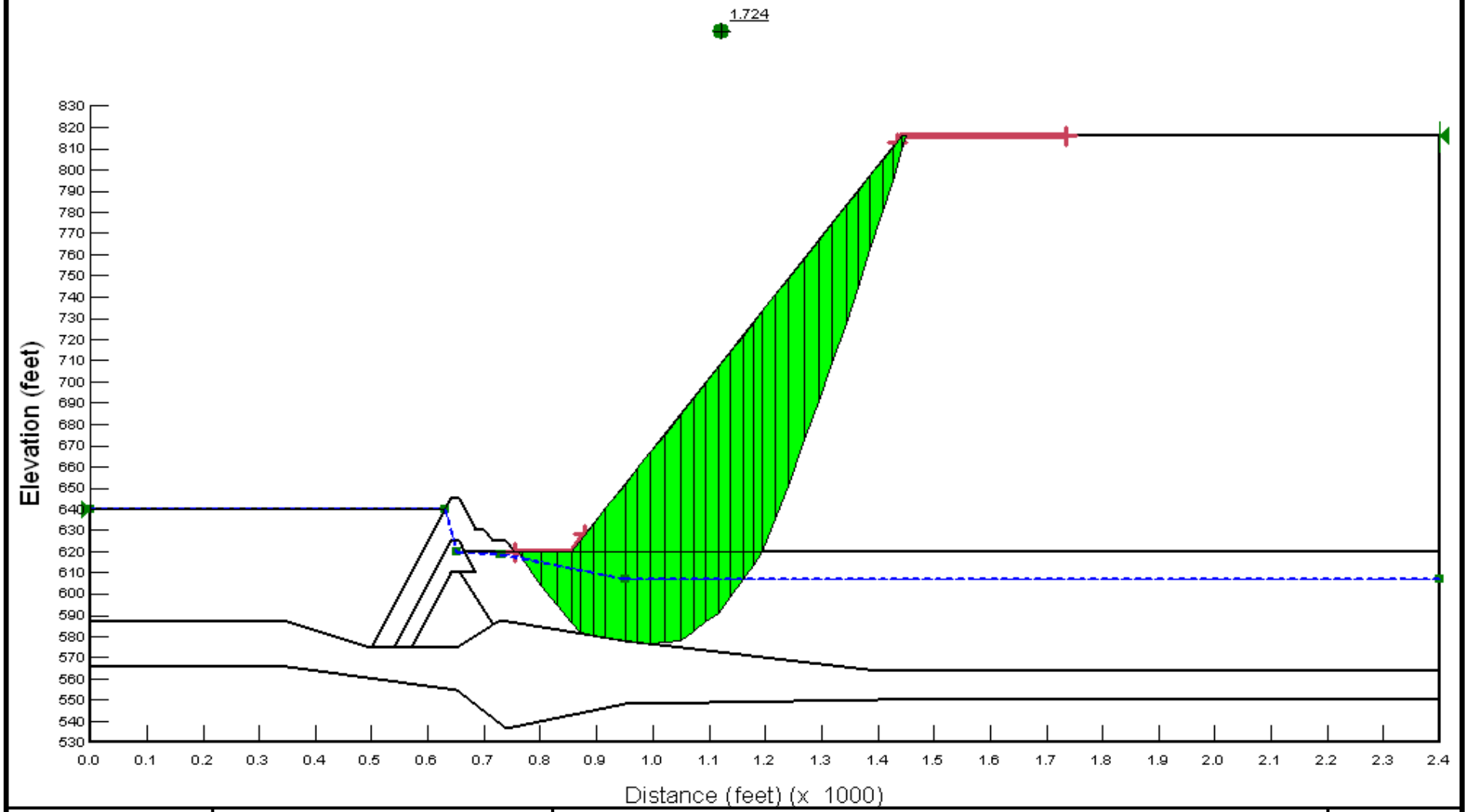

SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Global Slope Stability Analysis (NS R to L Static)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			6
CHECKED BY:			
DATE: 10/26/2007		JOB NO.: 1356-06-825	

Name: Ash Fill Model: MohrCoulomb Weight: 90 Cohesion: 0 Phi: 34 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
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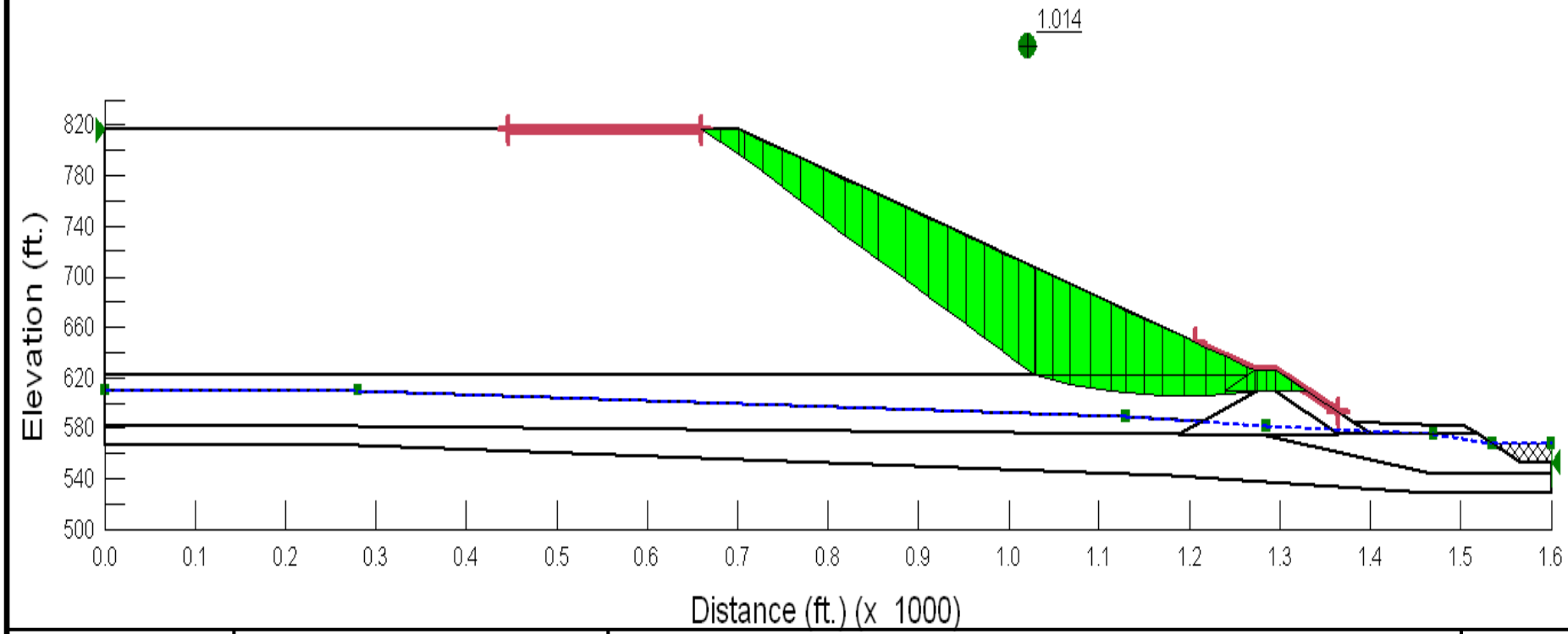
Name: Fill Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Alluvium Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Saprolite Model: MohrCoulomb Weight: 110 Cohesion: 70 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Ash (Wet) Model: SFnDatum Weight: 90 C-Datum: 5078.7 C-Rate of Increase: 7.5 Limiting C: 6500 Elevation: 598 Anisotropic Strength Fn: Piezometric Line: 1

Yield Acceleration = 0.25g



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Global Slope Stability Analysis (EW LtoR Pseudo-Static Deep Failure)**	FIGURE NO.
DRAWN BY: ZDS		**Allen Steam Station**	7
CHECKED BY:		253 Plant Allen Rd. BELMONT, NORTH CAROLINA	
DATE: 10/26/2007		JOB NO.: 1356-06-825	

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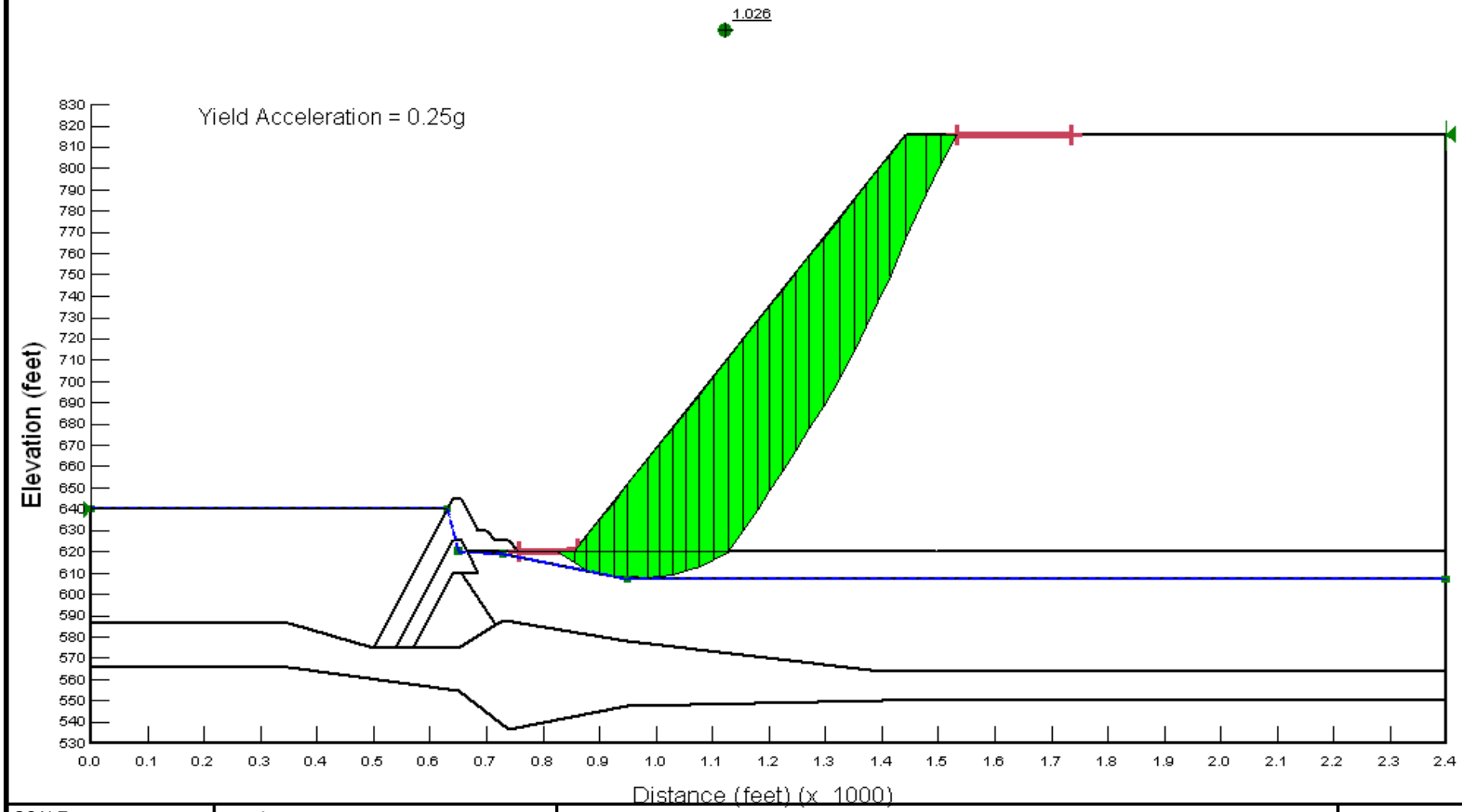
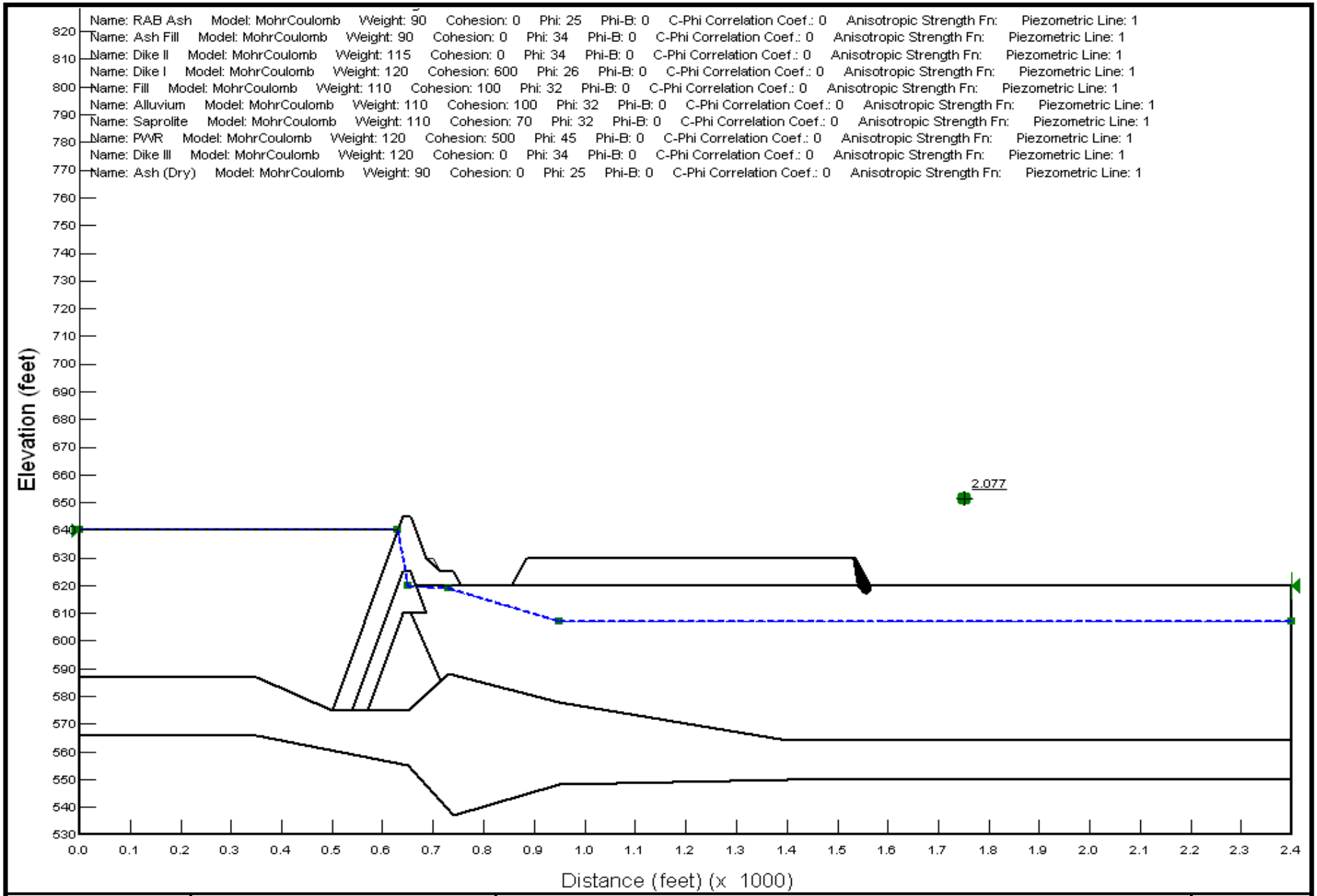
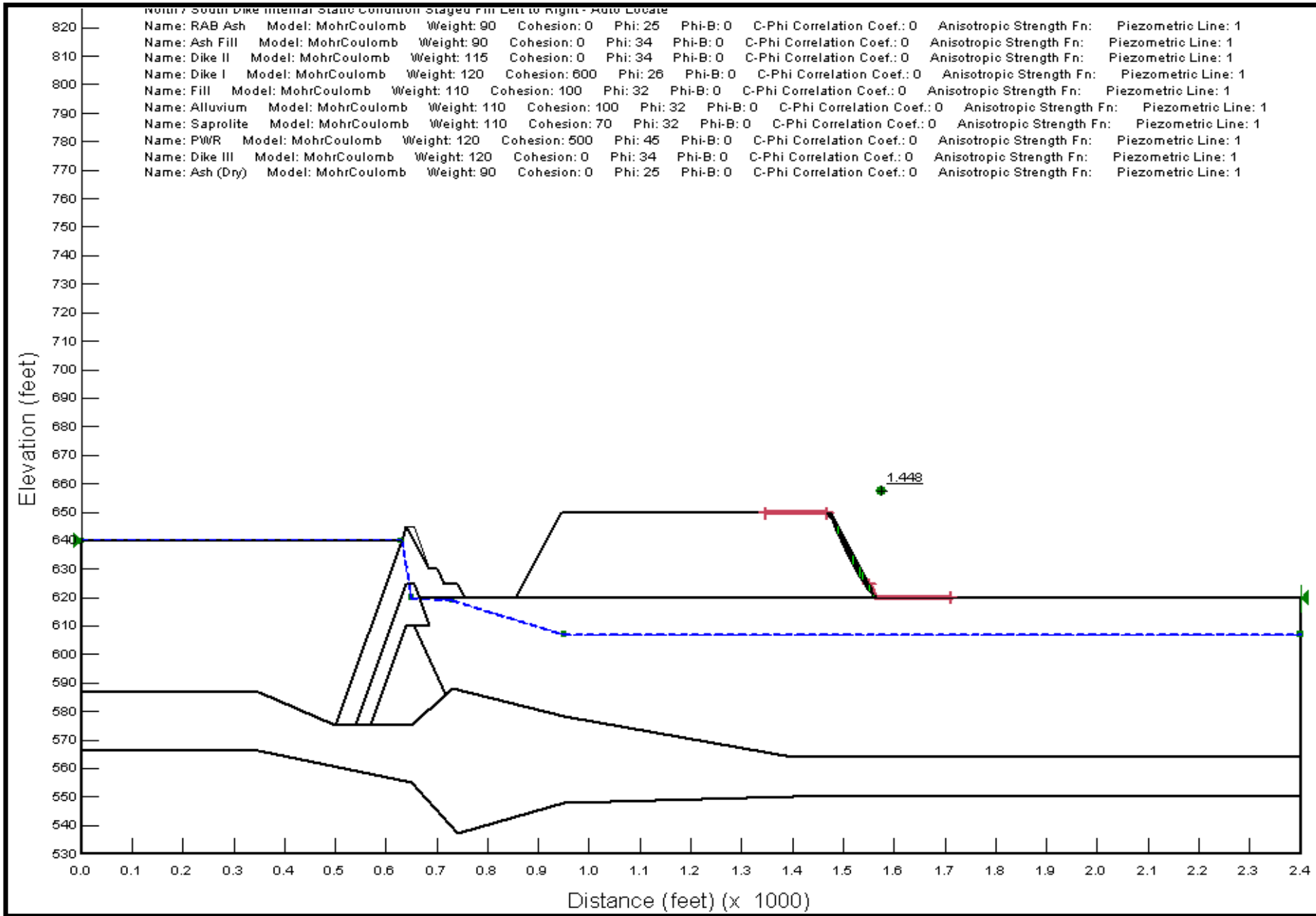
Name: Fill Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Alluvium Model: MohrCoulomb Weight: 110 Cohesion: 100 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Saprolite Model: MohrCoulomb Weight: 110 Cohesion: 70 Phi: 32 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: PWR Model: MohrCoulomb Weight: 120 Cohesion: 500 Phi: 45 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Dike III Model: MohrCoulomb Weight: 120 Cohesion: 0 Phi: 34 Phi-B: 0 C-Phi Correlation Coef.: 0 Anisotropic Strength Fn: Piezometric Line: 1
Name: Ash (Wet) Model: SFnDatum Weight: 90 C-Datum: 5078.7 C-Rate of Increase: 7.5 Limiting C: 6500 Elevation: 607 Anisotropic Strength Fn: Piezometric Line: 1



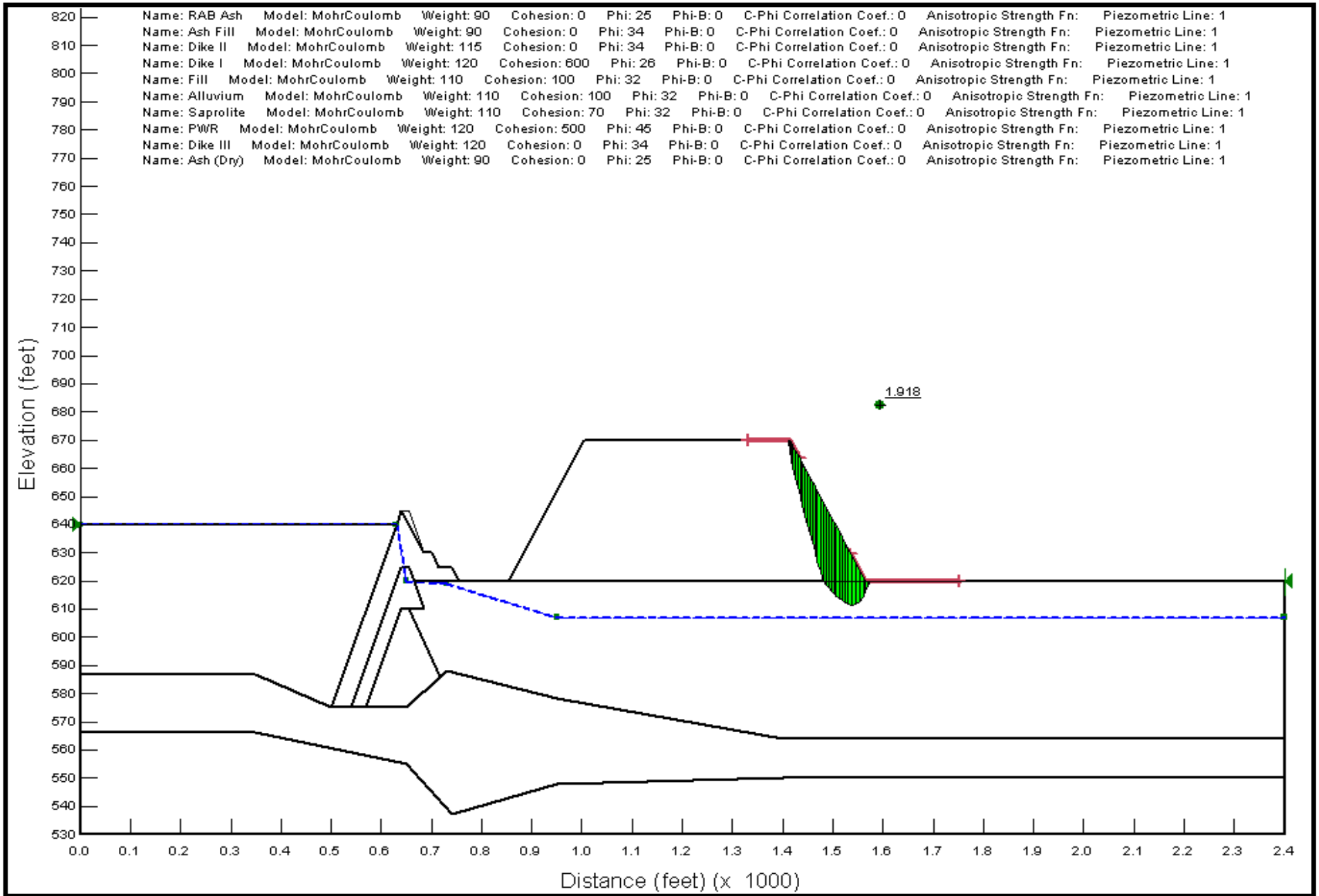
SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Global Slope Stability Analysis (NS R to L Pseudostatic FS = 1)**	FIGURE NO.
DRAWN BY: ZDS		**Allen Steam Station**	8
CHECKED BY:		253 Plant Allen Rd. BELMONT, NORTH CAROLINA	
DATE: 10/26/2007		JOB NO.: 1356-06-825	



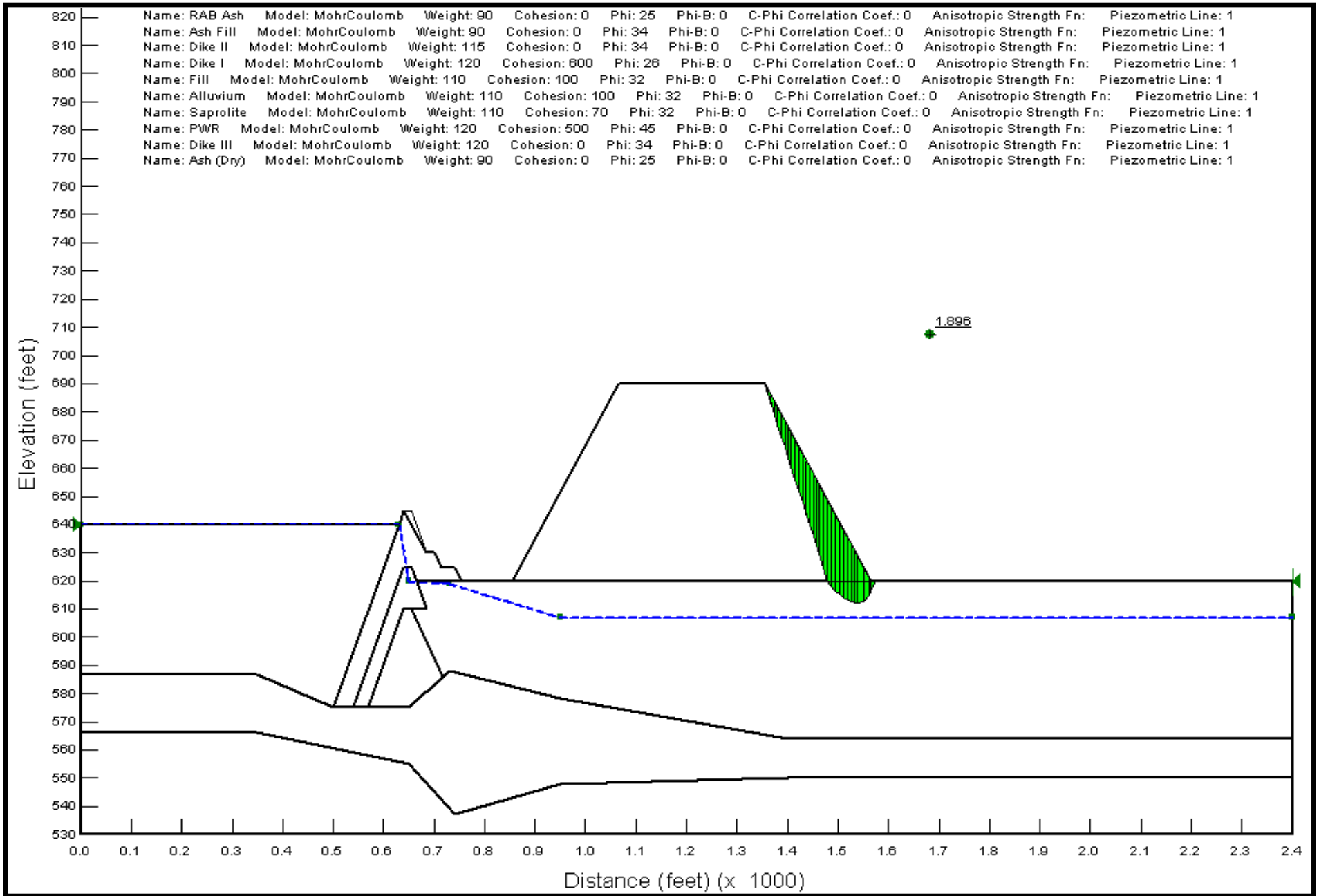
SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Staged Fill Slope Stability Analysis (LtoR Static Case 1)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			9
CHECKED BY:			
DATE: 11/6/2007		JOB NO.: 1356-06-825	



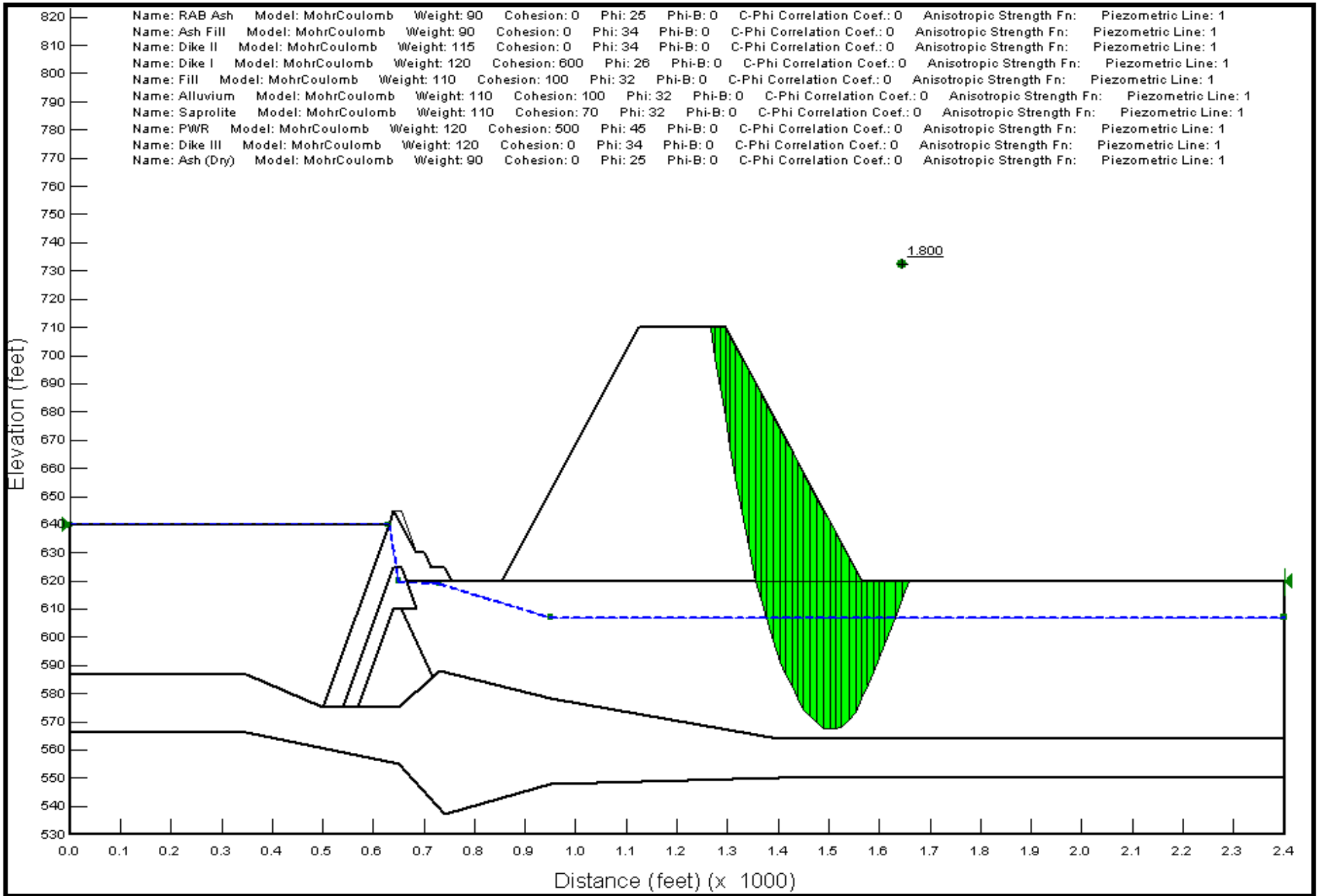
SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Staged Fill Slope Stability Analysis (LtoR Static Case 2)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			10
CHECKED BY:			
DATE: 11/6/2007		JOB NO.: 1356-06-825	



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Staged Fill Slope Stability Analysis (LtoR Static Case 3)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			11
CHECKED BY:			
DATE: 11/6/2007		JOB NO.: 1356-06-825	



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Staged Fill Slope Stability Analysis (LtoR Static Case 4)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			12
CHECKED BY:			
DATE: 11/6/2007		JOB NO.: 1356-06-825	



SCALE: AS SHOWN	S&ME ENGINEERING • TESTING ENVIRONMENTAL SERVICES	**Staged Fill Slope Stability Analysis (LtoR Static Case 5)** **Allen Steam Station** 253 Plant Allen Rd. BELMONT, NORTH CAROLINA	FIGURE NO.
DRAWN BY: ZDS			13
CHECKED BY:			
DATE: 11/6/2007		JOB NO.: 1356-06-825	

ATTACHMENTS

- SLOPE/W OUTPUT FILES
- SEISMIC DESIGN FIGURES AND CALCULATIONS

ATTACHMENT 1
SLOPE/W OUTPUT FILES

SLOPE/W

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File Information

Title: Allen Steam Station
Revision Number: 36
Last Edited By: ZScarboro
Date: 3/4/2008
Time: 8:39:22 AM
File Name: EWLTStaticLtoR_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\East-West\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 10
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 2: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 3: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 4: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 5: Fill

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 100 psf
Phi: 32 °
Phi-B: 0 °

Material 6: Alluvium

Model: Mohr-Coulomb
Weight: 110 pcf

Cohesion: 100 psf
Phi: 32 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	Dike I	2,4,5,6,7,8,9,10,3
Region 2	Fill	5,13,14,15,6
Region 3	Alluvium	11,7,6,15,18,19,20,21
Region 4	Saprolite	20,21,11,12,16,17,22,23,24,25,26,27
Region 5	Dike II	12,30,9,8,7,11
Region 6	RAB Ash	3,10,9,30,12,16,17,31,32,1
Region 7	Ash Fill	32,34,33,2,3,1

Points

	X	Y
Point 1	371.9807	621.98445
Point 2	1271.9582	625.98435
Point 3	1263.9584	621.98445
Point 4	1294.9576	625.98435
Point 5	1379.9555	585.98535
Point 6	1401.955	575.05229
Point 7	1364.9559	575.05229
Point 8	1294.9576	609.98475

Point 9	1274.9581	609.98475
Point 10	1239.959	609.98475
Point 11	1284.9579	573.98565
Point 12	1187.9603	575.05229
Point 13	1409.9548	583.9854
Point 14	1504.9524	581.98545
Point 15	1519.952	575.05229
Point 16	279.983	581.98545
Point 17	0	581.98545
Point 18	1566.9508	553.05284
Point 19	1599.95	553.05284
Point 20	1599.945	543.9864
Point 21	1469.9532	543.9864
Point 22	0	567.05249
Point 23	279.983	567.05249
Point 24	1179.9605	541.98645
Point 25	1284.9579	537.98655
Point 26	1469.9532	529.05344
Point 27	1599.95	529.05344
Point 28	1599.945	514.78713
Point 29	0	514.78713
Point 30	1213.9697	585.9853
Point 31	0	610.98473
Point 32	0	621.98445
Point 33	702	816
Point 34	0	816

Tension Crack

Tension Crack Option: Search for Tension Crack
Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (486, 816)
Left-Zone Right Coordinate: (644, 816)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1206.598, 647.77448)
Right-Zone Right Coordinate: (1365, 593.02322)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 816)
Right Coordinate: (1599.95, 553.05284)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 609.98475)
- Coordinate: (279.983, 609.98475)
- Coordinate: (1129.9618, 589.98525)
- Coordinate: (1284.9579, 581.98545)
- Coordinate: (1469.9532, 575.9856)
- Coordinate: (1534.9516, 567.9858)
- Coordinate: (1599.945, 567.9858)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: No
Materials Considered
- Material: Ash Fill
- Material: RAB Ash
- Material: Dike I
- Material: Dike II
- Material: Fill
- Material: Alluvium
- Material: Saprolite

Pressure Lines

Pressure Line 1

Coordinates
Coordinate: (1534.9516, 567.9858)
Coordinate: (1599.945, 567.9858)
Pressure (Unit Weight): 62.4 pcf

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.989	(1075.21, 1091.44)	346.2258	(644, 816)	(1308.34, 619.687)
2	113	2.051	(1075.21, 1091.44)	511.673	(644, 816)	(1287.71, 625.984)
3	122	2.076	(1268.06, 1556.75)	968.586	(644, 816)	(1365, 593.023)
4	117	2.084	(1225.34, 1512.93)	907.565	(644, 816)	(1326.7, 611.046)
5	108	2.123	(1050.7, 1074.77)	482.049	(644, 816)	(1246.75, 634.388)
6	97	2.132	(1243.94, 1588.53)	1002.84	(604.5, 816)	(1365, 593.023)
7	92	2.139	(1201.51, 1544.8)	942.107	(604.5, 816)	(1326.7, 611.046)
8	106	2.164	(2165.68, 4775.25)	4241.596	(644, 816)	(1246.75, 634.388)
9	111	2.168	(2235.14, 5020.93)	4495.901	(644, 816)	(1240.91, 636.336)
10	101	2.179	(2053.17, 4503.83)	3947.892	(644, 816)	(1206.6, 647.774)
11	83	2.183	(1028.5, 1088.99)	504.28	(604.5, 816)	(1246.75, 634.388)

Slices of Slip Surface: **Optimized**

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.30335	809.1696	-12977.071	453.97006	306.20667	0
2	671.91	795.50875	-12152.223	1361.9535	918.64924	0
3	690.51665	781.8479	-11326.941	2269.9369	1531.0918	0
4	700.91	774.09025	-10858.092	2647.6317	1785.8501	0
5	711.48825	765.0915	-10312.295	3016.262	2034.4944	0
6	730.4648	748.9485	-9332.9239	3636.4366	2452.8075	0
7	749.44135	732.8055	-8353.1515	4256.6514	2871.1476	0
8	771.34145	715.5125	-7306.3557	5122.3714	3455.0831	0
9	796.16515	697.06945	-6192.0516	5795.6102	3909.1885	0
10	821.62885	678.75435	-5086.3312	6581.5529	4439.3135	0
11	847.7326	660.5673	-3989.982	7222.7663	4871.8174	0
12	871.97415	644.12685	-2999.656	7932.5207	5350.5528	0
13	894.35345	629.43295	-2115.6003	8430.4277	5686.3953	0
14	905.68475	622.03525	-1670.6112	10069.26	6791.8014	0
15	916.02985	618.32645	-1454.3729	10177.243	4745.7262	0
16	936.4368	611.01035	-1027.8263	10218.758	4765.0851	0
17	956.84375	603.69425	-601.27978	10259.812	4784.2289	0
18	979.0765	596.64435	-193.98992	10594.215	4940.1638	0
19	1007.2184	588.7092	259.84378	10474.272	4763.0662	0
20	1032.8135	582.8164	589.99576	10946.4	4829.2705	0
21	1051.7785	580.1174	730.52562	10619.088	4611.1125	0
22	1070.7435	577.41845	871.1077	10291.777	4392.9302	0
23	1092.66	575.9674	929.48388	10432.818	4431.4776	0
24	1117.528	575.7642	905.63859	9661.5657	4082.9559	0
25	1135.2905	575.6191	879.28389	9111.2018	3838.6064	0
26	1153.4995	577.537	700.97287	9107.3514	3919.9587	0
27	1179.2605	581.45985	373.2126	7837.879	3480.8311	0
28	1196.4235	584.8776	104.66743	7752.8934	3566.4263	0
29	1210.5195	589.6711	-239.84733	6659.344	3105.3031	0

30	1230.146	596.3455	-719.52753	5109.4366	2382.5694	0
31	1241.552	600.2244	-998.3236	4239.896	1977.096	0
32	1253.5515	603.78625	-1259.2053	3475.0189	1620.4279	0
33	1267.958	607.9672	-1566.5314	2727.4142	1271.8141	0
34	1273.434	609.55635	-1683.3021	2471.2764	1152.3751	0
35	1279.934	611.44265	-1821.9096	2431.8254	1186.0805	600
36	1289.958	614.3516	-2029.8148	1987.9412	969.58369	600
37	1301.6495	617.74455	-2265.1418	989.87378	482.7937	600

Slices of Slip Surface: 113

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.66665	801.92515	-12494.229	736.77156	496.95869	0
2	673	775.54255	-10883.537	2199.4513	1483.5487	0
3	692.33335	752.3209	-9467.5928	3633.073	2450.5387	0
4	712.60575	730.74515	-8151.2326	4885.0882	3295.0336	0
5	733.8173	710.57675	-6926.8208	5916.6156	3990.8076	0
6	755.02885	692.5571	-5835.4115	6860.6706	4627.5808	0
7	776.24035	676.4042	-4860.2696	7718.9818	5206.519	0
8	797.4519	661.90625	-3988.1168	8493.9961	5729.2727	0
9	818.66345	648.89985	-3208.6384	9186.6477	6196.4721	0
10	839.87495	637.2563	-2513.9806	9798.6815	6609.2941	0
11	861.0865	626.87275	-1897.837	10330.004	6967.676	0
12	882.09875	617.74215	-1359.7903	10913.913	5089.2414	0
13	902.91165	609.77725	-893.73279	11237.592	5240.1751	0
14	923.72455	602.8284	-491.0088	11479.969	5353.1976	0
15	944.5375	596.8527	-148.97815	11641.226	5428.3929	0
16	965.8826	591.71025	141.09392	11720.171	5399.4125	0
17	987.7598	587.41935	376.52741	11705.49	5282.7819	0

18	1009.6372	584.1077	550.88389	11593.81	5149.401	0
19	1031.5145	581.75615	665.41707	11383.86	4998.092	0
20	1053.3915	580.35145	720.90642	11074.113	4827.7794	0
21	1075.2685	579.88575	717.81488	10661.871	4636.9893	0
22	1097.146	580.3565	656.33014	10142.91	4423.665	0
23	1119.0235	581.76635	536.30303	9513.8345	4186.2917	0
24	1139.226	583.8751	356.795	8830.7218	3951.457	0
25	1157.754	586.5581	129.7901	8114.5442	3723.352	0
26	1179.1745	590.5962	-187.01768	7145.2875	3331.9023	0
27	1203.488	596.2691	-618.97492	5842.2028	2724.2639	0
28	1227.802	603.2181	-1130.4611	4313.8082	2011.5618	0
29	1244.1985	608.5012	-1521.9946	3222.4254	1502.6416	0
30	1256.198	612.91975	-1833.217	2680.884	1307.5545	600
31	1267.958	617.4815	-2158.9524	1747.4256	852.27642	600
32	1278.458	621.9219	-2467.7588	971.065	473.62005	600
33	1286.3365	625.35995	-2709.2164	402.64545	196.38331	600

Slices of Slip Surface: 122

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	658.5	804.25415	-12663.654	768.25901	518.19725	0
2	687.5	781.64755	-11296.803	2277.8786	1536.4485	0
3	714.01275	762.4079	-10140.116	3354.5268	2262.6569	0
4	738.03825	746.174	-9162.9347	3988.9281	2690.566	0
5	762.06375	730.95825	-8248.9652	4572.7033	3084.3273	0
6	786.08925	716.7052	-7395.2935	5105.767	3443.8833	0
7	810.11475	703.3665	-6598.4185	5587.6781	3768.9364	0
8	834.14025	690.89985	-5856.0872	6017.95	4059.1586	0
9	858.16575	679.2681	-5165.8491	6395.9388	4314.1152	0

10	882.19125	668.4384	-4525.6487	6721.4758	4533.6927	0
11	906.21675	658.38165	-3933.6837	6994.0734	4717.5621	0
12	930.24225	649.07215	-3388.1254	7212.4293	4864.845	0
13	954.26775	640.48715	-2887.8809	7376.3207	4975.3912	0
14	978.29325	632.60645	-2431.5338	7484.6364	5048.451	0
15	1002.3185	625.41215	-2018.0027	7536.0915	5083.1579	0
16	1025.8945	618.9984	-1652.8953	7510.0396	3501.989	0
17	1049.021	613.3276	-1333.0492	7430.773	3465.0263	0
18	1072.147	608.2545	-1050.5263	7296.686	3402.5006	0
19	1095.273	603.76955	-804.68147	7106.1122	3313.6345	0
20	1118.399	599.86445	-595.01559	6857.9733	3197.9255	0
21	1141.498	596.5353	-441.46582	6551.9474	3055.2233	0
22	1164.5705	593.7749	-343.57403	6186.3924	2884.7622	0
23	1187.643	591.5739	-280.57021	5759.1182	2685.5209	0
24	1210.715	589.9284	-252.22111	5269.2264	2457.0806	0
25	1231.105	588.90605	-255.87229	5014.5731	3382.3723	0
26	1251.9585	588.36845	-287.37679	4895.9873	3302.3852	0
27	1267.958	588.16845	-330.55731	4876.6079	3289.3136	0
28	1273.458	588.17635	-349.20605	4886.7514	3296.1554	0
29	1279.958	588.2461	-373.75757	4918.2049	3317.3711	0
30	1289.958	588.4206	-410.8655	4930.6659	3325.7762	0
31	1304.7595	588.90535	-468.77166	4325.6017	2917.6552	0
32	1324.363	589.8477	-567.23973	3047.9396	2055.8612	0
33	1349.5825	591.7208	-730.52517	1293.9864	631.11932	600

Slices of Slip Surface: 117

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.66665	808.1589	-12907.958	508.09971	342.71758	0

2	673	792.9024	-11984.504	1512.1084	1019.93	0
3	692.33335	778.4718	-11112.837	2498.9336	1685.552	0
4	713.6823	763.48095	-10206.563	3303.5601	2228.2794	0
5	737.0469	748.0474	-9278.2215	3902.1198	2632.013	0
6	760.41155	733.61995	-8412.6889	4449.8416	3001.4561	0
7	783.7762	720.1436	-7606.573	4946.6654	3336.5679	0
8	807.1408	707.57055	-6856.628	5392.017	3636.9614	0
9	830.5054	695.859	-6160.5773	5785.2472	3902.1985	0
10	853.87005	684.97235	-5515.5701	6125.8948	4131.9682	0
11	877.2347	674.87845	-4920.3764	6413.2081	4325.7635	0
12	900.5993	665.5489	-4372.4858	6646.8497	4483.3568	0
13	923.9639	656.9587	-3871.0928	6825.641	4603.953	0
14	947.3285	649.08575	-3414.2617	6948.7081	4686.9628	0
15	970.69315	641.9106	-3000.9777	7015.0431	4731.7063	0
16	994.05775	635.4161	-2630.1512	7023.4757	4737.3942	0
17	1017.4225	629.58725	-2300.8412	6972.6373	4703.1032	0
18	1040.787	624.411	-2012.236	6860.9621	4627.7774	0
19	1065.3845	619.6717	-1751.6163	6598.4265	3076.8968	0
20	1091.2155	615.42875	-1524.8532	6310.4503	2942.6113	0
21	1117.0465	611.9462	-1345.5492	5943.662	2771.5751	0
22	1140.9615	609.3666	-1240.6028	5531.8431	2579.5408	0
23	1162.961	607.5815	-1200.1103	5089.302	2373.1805	0
24	1184.9605	606.33365	-1193.091	4584.5501	2137.8108	0
25	1206.96	605.62085	-1219.4784	4014.6352	1872.0551	0
26	1228.9595	605.4418	-1279.1731	3377.6133	1575.007	0
27	1251.9585	605.8377	-1377.1515	2833.0605	1321.0778	0
28	1264.7205	606.2229	-1447.193	2599.8083	1212.3105	0
29	1268.7205	606.41095	-1471.4906	2654.2915	1790.3422	0
30	1273.458	606.64555	-1501.668	2630.3823	1774.2153	0
31	1279.958	607.0266	-1545.6163	2612.0956	1761.8807	0
32	1289.958	607.6849	-1612.937	2544.8894	1716.5496	0

33	1296.639	608.1743	-1657.7374	2384.9098	1608.642	0
34	1312.511	609.6763	-1776.6358	1243.7608	606.62266	600

Slices of Slip Surface: 108

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.66665	801.9329	-12493.044	739.54861	498.83184	0
2	673	775.65915	-10889.715	2206.3569	1488.2065	0
3	692.33335	752.6964	-9490.261	3641.1656	2455.9972	0
4	712.1838	731.88605	-8222.681	4866.9552	3282.8027	0
5	732.55145	712.8788	-7069.2666	5848.9019	3945.1341	0
6	752.9191	695.92105	-6042.9386	6744.6095	4549.2966	0
7	773.2867	680.74625	-5127.6102	7556.943	5097.2224	0
8	793.6543	667.1541	-4310.3019	8287.1575	5589.7583	0
9	814.02195	654.9901	-3582.2768	8937.1967	6028.2153	0
10	834.3896	644.1327	-2935.4322	9507.8118	6413.1001	0
11	854.7572	634.48495	-2363.9162	9999.7174	6744.8946	0
12	875.1248	625.9686	-1862.8702	10413.438	7023.9525	0
13	895.5025	618.51685	-1428.2033	10811.702	5041.5793	0
14	915.8903	612.079	-1056.7267	11022.127	5139.7023	0
15	936.27805	606.6172	-746.13177	11149.336	5199.021	0
16	956.6658	602.0975	-494.25296	11192.965	5219.3655	0
17	977.0536	598.493	-299.40863	11151.303	5199.9379	0
18	997.44125	595.78305	-160.36087	11022.19	5139.7314	0
19	1017.829	593.95245	-76.141685	10802.519	5037.2973	0
20	1038.217	592.9912	-46.134732	10488.754	4890.9865	0
21	1058.605	592.8941	-70.012681	10076.981	4698.9735	0
22	1078.9925	593.66055	-147.73923	9561.556	4458.6268	0
23	1099.38	595.29475	-279.57816	8935.7468	4166.8072	0

24	1119.768	597.8056	-466.08209	8190.9722	3819.5131	0
25	1140.7295	601.32905	-734.62398	7291.0461	3399.8706	0
26	1162.2645	605.93865	-1091.369	6210.518	2896.0121	0
27	1183.7995	611.59485	-1513.3543	4953.0312	2309.6364	0
28	1205.3345	618.3367	-2003.0458	3494.6878	1629.5997	0
29	1223.7645	624.93235	-2478.1435	2257.2646	1522.5442	0
30	1239.0895	631.13395	-2914.247	800.22726	539.7601	0

Slices of Slip Surface: 97

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	616.6875	806.228	-12730.116	644.63536	434.81204	0
2	641.0625	787.28575	-11584.8	1914.0489	1291.0423	0
3	665.4375	769.50705	-10511.537	3155.7396	2128.5733	0
4	689.8125	752.8175	-9506.4535	4368.5785	2946.6434	0
5	714.48125	736.9761	-8554.4579	5272.6295	3556.4335	0
6	739.44375	721.94955	-7653.6512	5850.328	3946.0961	0
7	764.40625	707.8869	-6813.1701	6373.4065	4298.9169	0
8	789.36875	694.74265	-6030.0503	6842.0075	4614.9924	0
9	814.3312	682.47675	-5301.64	7255.1426	4893.6554	0
10	839.29365	671.0539	-4625.5266	7613.4262	5135.3208	0
11	864.25615	660.44295	-4000.1513	7915.398	5339.0034	0
12	889.21865	650.61635	-3424.0039	8161.0615	5504.7055	0
13	914.18115	641.5496	-2895.0462	8349.6542	5631.9129	0
14	939.14365	633.2211	-2412.1275	8479.9418	5719.793	0
15	964.10615	625.6117	-1974.1144	8551.7134	5768.2035	0
16	989.3687	618.62975	-1575.3889	8555.3651	3989.4322	0
17	1014.931	612.27675	-1216.5866	8481.5252	3955.0001	0
18	1040.4935	606.63025	-901.85853	8342.4979	3890.1706	0

19	1066.056	601.6781	-630.48843	8137.4085	3794.5359	0
20	1091.618	597.4099	-401.72832	7864.8275	3667.4293	0
21	1117.1805	593.8168	-215.11581	7523.5236	3508.2767	0
22	1144.023	590.77985	-88.627986	7089.5312	3305.9027	0
23	1172.1455	588.36235	-28.390298	6548.8245	3053.767	0
24	1200.2685	586.73995	-17.756154	5917.5339	2759.3914	0
25	1227.1445	585.9122	-53.722311	5512.2813	3718.0807	0
26	1251.9585	585.79345	-126.86276	5261.9211	3549.2106	0
27	1267.958	585.98525	-194.3361	5192.5016	3502.3865	0
28	1273.458	586.12525	-221.21477	5185.9239	3497.9498	0
29	1279.958	586.3491	-255.40909	5197.1258	3505.5056	0
30	1289.958	586.75845	-307.17392	5178.5713	3492.9904	0
31	1305.04	587.60355	-388.02926	4505.4102	3038.9375	0
32	1325.2045	589.0387	-518.39671	3120.1175	2104.5458	0
33	1350.1435	591.4408	-714.94234	1299.1042	633.61544	600

Slices of Slip Surface: 92

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	616.6875	806.348	-12737.268	638.11764	430.41578	0
2	641.0625	787.6744	-11608.491	1893.6751	1277.3	0
3	665.4375	770.2181	-10555.777	3120.2152	2104.6117	0
4	689.8125	753.8983	-9573.6447	4316.1483	2911.2788	0
5	713.9162	738.8044	-8668.0809	5187.2065	3498.815	0
6	737.74855	724.8558	-7833.0917	5717.0467	3856.1967	0
7	761.5809	711.82255	-7054.8969	6194.1364	4177.9977	0
8	785.41325	699.6623	-6331.6036	6618.4456	4464.1979	0
9	809.2456	688.3378	-5659.9678	6989.4136	4714.419	0
10	833.07795	677.8162	-5038.6452	7306.5762	4928.3478	0

11	856.9103	668.06865	-4465.7972	7569.5184	5105.7046	0
12	880.74265	659.06955	-3939.2737	7777.3947	5245.9189	0
13	904.575	650.79625	-3458.1717	7929.6722	5348.6315	0
14	928.40735	643.2288	-3021.1011	8024.8939	5412.8593	0
15	952.2397	636.3495	-2626.9374	8062.6529	5438.328	0
16	976.07205	630.1428	-2274.7661	8041.9583	5424.3694	0
17	999.9046	624.59515	-1963.6614	7960.8005	5369.6278	0
18	1023.635	619.71285	-1694.0185	7753.3942	3615.4671	0
19	1047.263	615.48035	-1464.6708	7531.6861	3512.0829	0
20	1070.891	611.8654	-1273.8408	7248.3145	3379.9446	0
21	1094.5195	608.8608	-1121.0646	6901.6409	3218.288	0
22	1118.148	606.46075	-1006.0311	6489.3539	3026.0354	0
23	1140.9615	604.70275	-949.76213	6027.9821	2810.8942	0
24	1162.961	603.54385	-948.29865	5522.2046	2575.0463	0
25	1184.9605	602.9001	-978.98774	4954.7023	2310.4156	0
26	1206.96	602.77045	-1041.758	4323.53	2016.0951	0
27	1228.9595	603.1548	-1136.6109	3626.3323	1690.9865	0
28	1250.5985	604.03065	-1261.1874	3048.644	1421.606	0
29	1262.598	604.6742	-1343.7019	2922.946	1971.552	0
30	1267.958	605.0454	-1383.7007	2854.436	1925.3414	0
31	1273.458	605.4431	-1426.6351	2805.3756	1892.2498	0
32	1279.958	605.9758	-1480.0642	2766.5002	1866.028	0
33	1289.958	606.8651	-1561.8109	2667.6331	1799.3412	0
34	1297.1605	607.5614	-1620.4637	2446.7286	1650.3393	0
35	1313.0325	609.416	-1762.1742	1248.3293	608.85089	600

Slices of Slip Surface: 106

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)

1	653.66665	812.3118	-13173.213	294.17066	198.42062	0
2	673	804.98925	-12744.383	878.25515	592.39058	0
3	692.33335	797.77415	-12322.769	1456.702	982.55791	0
4	712.18955	790.47665	-11896.245	1772.8198	1195.7821	0
5	732.5687	783.10205	-11466.118	1824.0396	1230.3303	0
6	752.94785	775.8449	-11043.251	1866.0818	1258.6881	0
7	773.32695	768.7045	-10627.736	1898.8462	1280.788	0
8	793.7061	761.68025	-10219.196	1922.3733	1296.6572	0
9	814.08525	754.7716	-9818.1806	1936.6593	1306.2932	0
10	834.46435	747.97795	-9423.8398	1941.6083	1309.6313	0
11	854.8435	741.2987	-9037.1946	1937.2217	1306.6725	0
12	875.22265	734.73325	-8657.3874	1923.5003	1297.4173	0
13	895.60175	728.2811	-8284.4941	1900.4007	1281.8364	0
14	915.9809	721.9417	-7919.0576	1867.881	1259.9016	0
15	936.36005	715.71445	-7560.2098	1825.947	1231.6168	0
16	956.73915	709.5989	-7208.4937	1774.5142	1196.925	0
17	977.1183	703.59455	-6863.9753	1713.6386	1155.8639	0
18	997.49745	697.7009	-6526.2543	1643.2387	1108.3785	0
19	1017.8765	691.91745	-6194.9164	1563.3259	1054.4767	0
20	1038.2555	686.2437	-5870.972	1473.7743	994.07334	0
21	1058.6345	680.6793	-5553.5371	1374.6473	927.2113	0
22	1079.014	675.22375	-5243.1416	1265.8672	853.83822	0
23	1099.3935	669.8766	-4939.3692	1147.4535	773.96714	0
24	1119.7725	664.63745	-4642.5134	1019.2843	687.51596	0
25	1139.6945	659.6186	-4375.7066	884.61255	596.6787	0
26	1159.1595	654.81495	-4138.6669	744.00982	501.84096	0
27	1178.6245	650.10875	-3907.665	594.41875	400.94051	0
28	1198.0895	645.4997	-3682.74	435.88043	294.00506	0
29	1217.5545	640.9874	-3463.8835	268.31765	180.98254	0
30	1237.0195	636.57155	-3251.032	91.708628	61.85825	0

Slices of Slip Surface: 111

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.66665	812.3675	-13176.593	290.45736	195.91596	0
2	673	805.15305	-12754.905	867.35102	585.03565	0
3	692.33335	798.03945	-12339.177	1438.8419	970.51114	0
4	711.7264	791.00485	-11928.824	1746.5202	1178.0428	0
5	731.1792	784.0493	-11523.091	1788.4384	1206.317	0
6	750.632	777.1943	-11123.948	1822.4351	1229.248	0
7	770.0848	770.4394	-10730.98	1848.4696	1246.8085	0
8	789.5376	763.7841	-10344.255	1866.5026	1258.9719	0
9	808.99045	757.22795	-9963.8361	1876.5923	1265.7775	0
10	828.4433	750.7705	-9589.3006	1878.6534	1267.1677	0
11	847.8961	744.4113	-9221.1957	1872.7467	1263.1836	0
12	867.3489	738.14985	-8859.1001	1858.7412	1253.7367	0
13	886.8017	731.9858	-8503.0694	1836.7003	1238.87	0
14	906.2545	725.9187	-8153.1628	1806.5429	1218.5285	0
15	925.7073	719.9481	-7808.9385	1768.3343	1192.7566	0
16	945.1601	714.0737	-7470.9516	1721.9975	1161.502	0
17	964.6129	708.29505	-7139.2504	1667.5017	1124.7441	0
18	984.0657	702.6117	-6812.902	1604.8191	1082.4642	0
19	1003.5186	697.02335	-6492.9415	1533.9716	1034.6769	0
20	1022.9715	691.52965	-6178.4345	1454.885	981.33229	0
21	1042.4245	686.1302	-5870.4137	1367.5824	922.44596	0
22	1061.877	680.82465	-5567.4408	1271.9907	857.96859	0
23	1081.3295	675.61265	-5271.0525	1168.1376	787.91875	0
24	1100.7825	670.4939	-4980.2942	1055.9995	712.28063	0
25	1120.2355	665.46805	-4695.1102	935.5061	631.00684	0
26	1139.2075	660.65445	-4438.8884	809.91238	546.2928	0
27	1157.6985	656.0484	-4211.037	679.82279	458.54626	0

28	1176.1895	651.5255	-3988.3467	542.14059	365.67845	0
29	1194.6805	647.08545	-3770.8521	396.82519	267.66197	0
30	1213.1715	642.728	-3558.4732	243.85671	164.48343	0
31	1231.6625	638.4529	-3351.2971	83.21178	56.127054	0

Slices of Slip Surface: 101

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	653.66665	812.3352	-13174.632	292.83085	197.5169	0
2	673	805.06335	-12748.934	873.93296	589.47523	0
3	692.33335	797.90665	-12330.789	1448.8532	977.26379	0
4	711.3035	790.9946	-11927.224	1758.2015	1185.9219	0
5	729.91055	784.3224	-11538.52	1800.4	1214.3851	0
6	748.5176	777.75505	-11156.148	1834.3175	1237.2627	0
7	767.1246	771.29195	-10780.187	1859.9074	1254.5234	0
8	785.73165	764.93265	-10410.707	1877.2255	1266.2046	0
9	804.3387	758.6766	-10047.282	1886.2297	1272.278	0
10	822.9457	752.5233	-9691.0032	1886.8782	1272.7154	0
11	841.55275	746.4722	-9340.4022	1879.1799	1267.5228	0
12	860.1598	740.5228	-8996.5799	1863.0979	1256.6754	0
13	878.7668	734.6747	-8659.0882	1838.5939	1240.1472	0
14	897.37385	728.92735	-8327.4751	1805.6309	1217.9134	0
15	915.9809	723.2803	-8002.8368	1764.2267	1189.9859	0
16	934.58795	717.73315	-7683.6845	1714.3461	1156.341	0
17	953.195	712.28545	-7371.1164	1655.9592	1116.9586	0
18	971.802	706.9367	-7064.6685	1589.0335	1071.8167	0
19	990.40905	701.68655	-6764.4017	1513.5925	1020.931	0
20	1009.0163	696.5346	-6470.3651	1429.5547	964.24682	0
21	1027.6235	691.4804	-6182.0979	1336.8423	901.71154	0

22	1046.2305	686.5236	-5900.168	1235.5848	833.41244	0
23	1064.8375	681.6638	-5624.6276	1125.6019	759.2281	0
24	1083.4445	676.90065	-5354.4831	1006.9221	679.17751	0
25	1102.0515	672.23375	-5090.5629	879.52326	593.24593	0
26	1120.6585	667.6628	-4832.651	743.38435	501.41907	0
27	1139.5415	663.1225	-4593.8088	596.23189	402.16349	0
28	1158.7005	658.61535	-4374.2946	437.62773	295.18363	0
29	1177.8595	654.20885	-4161.0173	269.64976	181.88106	0
30	1197.0185	649.9026	-3954.0144	92.249465	62.22305	0

SLOPE/W

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File Information

Revision Number: 31
Date: 3/4/2008
Time: 8:47:13 AM
File Name: NSLTStaticRtoL_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Right to Left
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 10
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 10
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °

Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	12,13,14,15,16,17,18,19
Region 3	Dike I	19,18,17,20,21
Region 4	Dike III	3,12,13,14,15,7,8,9,10,11,6,33,2
Region 5	Saprolite	5,4,3,12,19,21,20,22,23,24,35,37,25,26,27,28,29,30
Region 6	PWR	32,30,29,28,27,26,25,37,38
Region 7	RAB Ash	36,35,24,23,22,20,17,16,15,7,40,34,39
Region 8	Ash Fill	40,41,42,36,39,34

Points

	X	Y
Point 1	0	640
Point 2	630	640
Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	655	645
Point 7	755	620
Point 8	740	625

Point 9	715	625
Point 10	700	630
Point 11	685	630
Point 12	540	575
Point 13	640	625
Point 14	655	625
Point 15	665	620
Point 16	685	610
Point 17	655	610
Point 18	640	610
Point 19	570	575
Point 20	716	585.75
Point 21	650	575
Point 22	730	588
Point 23	950	578
Point 24	1400	564
Point 25	1400	550
Point 26	950	548
Point 27	740	537
Point 28	650	555
Point 29	350	566
Point 30	0	566
Point 31	1400	530
Point 32	0	530
Point 33	640	645
Point 34	1497	620
Point 35	2400	564
Point 36	2400	620
Point 37	2400	550
Point 38	2400	530
Point 39	1985	620

Point 40	855	620
Point 41	1443	816
Point 42	2400	816

Tension Crack

Tension Crack Option: (none)

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (756, 620)
Left-Zone Right Coordinate: (879.99999, 628.33333)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1434, 813)
Right-Zone Right Coordinate: (1734, 816)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 816)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft

Bound by Surface Layer: Yes
Materials Considered
Material: RAB Ash
Material: Ash Fill
Material: Dike II
Material: Dike I
Material: Fill
Material: Alluvium
Material: Saprolite
Material: PWR
Material: Dike III

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.724	(1012.65, 1078.96)	351.5798	(1451.06, 816)	(761.094, 620)
2	53	1.807	(1012.65, 1078.96)	498.264	(1434, 813)	(818.676, 620)
3	28	1.855	(999.138, 1090.19)	515.695	(1434, 813)	(787.338, 620)
4	78	1.872	(1025.92, 1067.77)	481.081	(1434, 813)	(850.014, 620)
5	3	1.906	(985.413, 1101.48)	533.337	(1434, 813)	(756, 620)
6	83	1.960	(1066.18, 1098.19)	524.778	(1508.64, 816)	(850.014, 620)
7	103	2.001	(1045.53, 1055.07)	457.718	(1434, 813)	(880, 628.333)
8	108	2.004	(1085.86, 1085.48)	501.356	(1508.64, 816)	(880, 628.333)
9	58	2.008	(1052.45, 1109.47)	542.432	(1508.64, 816)	(818.676, 620)
10	33	2.019	(1038.53, 1120.8)	560.263	(1508.64, 816)	(787.338, 620)
11	8	2.020	(1024.46, 1132.15)	578.249	(1508.64, 816)	(756, 620)

Slices of Slip Surface: **Optimized**

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	764.85765	618.4467	-84.116423	200.34152	93.420785	0
2	784.76	610.2332	360.67792	1163.0245	374.14034	0
3	814.4239	599.34965	938.8182	2269.3253	620.42563	0
4	841.47465	590.90295	1373.8398	3186.7241	845.3618	0
5	862.8965	584.21395	1718.347	4227.8711	1170.2103	0
6	882.03365	581.2008	1841.2153	4611.7018	1291.8991	0
7	904.51495	580.1058	1832.996	5473.6191	1697.6505	0
8	932.8778	578.9352	1809.521	6498.9488	2186.7161	0
9	961.5211	577.89285	1816.2909	7552.4462	2674.8132	0
10	984.5633	577.05435	1868.5951	8395.1247	3043.3707	0
11	1009.2922	577.0824	1866.8732	8872.7744	3266.9054	0
12	1035.7075	577.977	1811.0282	9631.7521	3646.8634	0
13	1060.0915	580.548	1650.5926	9391.7121	3609.7433	0
14	1082.4445	584.7954	1385.5731	9678.2672	3866.9468	0
15	1104.7975	589.0428	1120.5096	9964.8223	4124.1707	0
16	1126.91	595.12485	741.02097	9267.8135	3976.1087	0
17	1148.7825	603.0416	247.00412	9208.0572	4178.6077	0
18	1168.698	610.25	-202.80233	9157.3116	4270.1245	0
19	1186.656	616.75	-608.37557	9116.4705	4251.08	0
20	1195.8005	620.0599	-814.93161	9015.781	6081.2211	0
21	1206.9745	627.8919	-1303.6554	7219.3607	4869.5203	0
22	1228.9915	643.43605	-2273.5958	6678.0107	4504.3751	0
23	1254.894	661.9009	-3425.7203	5994.3288	4043.2258	0
24	1282.145	681.77185	-4665.9011	5223.3146	3523.1702	0
25	1306.8585	700.1282	-5811.2623	4567.8016	3081.0211	0
26	1331.572	718.4846	-6956.6234	3911.9638	2638.6529	0
27	1354.57	736.176	-8060.5305	3174.6434	2141.324	0
28	1375.942	753.60305	-9147.8549	2489.0925	1678.9141	0
29	1397.404	771.43075	-10260.379	1825.6284	1231.4019	0

30	1416.8515	787.5849	-11268.509	1224.4581	825.90742	0
31	1434.284	802.0655	-12172.214	685.54474	462.40577	0
32	1447.0295	812.6529	-12832.518	208.05593	140.33549	0

Slices of Slip Surface: 53

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	827.09125	616.62255	-176.56488	444.41724	207.23516	0
2	845.25315	609.7676	190.94381	1237.4654	488.00105	0
3	864.5	603.33095	526.43665	2278.2442	816.88126	0
4	883.5	597.8217	805.33092	3537.936	1274.2347	0
5	902.5	593.1177	1034.0053	4651.9971	1687.0973	0
6	921.5	589.1957	1213.9192	5634.9819	2061.5754	0
7	940.5	586.03705	1346.2538	6498.2404	2402.4108	0
8	960.1098	583.5742	1468.295	7269.4297	2705.1135	0
9	980.32945	581.84455	1576.1651	7948.1873	2971.3227	0
10	1000.5492	580.9415	1632.4714	8519.8003	3211.6142	0
11	1020.769	580.8606	1637.4831	8990.433	3428.7368	0
12	1040.9885	581.6014	1591.304	9364.6486	3624.7701	0
13	1061.208	583.1675	1493.6172	9645.7341	3801.3946	0
14	1081.428	585.5669	1344.0064	9837.1078	3960.3982	0
15	1101.6475	588.8118	1141.6574	9939.8103	4102.6461	0
16	1121.867	592.91915	885.53475	9955.9332	4229.5962	0
17	1142.0865	597.91115	574.25047	9886.1814	4342.2247	0
18	1162.306	603.8157	206.07543	9730.9072	4441.502	0
19	1180.969	610.0702	-186.08751	9513.4501	4436.1946	0
20	1198.0745	616.5702	-591.45689	9257.8928	4317.0263	0
21	1216.962	624.6479	-1092.4162	8778.683	5921.2965	0
22	1237.6325	634.5277	-1708.2888	8290.4725	5591.9943	0

23	1258.303	645.6184	-2399.6381	7728.0618	5212.6435	0
24	1278.973	658.01605	-3172.3049	7092.1261	4783.6995	0
25	1299.643	671.84055	-4033.9751	6382.8769	4305.3049	0
26	1320.3135	687.2437	-4993.3826	5600.1513	3777.3497	0
27	1340.984	704.4214	-6063.2603	4743.2308	3199.3496	0
28	1361.654	723.6329	-7259.4455	3811.9336	2571.1817	0
29	1382.324	745.23265	-8603.3934	2807.2935	1893.5433	0
30	1402.9945	769.72725	-10126.191	1731.13	1167.6619	0
31	1423.665	797.8867	-11874.157	590.14487	398.05774	0

Slices of Slip Surface: 28

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	792.7373	617.64175	-126.48721	311.77549	145.3833	0
2	807.61375	611.4917	211.13712	1039.1549	386.11104	0
3	826.56825	604.33375	592.96436	1799.623	562.67416	0
4	845.52275	598.00965	922.82606	2437.0665	706.10193	0
5	864.7271	592.4251	1206.0694	3344.7895	997.30154	0
6	884.1813	587.5738	1442.3949	4498.4462	1425.0601	0
7	903.6355	583.51565	1629.2579	5519.7578	1814.1699	0
8	923.0897	580.23165	1767.8749	6420.2708	2169.4478	0
9	941.4084	577.81305	1855.0516	7419.2813	3476.9166	70
10	960.11985	576.077	1935.8408	8099.8306	3851.6883	70
11	980.35955	574.94015	2006.7225	8708.7164	4187.8706	70
12	1000.5992	574.6	2027.957	9196.1587	4479.1895	70
13	1020.839	575.055	1999.5627	9568.1263	4729.3634	70
14	1041.556	576.3561	1919.0369	9706.6197	3631.4095	0
15	1062.75	578.54845	1782.3342	9952.6805	3809.8951	0
16	1083.9445	581.63315	1589.9601	10104.898	3970.5805	0

17	1105.139	585.6266	1340.9448	10164.087	4114.2989	0
18	1126.3335	590.55065	1033.9247	10132.132	4242.564	0
19	1147.528	596.43315	667.11879	10008.815	4356.1045	0
20	1168.722	603.30895	238.3877	9794.1853	4455.9416	0
21	1195.1285	613.5	-386.47877	9405.3403	4385.7822	0
22	1222.091	625.34935	-1134.7295	8727.8177	5886.9874	0
23	1244.3975	636.73095	-1844.1523	8164.0764	5506.7391	0
24	1266.704	649.5353	-2642.1722	7516.7689	5070.1246	0
25	1289.01	663.89115	-3536.6906	6786.0304	4577.2353	0
26	1311.316	679.9622	-4537.7317	5971	4027.4904	0
27	1333.622	697.9605	-5658.6855	5071.7048	3420.9081	0
28	1355.928	718.16785	-6916.9193	4087.197	2756.8492	0
29	1378.2345	740.9714	-8335.6945	3018.0753	2035.7175	0
30	1400.541	766.92755	-9949.0669	1866.058	1258.672	0
31	1422.847	796.88825	-11808.334	637.80157	430.20259	0

Slices of Slip Surface: 78

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	852.5071	619.03665	-418.75462	122.26632	57.013723	0
2	864.786	614.5938	-176.38867	1080.6291	503.90563	0
3	884.0005	608.2027	156.19894	2532.2478	1107.9698	0
4	902.8575	602.79575	429.18233	3753.878	1550.331	0
5	921.7145	598.2081	651.08353	4830.8151	1949.0408	0
6	940.5715	594.41585	823.38716	5777.4872	2310.1348	0
7	959.7378	591.3632	982.05191	6613.6322	2626.049	0
8	979.21335	589.06045	1125.6877	7344.6411	2899.9456	0
9	998.68905	587.55825	1219.3353	7968.4563	3147.1668	0
10	1018.1645	586.84915	1263.5393	8492.0437	3370.7069	0

11	1037.64	586.9296	1258.5544	8920.2353	3572.7005	0
12	1057.1155	587.79995	1204.2736	9256.5884	3754.8561	0
13	1076.591	589.4646	1100.4856	9505.3074	3919.2328	0
14	1096.0665	591.93185	946.59432	9668.1028	4066.9062	0
15	1115.542	595.2143	741.92374	9746.7028	4198.9974	0
16	1135.018	599.32915	485.31795	9742.8622	4316.8638	0
17	1154.4935	604.29855	175.44511	9656.8525	4421.2529	0
18	1173.628	610.03245	-182.58154	9492.6198	4426.4813	0
19	1192.4225	616.53245	-587.88619	9261.5285	4318.7217	0
20	1211.494	624.046	-1055.9259	8853.338	5971.6519	0
21	1230.842	632.64815	-1592.256	8437.2364	5690.9878	0
22	1250.1905	642.3038	-2194.1825	7953.3688	5364.615	0
23	1269.539	653.0868	-2866.369	7402.5291	4993.0689	0
24	1288.8875	665.088	-3614.3504	6783.8032	4575.733	0
25	1308.236	678.4205	-4445.2347	6098.2345	4113.3111	0
26	1327.584	693.22715	-5367.758	5344.0122	3604.5818	0
27	1346.9325	709.6919	-6393.2321	4522.014	3050.137	0
28	1366.281	728.05755	-7536.6877	3631.0079	2449.1457	0
29	1385.629	748.6552	-8818.6718	2671.8706	1802.1995	0
30	1404.9775	771.9568	-10267.33	1646.5687	1110.6246	0
31	1424.326	798.67675	-11925.93	561.05521	378.43652	0

Slices of Slip Surface: 3

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	758.9167	618.6318	-74.776494	180.96219	84.384054	0
2	773.4792	612.21895	285.42019	944.32307	307.25146	0
3	796.77085	602.7691	795.23653	1959.4419	542.87789	0
4	820.0625	594.56515	1227.429	2788.3054	727.84861	0

5	843.35415	587.5473	1585.7056	3455.226	871.77171	0
6	860.12125	583.0904	1799.5508	4036.6762	1043.1887	0
7	875.8372	579.628	1967.4474	5133.7163	1978.5044	70
8	897.0266	575.6226	2145.0993	6281.631	2584.7919	70
9	918.21595	572.49595	2267.9576	7261.8085	3120.5044	70
10	939.4053	570.2326	2336.9906	8087.883	3593.5564	70
11	961.6701	568.7949	2391.9689	8802.3806	4005.6698	70
12	985.01035	568.2659	2424.9746	9396.3268	4356.1843	70
13	1008.3508	568.7596	2394.1821	9842.1827	4654.0273	70
14	1031.691	570.27885	2299.4795	10147.876	4904.2221	70
15	1055.031	572.83245	2140.2356	10319.122	5110.7354	70
16	1078.558	576.4729	1913.5158	10332.545	3925.858	0
17	1102.2715	581.2399	1616.2648	10382.751	4087.8797	0
18	1125.985	587.1439	1248.1707	10321.904	4231.1514	0
19	1149.699	594.22465	806.74244	10150.57	4357.0982	0
20	1173.4125	602.5324	288.81487	9867.5917	4466.657	0
21	1200.047	613.5	-388.93493	9426.7174	4395.7505	0
22	1225.784	625.53465	-1146.6707	8710.5921	5875.3686	0
23	1247.7015	637.26115	-1877.6314	8132.2191	5485.251	0
24	1269.619	650.35705	-2693.8686	7474.8195	5041.8294	0
25	1291.5365	664.94615	-3603.0322	6737.5231	4544.5167	0
26	1313.454	681.1846	-4614.7699	5920.5858	3993.4856	0
27	1335.3715	699.27325	-5741.606	5023.0019	3388.0575	0
28	1357.289	719.47685	-6999.4783	4043.8307	2727.5982	0
29	1379.2065	742.15535	-8410.6273	2983.6772	2012.5157	0
30	1401.124	767.8193	-10006.362	1843.9129	1243.7349	0
31	1423.0415	797.23655	-11833.027	630.2789	425.12849	0

Slices of Slip Surface: 83

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	852.5071	618.88865	-409.53943	142.46499	66.432514	0
2	862.63715	614.563	-170.1476	1007.0797	469.60899	0
3	880.24	607.57165	208.98952	2501.269	1068.9075	0
4	900.1714	600.47055	583.94286	3975.3802	1581.4532	0
5	920.10285	594.2576	903.5654	5286.378	2043.7391	0
6	940.0343	588.9002	1169.8031	6451.8862	2463.0758	0
7	960.66895	584.24135	1427.3405	7514.4931	2838.4858	0
8	982.0069	580.3168	1672.0538	8474.7487	3172.1488	0
9	1003.3449	577.29555	1860.4588	9309.5055	3473.5475	0
10	1025.977	575.08895	1999.8558	10361.582	5224.9867	70
11	1049.9035	573.798	2080.311	11013.706	5582.2049	70
12	1073.8305	573.60095	2092.6256	11506.746	5882.5951	70
13	1096.114	574.365	2042.7697	11661.915	4485.481	0
14	1116.7545	575.9541	1943.7054	11928.883	4656.1647	0
15	1137.3955	578.3673	1793.1845	12107.991	4809.8734	0
16	1158.0365	581.6162	1590.5752	12201.66	4948.03	0
17	1178.6775	585.71675	1334.8809	12210.344	5071.3119	0
18	1199.3185	590.6896	1024.7536	12134.068	5180.3586	0
19	1219.959	596.56075	658.67085	11972.886	5275.9052	0
20	1240.5995	603.36225	234.54423	11726.526	5358.7991	0
21	1266.637	613.5	-386.98956	11301.059	5269.7704	0
22	1293.8285	625.5265	-1145.3595	10536.224	7106.7731	0
23	1316.778	637.29195	-1878.6596	9913.1063	6686.4746	0
24	1339.7275	650.5428	-2704.4752	9199.9371	6205.4359	0
25	1362.677	665.41605	-3631.299	8395.5143	5662.8459	0
26	1385.6265	682.0866	-4669.5996	7498.2461	5057.6309	0
27	1408.576	700.7821	-5833.9822	6506.6643	4388.8005	0
28	1431.5255	721.80655	-7142.6874	5418.6012	3654.8927	0
29	1453.939	744.9529	-8584.9683	4054.4317	2734.7487	0

30	1475.8175	770.64175	-10181.972	2454.4669	1655.5589	0
31	1497.696	800.1612	-12014.423	821.58981	554.16933	0

Slices of Slip Surface: 103

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	891.66905	624.16665	-861.55314	1100.0911	742.02085	0
2	911.1151	617.6104	-525.02042	2481.5471	1157.1644	0
3	926.66905	613.12915	-298.46892	3521.2702	1641.9952	0
4	942.223	609.2354	-108.55589	4446.4514	2073.4143	0
5	951.0267	607.21665	-13.442387	4924.0944	2296.1429	0
6	961.40125	605.25165	115.37103	5430.2453	2478.3666	0
7	980.09695	602.1528	308.61044	6247.9058	2769.5389	0
8	998.7924	599.8425	452.67724	6954.9339	3032.0521	0
9	1017.488	598.3088	548.30719	7559.71	3269.4708	0
10	1036.184	597.5439	596.01441	8066.9957	3483.7758	0
11	1054.88	597.5439	596.01441	8483.0187	3677.7705	0
12	1073.5755	598.3088	548.30719	8811.0313	3852.9715	0
13	1092.271	599.8425	452.67724	9053.864	4010.7993	0
14	1110.967	602.1528	308.61044	9214.3773	4152.8273	0
15	1129.6625	605.25165	115.37103	9294.3467	4280.2267	0
16	1147.1295	608.8486	-110.50775	9295.1401	4334.395	0
17	1163.368	612.86075	-360.73383	9234.1911	4305.974	0
18	1179.6065	617.51215	-650.82372	9118.244	4251.907	0
19	1197.198	623.3274	-1011.5693	8885.6553	5993.4502	0
20	1216.142	630.46075	-1456.3188	8575.3103	5784.1198	0
21	1235.086	638.57765	-1962.3169	8195.2565	5527.7703	0
22	1254.03	647.73695	-2533.3132	7745.8737	5224.6578	0
23	1272.9745	658.0111	-3173.7497	7227.2238	4874.824	0

24	1291.919	669.48955	-3889.1044	6639.4353	4478.3556	0
25	1310.863	682.28395	-4686.2677	5981.8931	4034.8378	0
26	1329.807	696.53595	-5574.2195	5254.5228	3544.2204	0
27	1348.751	712.42845	-6564.0083	4456.1106	3005.6846	0
28	1367.695	730.20395	-7670.9895	3586.4659	2419.1018	0
29	1386.6395	750.195	-8914.528	2645.2365	1784.2346	0
30	1405.584	772.8783	-10324.902	1633.9351	1102.1032	0
31	1424.528	798.9819	-11944.717	558.02684	376.39386	0

Slices of Slip Surface: 108

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	889.80405	624.16665	-858.63639	1043.8334	704.07452	0
2	908.01665	616.80925	-463.81568	2526.1033	1177.9413	0
3	924.8338	610.7663	-144.17847	3826.684	1784.4121	0
4	941.6212	605.3967	133.53731	4964.4883	2252.7095	0
5	960.1994	600.23805	429.08345	6062.6509	2626.9756	0
6	980.59825	595.4061	730.38982	7126.5726	2982.589	0
7	1000.9974	591.46335	976.22649	8060.7408	3303.5633	0
8	1021.396	588.38865	1167.9978	8874.1001	3593.4145	0
9	1041.7945	586.1659	1306.6205	9576.3823	3856.2533	0
10	1062.1935	584.78375	1392.7904	10172.829	4094.1994	0
11	1082.5925	584.23525	1427.0106	10669.247	4309.7256	0
12	1102.9915	584.5176	1409.4036	11069.861	4504.7454	0
13	1123.3905	585.63225	1339.8873	11378.117	4680.9036	0
14	1143.789	587.58485	1218.0895	11596.122	4839.3562	0
15	1164.1875	590.38525	1043.4767	11726.041	4981.3615	0
16	1184.5865	594.048	815.07387	11769.071	5107.9326	0
17	1204.9855	598.5926	531.70899	11725.5	5219.7503	0

18	1225.3845	604.04405	191.75757	11595.662	5317.7278	0
19	1244.715	610.05105	-184.301	11394.89	5313.5244	0
20	1262.977	616.55105	-589.668	11140.791	5195.0364	0
21	1282.789	624.56345	-1086.8372	10641.957	7178.0904	0
22	1304.1505	634.2945	-1693.4583	10143.474	6841.8597	0
23	1325.512	645.2769	-2377.9855	9562.8376	6450.2154	0
24	1346.8735	657.6073	-3146.486	8899.4792	6002.7745	0
25	1368.235	671.40665	-4006.3901	8152.3851	5498.8532	0
26	1389.5965	686.82825	-4967.1334	7320.5739	4937.7894	0
27	1410.958	704.07005	-6041.2317	6401.7321	4318.0228	0
28	1432.3195	723.3939	-7244.3109	5394.4262	3638.5864	0
29	1453.939	745.45565	-8615.7067	4073.1107	2747.3479	0
30	1475.8175	770.85615	-10194.674	2469.3848	1665.6211	0
31	1497.696	800.2074	-12015.806	827.62019	558.23687	0

Slices of Slip Surface: 58

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	825.8781	616.68875	-178.13283	431.81173	201.35712	0
2	844.04	608.81515	256.16503	1348.4808	509.35521	0
3	865.90595	600.2576	715.20228	2676.9614	914.78332	0
4	887.71785	592.78535	1106.9074	4246.5447	1464.0369	0
5	909.52975	586.3289	1435.2465	5633.9673	1957.8956	0
6	931.34165	580.85095	1702.611	6858.7939	2404.3676	0
7	946.1238	577.57755	1850.0152	7911.0728	3787.3691	70
8	961.1738	574.89485	2010.8386	8654.4878	4151.4128	70
9	983.5214	571.55525	2219.1195	9615.6961	4621.8941	70
10	1005.8691	569.1602	2368.484	10419.012	5030.528	70
11	1028.2165	567.69715	2459.6909	11076.588	5384.4349	70

12	1050.564	567.1586	2493.2772	11597.231	5688.7819	70
13	1072.9115	567.5417	2469.3842	11988.326	5948.0953	70
14	1095.259	568.84845	2387.916	12255.605	6166.0164	70
15	1117.607	571.0856	2248.4183	12404.347	6346.1283	70
16	1139.448	574.1716	2055.3164	12381.77	4815.3042	0
17	1160.782	578.08	1811.5611	12432.381	4952.5697	0
18	1182.1165	582.8814	1512.1685	12395.167	5074.8256	0
19	1203.451	588.6005	1155.5185	12270.941	5183.2067	0
20	1224.785	595.26805	739.74858	12058.355	5277.9529	0
21	1246.119	602.9216	262.52368	11756.785	5359.8618	0
22	1271.503	613.5	-389.32197	11290.928	5265.046	0
23	1297.4185	625.67035	-1154.8641	10495.94	7079.6012	0
24	1319.8155	637.6871	-1903.9	9861.2994	6651.5304	0
25	1342.213	651.11295	-2740.6855	9143.0396	6167.0581	0
26	1364.6105	666.0765	-3673.0832	8339.4539	5625.0327	0
27	1387.0075	682.7403	-4711.3582	7449.9888	5025.0809	0
28	1409.4045	701.31375	-5868.3931	6472.9421	4366.0546	0
29	1431.8015	722.0735	-7160.7419	5406.1209	3646.4746	0
30	1453.939	745.0928	-8594.173	4054.4521	2734.7625	0
31	1475.8175	770.82185	-10194.309	2454.4615	1655.5552	0
32	1497.696	800.2488	-12021.673	821.84682	554.34268	0

Slices of Slip Surface: 33

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	792.079	617.67765	-127.05439	305.64087	142.52268	0
2	811.3649	608.9005	368.70633	1343.0323	454.33566	0
3	840.45495	596.9459	1014.6218	2598.7166	738.67551	0
4	872.17915	586.10125	1587.8494	4325.2189	1276.4564	0

5	899.46525	578.16615	1977.4856	6316.2424	2711.1562	70
6	919.67915	573.38145	2207.0902	7529.225	3325.6389	70
7	939.89305	569.379	2387.9111	8588.8447	3874.7733	70
8	962.51225	565.85695	2576.2885	9605.9559	4392.6237	70
9	987.53675	562.99895	2754.4876	10544.352	4867.6474	70
10	1012.5615	561.27415	2862.0307	11303.792	5274.9978	70
11	1037.586	560.67215	2899.5914	11896.927	5622.1595	70
12	1062.6105	561.1893	2867.334	12332.658	5914.5909	70
13	1087.635	562.8287	2765.1202	12618.953	6157.3582	70
14	1112.6595	565.60035	2592.2919	12761.449	6354.3947	70
15	1137.684	569.5213	2347.8246	12764.558	6509.0977	70
16	1161.3705	574.28325	2049.0063	12656.012	4946.128	0
17	1183.719	579.7936	1705.4183	12580.296	5071.0387	0
18	1206.0675	586.29485	1299.9982	12410.801	5181.0524	0
19	1228.416	593.8237	830.53835	12147.218	5277.0544	0
20	1250.7645	602.42505	294.25344	11788.356	5359.7881	0
21	1275.8345	613.5	-391.13369	11283.304	5261.4912	0
22	1302.5025	626.8254	-1223.846	10402.915	7016.855	0
23	1328.0475	641.36375	-2129.814	9635.8301	6499.4495	0
24	1353.5925	657.7675	-3151.8058	8761.9917	5910.038	0
25	1379.1375	676.2443	-4302.5827	7779.9444	5247.6388	0
26	1404.6825	697.0672	-5599.1151	6687.1902	4510.5668	0
27	1430.2275	720.60545	-7064.1815	5481.5587	3697.358	0
28	1453.939	745.2056	-8601.9192	4052.2349	2733.267	0
29	1475.8175	770.97875	-10205.052	2453.015	1654.5795	0
30	1497.696	800.32655	-12027.975	821.56812	554.1547	0

SLOPE/W

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File Information

Title: Allen Steam Station
Revision Number: 49
Last Edited By: ZScarboro
Date: 3/4/2008
Time: 8:42:32 AM
File Name: EWLTPseudostaticLtoR_Slope3to1(FS=1).gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\East-West\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 10
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 2: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 3: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 4: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 5: Fill

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 100 psf
Phi: 32 °
Phi-B: 0 °

Material 6: Alluvium

Model: Mohr-Coulomb
Weight: 110 pcf

Cohesion: 100 psf
Phi: 32 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: Ash (Wet)

Model: S=f(datum)
Weight: 90 pcf
C-Datum: 5078.7 psf
C-Rate of Increase: 7.5
Limiting C: 6500 psf
Elevation: 598 ft

Regions

	Material	Points
Region 1	Dike I	2,4,5,6,7,8,9,10,3
Region 2	Fill	5,13,14,15,6
Region 3	Alluvium	11,7,6,15,18,19,20,21
Region 4	Saprolite	20,21,11,12,16,17,22,23,24,25,26,27
Region 5	Dike II	12,30,9,8,7,11
Region 6	Ash Fill	31,33,32,2,3,1
Region 7	RAB Ash	30,9,10,3,1,31,36,34,35
Region 8	Ash (Wet)	12,30,35,34,36,17,16

Points

	X	Y
Point 1	371.9807	621.98445

Point 2	1271.9582	625.98435
Point 3	1263.9584	621.98445
Point 4	1294.9576	625.98435
Point 5	1379.9555	585.98535
Point 6	1401.955	575.05229
Point 7	1364.9559	575.05229
Point 8	1294.9576	609.98475
Point 9	1274.9581	609.98475
Point 10	1239.959	609.98475
Point 11	1284.9579	573.98565
Point 12	1187.9603	575.05229
Point 13	1409.9548	583.9854
Point 14	1504.9524	581.98545
Point 15	1519.952	575.05229
Point 16	279.983	581.98545
Point 17	0	581.98545
Point 18	1566.9508	553.05284
Point 19	1599.95	553.05284
Point 20	1599.945	543.9864
Point 21	1469.9532	543.9864
Point 22	0	567.05249
Point 23	279.983	567.05249
Point 24	1179.9605	541.98645
Point 25	1284.9579	537.98655
Point 26	1469.9532	529.05344
Point 27	1599.95	529.05344
Point 28	1599.945	514.78713
Point 29	0	514.78713
Point 30	1213.9697	585.9853
Point 31	0	621.98445
Point 32	702	816

Point 33	0	816
Point 34	279.993	609.98475
Point 35	1129.9717	589.98525
Point 36	0	609.98475

Tension Crack

Tension Crack Option: Search for Tension Crack
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (446, 816)
Left-Zone Right Coordinate: (660, 816)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1206.598, 647.77448)
Right-Zone Right Coordinate: (1365, 593.02322)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 816)
Right Coordinate: (1599.95, 553.05284)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 609.98475)
- Coordinate: (279.983, 609.98475)
- Coordinate: (1129.9618, 589.98525)

Coordinate: (1284.9579, 581.98545)
Coordinate: (1469.9532, 575.9856)
Coordinate: (1534.9516, 567.9858)
Coordinate: (1599.945, 567.9858)
Adjust Piez Line By: 0 ft
Bound by Surface Layer: No
Materials Considered
Material: Ash Fill
Material: RAB Ash
Material: Dike I
Material: Dike II
Material: Fill
Material: Alluvium
Material: Saprolite
Material: Ash (Wet)

Pressure Lines

Pressure Line 1

Coordinates
Coordinate: (1534.9516, 567.9858)
Coordinate: (1599.945, 567.9858)
Pressure (Unit Weight): 62.4 pcf

Seismic Loads

Horz Seismic Load: 0.25
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.014	(1235.15, 1500.07)	340.036	(660, 816)	(1328.96, 609.984)
2	117	1.075	(1235.15, 1500.07)	893.724	(660, 816)	(1326.7, 611.046)
3	122	1.077	(1277.98, 1543.91)	954.863	(660, 816)	(1365, 593.023)
4	92	1.091	(1202.7, 1543.18)	940.346	(606.5, 816)	(1326.7, 611.046)

5	106	1.093	(2183.33, 4698.93)	4171.049	(660, 816)	(1246.75, 634.388)
6	111	1.094	(2252.35, 4944.47)	4424.91	(660, 816)	(1237.13, 637.595)
7	101	1.096	(2070.68, 4427.47)	3877.205	(660, 816)	(1206.6, 647.774)
8	97	1.098	(1245.15, 1586.92)	1001.094	(606.5, 816)	(1365, 593.023)
9	67	1.116	(1171.11, 1586.53)	987.819	(553, 816)	(1326.7, 611.046)
10	108	1.117	(1059.8, 1069.03)	473.145	(660, 816)	(1246.75, 634.388)
11	113	1.120	(1084.26, 1085.69)	502.721	(660, 816)	(1287.71, 625.984)

Slices of Slip Surface: **Optimized**

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	811.1518	-13126.38	313.60298	211.52788	0
2	691.5	801.45535	-12551.815	940.79165	634.57198	0
3	705.08785	795.18135	-12180.482	1280.0422	863.39933	0
4	718.397	788.031	-11753.996	1320.8094	890.89719	0
5	738.83955	776.58185	-11069.413	1592.8073	1074.3621	0
6	759.2821	765.13275	-10384.83	1864.8051	1257.827	0
7	781.92385	752.6768	-9640.9353	2190.1628	1477.2835	0
8	806.76475	739.214	-8837.1701	2499.5647	1685.9777	0
9	828.2699	727.6214	-8145.7441	2781.9565	1876.4533	0
10	846.4393	717.89905	-7565.361	3002.2691	2025.0561	0
11	870.39385	705.2546	-6811.6746	3319.5928	2239.0936	0
12	898.34385	690.6225	-5939.845	3642.1342	2456.6505	0
13	921.72745	678.40085	-5211.1907	3919.2147	2643.5437	0
14	942.33435	667.6551	-4570.9255	4155.3125	2802.7937	0
15	962.81255	656.92	-3931.3204	4369.5345	2947.2883	0
16	983.162	646.1956	-3291.9972	4608.2048	3108.2734	0
17	1002.2394	636.12115	-2691.3422	4822.6148	3252.8948	0
18	1020.0445	626.6967	-2129.3864	5033.3297	3395.0237	0

19	1029.146	621.8792	-1842.1525	5106.1279	2381.0265	0
20	1038.9015	620.1456	-1748.3251	7047.0444	3286.0908	0
21	1058.0145	616.889	-1573.1677	6784.5146	3163.6711	0
22	1079.0365	613.7659	-1409.1572	6761.6886	3153.0272	0
23	1101.968	610.77625	-1256.2549	6350.461	2961.2686	0
24	1121.698	608.7085	-1156.203	6412.6863	2990.2847	0
25	1139.99	607.4404	-1121.5069	5952.9849	2775.9225	0
26	1160.046	606.05	-1099.3225	5449.1101	2540.9618	0
27	1182.177	605.3248	-1125.3524	5259.3008	2452.4522	0
28	1206.3835	605.2648	-1199.5882	4426.4714	2064.0975	0
29	1229.223	606.1301	-1327.1309	4014.6233	1872.0496	0
30	1251.9585	608.02605	-1518.642	3134.5323	1461.6564	0
31	1267.958	609.36025	-1653.4275	2663.4471	1241.9858	0
32	1273.044	609.78435	-1696.2671	2535.0159	1182.0973	0
33	1274.406	609.87545	-1706.3419	2242.7646	1045.8183	0
34	1274.82	609.87625	-1707.7329	2646.8901	1785.3499	0
35	1279.958	609.88645	-1724.931	2647.1476	1785.5236	0
36	1289.958	609.90635	-1752.3491	2643.974	1783.383	0
37	1295.026	609.91645	-1763.2998	2637.3379	1778.9069	0
38	1303.56	609.9334	-1781.5749	2162.0332	1054.494	600
39	1320.4925	609.96705	-1817.9552	1027.9816	501.38012	600

Slices of Slip Surface: 117

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	807.44015	-12886.501	403.50588	272.16816	0
2	691.5	790.8318	-11881.425	1220.039	822.92668	0
3	713.45865	774.54395	-10896.289	1894.3275	1277.74	0
4	736.376	758.5966	-9935.5779	2403.5388	1621.2074	0

5	759.29335	743.67985	-9038.8978	2892.1592	1950.786	0
6	782.21065	729.7337	-8202.3788	3358.3977	2265.2679	0
7	805.12795	716.70615	-7423.4665	3800.5104	2563.4766	0
8	828.0453	704.5521	-6699.2325	4216.7837	2844.2565	0
9	850.96265	693.23205	-6026.7283	4604.9436	3106.0737	0
10	873.87995	682.7112	-5404.1003	4963.9022	3348.1943	0
11	896.79725	672.95905	-4829.2712	5290.4711	3568.4678	0
12	919.7146	663.94875	-4300.9304	5583.2486	3765.9487	0
13	942.63195	655.65645	-3817.4038	5838.9935	3938.4509	0
14	965.54925	648.0612	-3377.2374	6055.4148	4084.4288	0
15	988.4666	641.1445	-2979.4367	6229.5445	4201.8808	0
16	1011.3842	634.89	-2622.9201	6356.8532	4287.7516	0
17	1034.3015	629.2835	-2306.7896	6434.1807	4339.9097	0
18	1057.2185	624.31255	-2030.3418	6455.9413	4354.5874	0
19	1078.891	620.1706	-1804.7778	5812.0536	2710.2051	0
20	1099.3195	616.78605	-1623.609	5685.8729	2651.3661	0
21	1119.748	613.8853	-1472.6384	5508.4384	2568.627	0
22	1140.9615	611.3894	-1366.7546	5265.5107	2455.348	0
23	1162.961	609.3322	-1309.2535	4945.1525	2305.9625	0
24	1184.9605	607.8221	-1285.9222	4549.1739	2121.3146	0
25	1206.96	606.85625	-1296.4911	4070.6557	1898.1779	0
26	1228.9595	606.43295	-1340.9683	3501.5536	1632.8013	0
27	1251.9585	606.5826	-1423.5741	3013.5346	1405.2343	0
28	1265.561	606.86295	-1489.7821	2795.1228	1303.3871	0
29	1269.561	607.0099	-1511.7402	3340.1796	2252.9796	0
30	1273.458	607.16665	-1534.2053	3347.0301	2257.6003	0
31	1279.958	607.482	-1574.0403	3367.907	2271.6819	0
32	1289.958	608.04025	-1635.0572	3349.1672	2259.0418	0
33	1296.3995	608.44655	-1674.2595	3202.1507	2159.8779	0
34	1312.2715	609.7957	-1783.2949	1949.0873	950.63338	600

Slices of Slip Surface: 122

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	807.34015	-12880.538	414.33871	279.47499	0
2	691.5	790.50665	-11861.627	1250.5284	843.49205	0
3	713.6917	773.7664	-10848.381	1946.527	1312.949	0
4	737.0751	757.1615	-9847.1271	2480.4583	1673.0903	0
5	760.4585	741.5817	-8909.7369	2992.8637	2018.7121	0
6	783.8419	726.96825	-8032.4459	3482.0316	2348.66	0
7	807.2253	713.27015	-7212.4453	3946.2709	2661.7933	0
8	830.6087	700.4427	-6446.5871	4384.2384	2957.2061	0
9	853.9921	688.4467	-5732.4716	4794.1104	3233.6683	0
10	877.3755	677.2476	-5068.42	5174.004	3489.9097	0
11	900.7589	666.81475	-4451.7619	5522.6676	3725.0863	0
12	924.1423	657.12115	-3881.4992	5837.5008	3937.444	0
13	947.5257	648.1428	-3355.7677	6116.4595	4125.604	0
14	970.9091	639.85835	-2873.2784	6357.6634	4288.2981	0
15	994.2924	632.24885	-2432.9044	6558.1683	4423.5404	0
16	1017.676	625.29755	-2033.5926	6715.5542	4529.6985	0
17	1041.942	618.7762	-1661.6452	6411.0961	2989.5432	0
18	1067.0905	612.72015	-1320.783	6417.7689	2992.6548	0
19	1092.239	607.3785	-1024.4871	6363.3105	2967.2604	0
20	1117.3875	602.73895	-771.96575	6243.9271	2911.591	0
21	1141.896	598.87475	-588.33896	6060.4553	2826.0367	0
22	1165.7645	595.7437	-469.88399	5813.8471	2711.0414	0
23	1189.633	593.2221	-389.44635	5494.7485	2562.2433	0
24	1213.5015	591.30515	-346.72672	5097.4471	2376.9786	0
25	1232.6975	590.1525	-339.58013	5486.0066	3700.3582	0
26	1251.9585	589.48045	-356.70031	5518.7753	3722.4609	0
27	1267.958	589.1112	-389.3746	5620.6888	3791.2025	0

28	1273.458	589.0621	-404.47543	5677.123	3829.2678	0
29	1279.958	589.06535	-424.86565	5767.7767	3890.4145	0
30	1289.958	589.1384	-455.64585	5867.289	3957.5364	0
31	1304.6315	589.47115	-503.85865	5259.5603	3547.6182	0
32	1323.9785	590.20775	-588.94651	3826.5519	2581.0419	0
33	1349.326	591.84875	-737.63423	1878.1696	916.04454	600

Slices of Slip Surface: 92

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	618.4375	806.53185	-12751.758	449.33047	303.07723	0
2	642.3125	788.20295	-11643.706	1359.5982	917.06057	0
3	666.1875	771.04745	-10608.802	2283.8298	1540.4627	0
4	690.0625	754.9885	-9642.3317	3220.5592	2172.2946	0
5	713.996	739.92585	-8737.8817	3952.3426	2665.8887	0
6	737.988	725.8071	-7892.5143	4452.6056	3003.3204	0
7	761.98	712.6213	-7105.2882	4928.6747	3324.433	0
8	785.972	700.32465	-6373.5627	5378.6159	3627.9223	0
9	809.96395	688.8787	-5694.7669	5800.0432	3912.1785	0
10	833.9559	678.2496	-5067.0514	6191.9552	4176.5265	0
11	857.9479	668.40755	-4488.3791	6551.2885	4418.8999	0
12	881.9399	659.3263	-3957.0786	6875.9139	4637.8625	0
13	905.9319	650.98255	-3471.7133	7163.0807	4831.5589	0
14	929.9239	643.35575	-3031.1612	7410.5777	4998.4978	0
15	953.9159	636.42785	-2634.2286	7614.3346	5135.9335	0
16	977.9079	630.18285	-2279.8768	7770.3757	5241.1846	0
17	1001.9	624.60685	-1967.2417	7875.2373	5311.9146	0
18	1025.5025	619.7572	-1699.6829	7165.7779	3341.4571	0
19	1048.7155	615.6031	-1474.6191	7090.9207	3306.5506	0

20	1071.9285	612.04615	-1286.7711	6957.2837	3244.2347	0
21	1095.142	609.0795	-1135.781	6759.0527	3151.798	0
22	1118.3555	606.6976	-1021.2912	6491.8321	3027.191	0
23	1140.9615	604.92835	-963.82679	6158.9666	2871.9733	0
24	1162.961	603.7392	-960.50704	5759.4091	2685.6566	0
25	1184.9605	603.06625	-989.37186	5279.5282	2461.8844	0
26	1206.96	602.9084	-1050.3555	4709.9636	2196.2921	0
27	1228.9595	603.2655	-1143.5117	4042.7525	1885.1665	0
28	1250.7075	604.12225	-1267.1759	3478.4273	1622.0173	0
29	1262.707	604.7517	-1348.8979	4038.318	2723.8799	0
30	1267.958	605.1099	-1387.6772	3980.3441	2684.776	0
31	1273.458	605.5013	-1430.2814	3948.9049	2663.57	0
32	1279.958	606.02665	-1483.1913	3938.4	2656.4844	0
33	1289.958	606.90475	-1564.2612	3865.3481	2607.2102	0
34	1297.136	607.5906	-1622.2492	3593.7576	2424.0201	0
35	1313.008	609.42815	-1762.8242	2122.6627	1035.2918	600

Slices of Slip Surface: 106

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	811.9134	-13172.702	293.69659	198.10085	0
2	691.5	803.8053	-12697.676	877.81789	592.09564	0
3	711.7264	796.1163	-12247.863	1202.179	810.87995	0
4	731.1792	788.83655	-11822.052	1264.4661	852.89318	0
5	750.632	781.667	-11402.945	1319.2154	889.82199	0
6	770.0848	774.60695	-10991.105	1366.331	921.60189	0
7	789.5376	767.6558	-10586.14	1405.865	948.26794	0
8	808.99045	760.81305	-10187.644	1437.6275	969.69199	0
9	828.4433	754.0781	-9795.6993	1461.7218	985.94377	0

10	847.8961	747.45035	-9410.8663	1477.9599	996.89654	0
11	867.3489	740.9293	-9032.7358	1486.3989	1002.5887	0
12	886.8017	734.51445	-8660.8937	1486.9024	1002.9283	0
13	906.2545	728.2053	-8295.9002	1479.4323	997.88966	0
14	925.7073	722.0013	-7937.3365	1464.0009	987.48107	0
15	945.1601	715.90195	-7585.2668	1440.4742	971.61209	0
16	964.6129	709.9068	-7239.7612	1408.8676	950.29316	0
17	984.0657	704.01535	-6900.3853	1369.0483	923.43471	0
18	1003.5186	698.22715	-6567.7008	1321.0348	891.04925	0
19	1022.9715	692.54175	-6241.7633	1264.6965	853.04855	0
20	1042.4245	686.95875	-5921.645	1200.0034	809.41249	0
21	1061.877	681.47775	-5608.3919	1126.8773	760.08834	0
22	1081.3295	676.09825	-5301.0708	1045.3402	705.09088	0
23	1100.7825	670.81985	-5000.2284	955.21638	644.30159	0
24	1120.2355	665.6422	-4705.9186	856.48017	577.70317	0
25	1139.6945	660.56335	-4434.6202	749.08454	505.2639	0
26	1159.1595	655.58295	-4186.5499	632.87546	426.87989	0
27	1178.6245	650.70225	-3944.6897	507.88883	342.57534	0
28	1198.0895	645.9209	-3709.0322	374.00827	252.27176	0
29	1217.5545	641.23855	-3479.5208	231.1784	155.9318	0
30	1237.0195	636.6549	-3256.1935	79.339665	53.51528	0

Slices of Slip Surface: 111

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	811.9808	-13177.123	290.09683	195.67279	0
2	691.5	804.00335	-12710.192	867.14475	584.89652	0
3	711.7264	796.4326	-12267.236	1183.9792	798.60402	0
4	731.1792	789.2594	-11848.202	1238.4035	835.31374	0

5	750.632	782.1895	-11435.576	1285.6742	867.19821	0
6	770.0848	775.22235	-11029.447	1325.7036	894.19839	0
7	789.5376	768.35745	-10629.885	1358.5003	916.32	0
8	808.99045	761.59425	-10236.471	1383.9768	933.50412	0
9	828.4433	754.9323	-9849.2868	1402.146	945.75939	0
10	847.8961	748.3711	-9468.385	1412.9699	953.06022	0
11	867.3489	741.9102	-9093.8429	1416.3175	955.31819	0
12	886.8017	735.54915	-8725.2286	1412.202	952.54229	0
13	906.2545	729.2874	-8363.103	1400.5431	944.67823	0
14	925.7073	723.1246	-8007.0267	1381.3065	931.703	0
15	945.1601	717.06035	-7657.5552	1354.462	913.59616	0
16	964.6129	711.09415	-7313.7624	1319.979	890.33704	0
17	984.0657	705.2256	-6976.2002	1277.7306	861.84016	0
18	1003.5186	699.4543	-6644.4282	1227.7372	828.11923	0
19	1022.9715	693.77985	-6318.9905	1169.8725	789.08896	0
20	1042.4245	688.2019	-5999.4442	1104.1588	744.76453	0
21	1061.877	682.72005	-5685.8466	1030.5226	695.09624	0
22	1081.3295	677.3339	-5378.2391	948.88814	640.03313	0
23	1100.7825	672.0431	-5076.6738	859.23249	579.55963	0
24	1120.2355	666.8473	-4781.196	761.43318	513.59316	0
25	1138.8925	661.9511	-4518.7932	660.0247	445.19228	0
26	1156.754	657.34685	-4289.0502	555.82828	374.91091	0
27	1174.6155	652.82185	-4064.2133	444.64873	299.91936	0
28	1192.477	648.37585	-3844.312	326.47082	220.20735	0
29	1210.3385	644.00865	-3629.3208	201.22024	135.72476	0
30	1228.2	639.72	-3419.2154	68.872324	46.454969	0

Slices of Slip Surface: 101

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	811.9337	-13173.746	292.82689	197.51423	0
2	691.5	803.87095	-12701.555	874.91194	590.13555	0
3	711.3035	796.39155	-12264.291	1195.0725	806.08661	0
4	729.91055	789.4798	-11860.014	1251.3552	844.04976	0
5	748.5176	782.6761	-11462.86	1300.175	876.97908	0
6	767.1246	775.9799	-11072.425	1341.4863	904.84394	0
7	785.73165	769.3906	-10688.788	1375.2434	927.61338	0
8	804.3387	762.90765	-10311.525	1401.3515	945.2235	0
9	822.9457	756.53045	-9940.715	1419.8695	957.71409	0
10	841.55275	750.25845	-9576.9456	1430.6037	964.95439	0
11	860.1598	744.09115	-9219.2744	1433.6158	966.98608	0
12	878.7668	738.028	-8868.2804	1428.8154	963.74818	0
13	897.37385	732.0685	-8523.5335	1416.1666	955.21646	0
14	915.9809	726.21215	-8185.6068	1395.5805	941.33096	0
15	934.58795	720.4584	-7854.0569	1367.0221	922.06805	0
16	953.195	714.8068	-7528.4394	1330.4068	897.37074	0
17	971.802	709.25695	-7209.3245	1285.7007	867.21605	0
18	990.40905	703.80835	-6896.7795	1232.8213	831.54845	0
19	1009.0163	698.46055	-6590.3462	1171.7377	790.34706	0
20	1027.6235	693.21315	-6290.6038	1102.4215	743.59267	0
21	1046.2305	688.0657	-5996.5687	1024.7399	691.19581	0
22	1064.8375	683.01775	-5708.8166	938.61478	633.10366	0
23	1083.4445	678.06895	-5427.3992	844.07154	569.33344	0
24	1102.0515	673.2189	-5152.0056	740.98166	499.79844	0
25	1120.6585	668.4672	-4882.8399	629.32111	424.48245	0
26	1139.5415	663.7459	-4632.6917	507.12657	342.06119	0
27	1158.7005	659.0576	-4401.8581	373.95249	252.23414	0
28	1177.8595	654.47245	-4177.4811	231.44343	156.11057	0
29	1197.0185	649.99005	-3959.4565	79.527807	53.642183	0

Slices of Slip Surface: 97

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	618.4375	806.41465	-12744.796	464.52783	313.32798	0
2	642.3125	787.8236	-11620.279	1402.2976	945.86166	0
3	666.1875	770.3539	-10566.043	2350.1544	1585.1991	0
4	690.0625	753.9349	-9576.7173	3306.5588	2230.3021	0
5	714.56895	738.12305	-8625.6999	4065.2642	2742.0553	0
6	739.7069	722.9133	-7714.1318	4600.5987	3103.143	0
7	764.84485	708.6864	-6863.567	5108.761	3445.9028	0
8	789.98275	695.3953	-6071.4322	5587.1206	3768.5605	0
9	815.1207	682.9986	-5335.0422	6034.7906	4070.5176	0
10	840.25865	671.45995	-4652.2559	6449.0569	4349.9438	0
11	865.39655	660.7473	-4021.0027	6828.5275	4605.9	0
12	890.5345	650.8322	-3439.2787	7170.5734	4836.6128	0
13	915.67245	641.6895	-2905.8564	7473.1144	5040.6793	0
14	940.81035	633.297	-2419.2583	7733.1074	5216.0468	0
15	965.9483	625.6351	-1978.1844	7948.0348	5361.0172	0
16	991.13765	618.6736	-1580.8388	7620.4301	3553.4649	0
17	1016.3785	612.4	-1226.528	7670.5727	3576.8468	0
18	1041.6195	606.8165	-915.28423	7664.4775	3574.0046	0
19	1066.86	601.9113	-646.31446	7598.7463	3543.3536	0
20	1092.1005	597.67435	-419.07857	7469.7309	3483.1927	0
21	1117.3415	594.09715	-232.96514	7272.3758	3391.1645	0
22	1144.0905	591.03875	-104.92179	6983.0504	3256.2499	0
23	1172.3475	588.57465	-42.215835	6580.6726	3068.618	0
24	1200.6045	586.91495	-29.687884	6070.1514	2830.5581	0
25	1227.346	586.0612	-63.818572	6510.6675	4391.5007	0

26	1251.9585	585.9184	-134.64703	6399.442	4316.4781	0
27	1267.958	586.09115	-200.95232	6439.3473	4343.3946	0
28	1273.458	586.22475	-227.4232	6475.2902	4367.6384	0
29	1279.958	586.44115	-261.14618	6542.7463	4413.1381	0
30	1289.958	586.8391	-312.20498	6603.4484	4454.0822	0
31	1305.027	587.66645	-391.93138	5860.2347	3952.7782	0
32	1325.1655	589.0772	-520.70237	4172.499	2814.3861	0
33	1350.1175	591.4539	-715.66625	1993.2145	972.15568	600

Slices of Slip Surface: 67

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	565.41665	806.3602	-12663.124	482.47287	325.43206	0
2	590.25	787.69185	-11535.393	1454.8208	981.28902	0
3	615.08335	770.2059	-10481.268	2435.5454	1642.7961	0
4	639.91665	753.82775	-9496.2245	3422.959	2308.815	0
5	664.75	738.49305	-8576.1532	4415.9963	2978.6271	0
6	689.58335	724.14605	-7717.8187	5413.2313	3651.2706	0
7	714.7985	710.54605	-6906.1357	6169.5459	4161.4113	0
8	740.3955	697.6773	-6140.9889	6657.4254	4490.4901	0
9	765.99255	685.71965	-5432.6391	7110.7431	4796.2568	0
10	791.5896	674.6372	-4778.851	7527.1412	5077.1208	0
11	817.1866	664.3984	-4177.8346	7904.5141	5331.6621	0
12	842.7836	654.97535	-3627.5846	8240.9768	5558.6091	0
13	868.38065	646.3435	-3126.6861	8533.377	5755.8354	0
14	893.9777	638.48125	-2673.81	8779.0871	5921.569	0
15	919.5747	631.3696	-2267.7681	8974.8898	6053.6396	0
16	945.1717	624.99185	-1907.4751	9117.7134	6149.9753	0
17	970.2553	619.433	-1597.9531	8557.0047	3990.1968	0

18	994.8257	614.6531	-1335.8658	8513.5965	3969.9553	0
19	1019.396	610.51505	-1113.772	8410.296	3921.7854	0
20	1043.966	607.01075	-931.22654	8243.1287	3843.834	0
21	1068.536	604.1334	-787.79361	8007.8723	3734.1322	0
22	1093.1065	601.87745	-683.14275	7700.0631	3590.5984	0
23	1117.677	600.2386	-616.98142	7313.8022	3410.482	0
24	1143.7115	599.1914	-612.77797	6811.8752	3176.4296	0
25	1171.2105	598.8112	-677.63168	6167.9574	2876.1658	0
26	1198.71	599.1969	-790.23137	5395.6736	2516.0439	0
27	1226.2095	600.3494	-950.69252	4479.5281	2088.8382	0
28	1247.7275	601.72195	-1109.7094	3797.1646	1770.6469	0
29	1259.727	602.7074	-1211.1996	4378.9615	2953.6469	0
30	1267.958	603.48255	-1286.1774	4250.6427	2867.0947	0
31	1273.458	604.03285	-1338.6346	4191.4597	2827.1753	0
32	1279.958	604.7434	-1403.2249	4147.9519	2797.8289	0
33	1289.958	605.90365	-1501.85	4023.862	2714.1292	0
34	1297.7235	606.86705	-1578.1975	3653.318	2464.1941	0
35	1313.5955	609.13515	-1746.5038	2038.3742	994.18154	600

Slices of Slip Surface: 108

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	670.5	800.76285	-12438.048	546.77815	368.80652	0
2	691.5	772.48505	-10714.862	1682.5312	1134.8817	0
3	712.14175	748.4462	-9252.8515	2692.6499	1816.2153	0
4	732.42525	727.72035	-7992.9448	3528.735	2380.1618	0
5	752.7087	709.3342	-6877.9308	4335.3533	2924.2327	0
6	772.99215	692.94155	-5886.7177	5109.0344	3446.0872	0
7	793.27565	678.2897	-5003.769	5847.9794	3944.5119	0

8	813.55915	665.18815	-4217.3137	6550.3047	4418.2363	0
9	833.8426	653.48955	-3517.8848	7214.6304	4866.3296	0
10	854.12605	643.07775	-2898.689	7838.806	5287.3414	0
11	874.40955	633.86015	-2353.8941	8421.0832	5680.0923	0
12	894.69305	625.76205	-1878.8048	8960.7026	6044.0702	0
13	914.2151	618.95025	-1483.8943	9163.2157	4272.8776	0
14	932.97565	613.30555	-1159.4931	9476.3051	4418.8737	0
15	951.7362	608.494	-886.95834	9736.149	4540.0408	0
16	970.4968	604.48965	-664.83787	9940.6399	4635.3965	0
17	989.2574	601.2717	-491.6831	10084.848	4702.6417	0
18	1008.0179	598.824	-366.58568	10166.218	4740.5851	0
19	1026.7785	597.13455	-288.77534	10178.81	4746.4569	0
20	1045.539	596.19515	-257.73627	10117.552	4717.8922	0
21	1064.2995	596.00145	-273.2022	9974.0655	4650.9831	0
22	1083.0605	596.55245	-335.10536	9739.3921	4541.5531	0
23	1101.821	597.8507	-443.61732	9401.5379	4384.0091	0
24	1120.5815	599.90255	-599.09137	8945.67	4171.4344	0
25	1140.5625	602.95475	-835.66728	8307.8795	3874.0278	0
26	1161.764	607.1317	-1164.4176	7422.9087	3461.3592	0
27	1182.9655	612.33065	-1556.8088	6267.4884	2922.5779	0
28	1204.167	618.587	-2015.1479	4756.1603	2217.834	0
29	1222.764	624.9185	-2473.6492	4706.508	3174.5798	0
30	1238.756	631.1201	-2911.8886	1900.7036	1282.0408	0

SLOPE/W

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File Information

Revision Number: 54
Last Edited By: ZScarboro
Date: 3/4/2008
Time: 8:49:40 AM
File Name: NSLTPseudoStaticRtoL_FS=1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Right to Left
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 10
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 2000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 10
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf

Phi: 45 °
Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Wet)

Model: S=f(datum)
Weight: 90 pcf
C-Datum: 5078.7 psf
C-Rate of Increase: 7.5
Limiting C: 6500 psf
Elevation: 607 ft

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	12,13,14,15,16,17,18,19
Region 3	Dike I	19,18,17,20,21
Region 4	Dike III	3,12,13,14,15,7,8,9,10,11,6,33,2
Region 5	Saprolite	5,4,3,12,19,21,20,22,23,24,35,37,25,26,27,28,29,30
Region 6	PWR	32,30,29,28,27,26,25,37,38
Region 7	Ash Fill	40,41,42,36,39,34
Region 8	RAB Ash	15,7,48,40,34,39,36,49,46,45,44,43,47
Region 9	Ash (Wet)	15,16,17,20,22,23,24,35,49,46,45,44,43,47

Points

	X	Y
Point 1	0	640

Point 2	630	640
Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	655	645
Point 7	755	620
Point 8	740	625
Point 9	715	625
Point 10	700	630
Point 11	685	630
Point 12	540	575
Point 13	640	625
Point 14	655	625
Point 15	665	620
Point 16	685	610
Point 17	655	610
Point 18	640	610
Point 19	570	575
Point 20	716	585.75
Point 21	650	575
Point 22	730	588
Point 23	950	578
Point 24	1400	564
Point 25	1400	550
Point 26	950	548
Point 27	740	537
Point 28	650	555
Point 29	350	566
Point 30	0	566
Point 31	1400	530
Point 32	0	530

Point 33	640	645
Point 34	1497	620
Point 35	2400	564
Point 36	2400	620
Point 37	2400	550
Point 38	2400	530
Point 39	1985	620
Point 40	855	620
Point 41	1443	816
Point 42	2400	816
Point 43	949	607.25
Point 44	1373	607
Point 45	1763	607
Point 46	2162	607
Point 47	730	619
Point 48	814	620
Point 49	2400	607

Tension Crack

Tension Crack Option: (none)

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (756, 620)
Left-Zone Right Coordinate: (860.00001, 621.66667)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1533, 816)
Right-Zone Right Coordinate: (1734, 816)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 816)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
- Material: RAB Ash
- Material: Ash Fill
- Material: Dike II
- Material: Dike I
- Material: Fill
- Material: Alluvium
- Material: Saprolite
- Material: PWR
- Material: Dike III
- Material: Ash (Wet)

Seismic Loads

Horz Seismic Load: 0.25
Vert Seismic Load: 0

Critical Slip Surfaces

Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)

1	Optimized	1.026	(948.123, 1540.67)	341.8233	(1533, 816)	(824.117, 620)
2	52	1.092	(948.123, 1540.67)	931.247	(1533, 816)	(808.135, 620)
3	77	1.101	(958.782, 1519.55)	908.132	(1533, 816)	(834.203, 620)
4	82	1.117	(988.324, 1560.3)	952.851	(1583.25, 816)	(834.203, 620)
5	102	1.122	(971.65, 1497.52)	882.937	(1533, 816)	(860, 621.667)
6	107	1.136	(1001.47, 1538.19)	927.381	(1583.25, 816)	(860, 621.667)
7	101	1.138	(-93.613, 5186.65)	4663.526	(1533, 816)	(860, 621.667)
8	3	1.169	(1037.8, 1141)	592.328	(1533, 816)	(756, 620)
9	103	1.182	(1085.58, 1102.98)	531.549	(1533, 816)	(860, 621.667)
10	28	1.190	(1049.6, 1131.53)	577.269	(1533, 816)	(782.068, 620)
11	112	1.190	(1030.63, 1579.07)	972.484	(1633.5, 816)	(860, 621.667)

Slices of Slip Surface: Optimized

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	839.55875	617.38705	-272.25043	379.32374	176.88157	0
2	865.62375	612.9764	-85.742009	1533.7689	715.20821	0
3	888.1938	610.5457	-10.885152	2405.3996	1121.6563	0
4	912.08645	609.27975	-13.212311	3487.3948	1626.1989	0
5	937.0164	608.4876	-48.634592	4257.741	1985.4172	0
6	967.4214	608.1148	-69.564399	5409.3208	2522.4077	0
7	995.8259	608.2522	-78.138792	6002.0312	2798.7931	0
8	1017.792	608.9542	-121.94256	6679.0854	3114.5087	0
9	1040.6755	610.2414	-202.26467	6839.7527	3189.4291	0
10	1064.476	612.1138	-319.1005	7418.2143	3459.1701	0
11	1089.2195	614.69985	-480.45903	7428.3298	3463.8871	0
12	1114.9065	617.9995	-686.38107	7897.0892	3682.4732	0
13	1128.204	619.82465	-800.26266	6032.5992	2813.0472	0
14	1141.2855	624.87435	-1115.3666	6320.066	4262.9383	0

15	1166.5405	634.62305	-1723.6947	6227.3465	4200.3983	0
16	1190.078	644.01505	-2309.759	5912.7526	3988.202	0
17	1211.898	653.0503	-2873.5537	5793.7693	3907.9467	0
18	1234.9675	662.67185	-3473.9131	5625.1133	3794.1868	0
19	1259.2865	672.8797	-4110.7764	5484.4475	3699.3066	0
20	1283.6055	683.08755	-4747.7533	5343.7818	3604.4263	0
21	1309.44	694.69265	-5471.8952	4822.0437	3252.5095	0
22	1336.7905	707.695	-6283.219	4578.3494	3088.1356	0
23	1361.068	720.10735	-7058.0249	3943.7615	2660.1007	0
24	1382.2725	731.92965	-7795.7502	3670.3789	2475.7018	0
25	1403.477	743.75195	-8533.4755	3396.9963	2291.3029	0
26	1428.5395	758.4882	-9452.9212	2874.4519	1938.8423	0
27	1459.9015	777.628	-10647.074	2093.279	1411.9345	0
28	1490.852	794.95705	-11728.673	1287.0495	868.12586	0
29	1518.9505	808.9857	-12603.985	429.02712	289.38245	0

Slices of Slip Surface: 52

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	811.0676	619.5637	-310.79339	61.802821	28.819129	0
2	824.25	617.75165	-239.27868	313.88617	146.36752	0
3	844.75	615.23095	-151.78942	628.75947	293.19535	0
4	866.875	613.0459	-89.557823	1367.8624	637.8447	0
5	890.625	611.27115	-59.673769	2456.206	1145.3477	0
6	914.375	610.1058	-67.814625	3378.9077	1575.6106	0
7	938.125	609.5476	-113.83037	4156.364	1938.1444	0
8	961.5092	609.5856	-156.90218	4796.4172	2236.6061	0
9	984.5276	610.2014	-195.31545	5318.9319	2480.2587	0
10	1007.5459	611.38765	-269.32305	5745.2577	2679.0577	0

11	1030.5645	613.1466	-379.05695	6085.3182	2837.6305	0
12	1053.583	615.4815	-524.73148	6347.5374	2959.9053	0
13	1076.601	618.3967	-706.5882	6538.8021	3049.0935	0
14	1099.94	621.95485	-928.28275	7595.6472	5123.3287	0
15	1123.5995	626.17965	-1191.8667	7594.757	5122.7283	0
16	1147.2585	631.03935	-1495.0263	7531.6955	5080.1928	0
17	1170.918	636.5442	-1838.4538	7413.484	5000.4581	0
18	1194.5775	642.70605	-2222.8282	7245.1718	4886.9301	0
19	1218.2365	649.53855	-2649.0664	7031.8994	4743.076	0
20	1241.8955	657.0573	-3118.1066	6777.6557	4571.5865	0
21	1265.555	665.27995	-3631.0205	6486.1222	4374.9447	0
22	1289.2145	674.2266	-4189.1785	6159.8857	4154.8953	0
23	1312.8735	683.92	-4793.6871	5802.4341	3913.7912	0
24	1336.533	694.38575	-5446.5402	5415.8101	3653.01	0
25	1360.1925	705.6529	-6149.4974	5002.2229	3374.042	0
26	1383.8515	717.75445	-6904.1716	4564.0593	3078.4969	0
27	1407.511	730.7279	-7713.3222	4102.4242	2767.1201	0
28	1431.1705	744.6159	-8579.8001	3619.8121	2441.5941	0
29	1454.25	759.0793	-9482.391	2936.8963	1980.9616	0
30	1476.75	774.12265	-10420.916	2079.0977	1402.3691	0
31	1499.25	790.14205	-11420.04	1235.75	833.52392	0
32	1521.75	807.2016	-12483.796	407.77132	275.04523	0

Slices of Slip Surface: 77

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	844.60145	618.682	-366.41403	183.91537	85.761146	0
2	866.875	616.1559	-283.4843	1002.1246	467.29835	0
3	890.625	614.05395	-233.19046	2167.4902	1010.7173	0

4	914.375	612.5787	-221.99298	3153.4795	1470.4917	0
5	938.125	611.7271	-249.70082	3983.023	1857.3141	0
6	961.11345	611.4854	-275.64429	4655.0319	2170.677	0
7	983.3404	611.8146	-296.18243	5196.1672	2423.0126	0
8	1005.5675	612.68865	-350.70685	5642.2572	2631.0277	0
9	1027.7945	614.10905	-439.31983	6002.164	2798.855	0
10	1050.0215	616.0784	-562.16163	6284.984	2930.7362	0
11	1072.2485	618.60035	-719.49928	6496.8745	3029.5424	0
12	1095.3495	621.8237	-919.90668	7603.7647	5128.8041	0
13	1119.325	625.8008	-1168.0036	7625.9104	5143.7415	0
14	1143.301	630.4421	-1457.518	7581.0045	5113.4521	0
15	1167.277	635.75805	-1789.1364	7475.6067	5042.3604	0
16	1191.253	641.761	-2163.6286	7315.9797	4934.6906	0
17	1215.229	648.46515	-2581.8483	7108.0747	4794.4569	0
18	1239.205	655.88675	-3044.8013	6855.9202	4624.3765	0
19	1263.181	664.0446	-3553.6649	6563.6589	4427.2438	0
20	1287.157	672.96	-4109.7025	6235.1291	4205.6477	0
21	1311.133	682.6571	-4714.5624	5872.7341	3961.2092	0
22	1335.1085	693.1635	-5370.1078	5479.4229	3695.9174	0
23	1359.084	704.51055	-6077.6608	5057.9165	3411.6078	0
24	1383.06	716.7339	-6840.1647	4610.0129	3109.493	0
25	1407.036	729.8743	-7660.0156	4137.7649	2790.9577	0
26	1431.012	743.97845	-8539.549	3643.1657	2457.3463	0
27	1454.25	758.60285	-9452.4436	2951.4492	1990.7776	0
28	1476.75	773.7412	-10396.742	2089.1312	1409.1368	0
29	1499.25	789.88745	-11403.781	1241.4807	837.38933	0
30	1521.75	807.11025	-12477.84	409.58169	276.26634	0

Slices of Slip Surface: 82

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	844.60145	618.4133	-349.78587	234.06834	109.14786	0
2	866.875	615.30045	-230.28519	1182.5794	551.44585	0
3	890.625	612.55015	-139.54737	2497.6462	1164.6716	0
4	914.375	610.40155	-86.342816	3614.1913	1685.3251	0
5	938.125	608.85055	-70.418123	4558.1734	2125.5111	0
6	962.02785	607.8919	-50.915168	5356.6264	2497.8359	0
7	986.08355	607.53155	-28.431911	6024.5872	2809.3111	0
8	1010.1392	607.77875	-43.852176	6573.255	3065.1591	0
9	1034.195	608.63395	-97.204484	7015.3644	3271.3181	0
10	1058.251	610.09885	-188.59179	7362.7537	3433.3084	0
11	1082.3065	612.17625	-318.18981	7625.4692	3555.8147	0
12	1106.362	614.87015	-486.24084	7811.2851	3642.4621	0
13	1130.418	618.1859	-693.09828	7927.7586	3696.7746	0
14	1154.969	622.22465	-944.64894	9098.9926	6137.348	0
15	1180.015	627.0215	-1243.8888	8995.7649	6067.7201	0
16	1205.061	632.51915	-1586.8165	8833.1426	5958.0299	0
17	1230.107	638.73015	-1974.2696	8617.9997	5812.9142	0
18	1255.1535	645.6691	-2407.1464	8355.7356	5636.0149	0
19	1280.2	653.3527	-2886.4689	8050.6748	5430.2487	0
20	1305.246	661.80005	-3413.4029	7707.2466	5198.6035	0
21	1330.292	671.03295	-3989.1724	7328.4507	4943.1024	0
22	1355.338	681.0762	-4615.7876	6917.418	4665.8574	0
23	1380.3845	691.9579	-5294.4304	6477.0351	4368.8153	0
24	1405.431	703.71005	-6027.5627	6009.256	4053.2944	0
25	1430.477	716.36905	-6817.3194	5516.2395	3720.7505	0
26	1454.6875	729.4907	-7636.5038	4801.7721	3238.8362	0
27	1478.0625	743.05505	-8482.7922	3894.0776	2626.5885	0
28	1501.4375	757.52915	-9385.4576	3001.4144	2024.4796	0
29	1524.8125	772.96325	-10348.334	2123.6497	1432.4198	0

30	1548.1875	789.41515	-11374.418	1261.5666	850.93742	0
31	1571.5625	806.95165	-12468.089	416.06526	280.63956	0

Slices of Slip Surface: 102

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	866.9797	620.83335	-578.87163	537.51655	362.55949	0
2	886.63285	618.77385	-513.27078	1466.8919	684.02291	0
3	911.9797	616.68915	-469.49872	2631.1294	1226.9158	0
4	937.32655	615.3375	-471.44113	3601.662	1679.4826	0
5	961.9341	614.7131	-476.28124	4383.2621	2043.9487	0
6	985.80225	614.7731	-480.01903	5008.8032	2335.6433	0
7	1009.6707	615.4788	-524.04518	5518.7984	2573.458	0
8	1033.539	616.83185	-608.4562	5926.1686	2763.4178	0
9	1057.407	618.83525	-733.41528	6241.2644	2910.3494	0
10	1080.331	621.36325	-891.91466	7419.7548	5004.6878	0
11	1102.311	624.37105	-1079.5369	7514.8693	5068.8434	0
12	1124.291	627.94475	-1302.4834	7544.608	5088.9024	0
13	1146.271	632.0914	-1561.1733	7515.7692	5069.4503	0
14	1168.251	636.8192	-1856.1048	7433.9104	5014.2359	0
15	1190.231	642.13785	-2187.9185	7304.2281	4926.7641	0
16	1212.211	648.0585	-2557.2807	7131.1103	4809.9946	0
17	1234.1905	654.5938	-2964.9376	6918.5786	4666.6402	0
18	1256.17	661.75815	-3411.8883	6669.423	4498.5826	0
19	1278.15	669.5679	-3899.0733	6386.5308	4307.7694	0
20	1300.13	678.04155	-4427.6525	6073.2951	4096.4892	0
21	1322.11	687.19995	-4999.0939	5731.0862	3865.6664	0
22	1344.09	697.0666	-5614.2884	5362.262	3616.8914	0
23	1366.07	707.6681	-6275.8305	4968.4845	3351.2851	0

24	1388.05	719.0345	-6984.6471	4551.5942	3070.089	0
25	1410.03	731.19985	-7743.4921	4113.2242	2774.4048	0
26	1432.01	744.2029	-8554.653	3654.9335	2465.2838	0
27	1454.25	758.26325	-9431.3151	2979.072	2009.4094	0
28	1476.75	773.4554	-10378.774	2109.7991	1423.0774	0
29	1499.25	789.68885	-11391.134	1254.3147	846.04595	0
30	1521.75	807.0372	-12472.835	413.98843	279.23872	0

Slices of Slip Surface: 107

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	865.62775	620.83335	-574.92872	510.99112	344.66786	0
2	884.3796	618.32945	-477.68685	1535.9295	716.21569	0
3	910.62775	615.36705	-382.20468	2924.9785	1363.9399	0
4	936.8759	613.1588	-333.80129	4080.1187	1902.5906	0
5	961.35495	611.75075	-292.0943	4976.3106	2320.4917	0
6	984.0648	611.04595	-248.12872	5671.7275	2644.77	0
7	1006.7749	610.8978	-238.88645	6251.6539	2915.1941	0
8	1029.4845	611.30605	-264.3526	6728.6393	3137.616	0
9	1052.194	612.2714	-324.57546	7113.814	3317.2259	0
10	1074.904	613.79555	-419.66081	7416.3911	3458.32	0
11	1097.614	615.8813	-549.76265	7644.0351	3564.4721	0
12	1120.324	618.5325	-715.17439	7804.1653	3639.142	0
13	1143.653	621.85795	-922.1355	9040.2124	6097.7003	0
14	1167.6005	625.8964	-1174.0869	8993.8017	6066.3959	0
15	1191.548	630.5846	-1466.5247	8886.2823	5993.8731	0
16	1215.496	635.93265	-1800.1825	8724.6364	5884.8416	0
17	1239.444	641.9524	-2175.6888	8514.6878	5743.2295	0
18	1263.392	648.65755	-2593.9802	8260.7287	5571.9318	0

19	1287.3395	656.06365	-3055.9673	7966.7348	5373.6305	0
20	1311.287	664.18855	-3562.7982	7636.7604	5151.0599	0
21	1335.235	673.0526	-4115.8628	7273.3704	4905.9503	0
22	1359.183	682.6787	-4716.1216	6879.2504	4640.113	0
23	1383.1305	693.09295	-5365.7868	6456.8302	4355.1869	0
24	1407.078	704.32495	-6066.4979	6008.2962	4052.647	0
25	1431.026	716.4082	-6820.1086	5535.6487	3733.8422	0
26	1454.6875	729.21485	-7619.1606	4829.7604	3257.7145	0
27	1478.0625	742.7654	-8464.3759	3918.4343	2643.0173	0
28	1501.4375	757.2507	-9368.0443	3021.142	2037.786	0
29	1524.8125	772.7238	-10333.005	2138.2892	1442.2943	0
30	1548.1875	789.2461	-11363.566	1270.5923	857.02534	0
31	1571.5625	806.8889	-12463.68	419.13351	282.70912	0

Slices of Slip Surface: 101

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	871.25	624.04575	-794.73441	112.78993	76.07777	0
2	893.75	628.8619	-1171.8397	330.02895	222.60734	0
3	916.25	633.79435	-1556.1766	536.21164	361.67932	0
4	938.75	638.8435	-1947.8209	731.43511	493.35921	0
5	961.20455	643.999	-2307.815	915.44083	617.47263	0
6	983.61365	649.2608	-2636.1595	1088.3558	734.10526	0
7	1006.0226	654.63955	-2971.7689	1250.6434	843.56966	0
8	1028.4315	660.1356	-3314.7633	1402.3715	945.91153	0
9	1050.8405	665.7494	-3665.0388	1543.6501	1041.2051	0
10	1073.25	671.4814	-4022.7104	1674.5055	1129.4682	0
11	1095.6595	677.33205	-4387.848	1795.0954	1210.8071	0
12	1118.0685	683.3018	-4760.3883	1905.4481	1285.241	0

13	1140.4775	689.39115	-5140.3959	2005.5935	1352.7899	0
14	1162.8865	695.6006	-5527.8036	2095.6921	1413.5621	0
15	1185.2955	701.9306	-5922.5456	2175.7341	1467.5512	0
16	1207.7045	708.38165	-6325.4064	2245.8385	1514.8372	0
17	1230.1135	714.9543	-6735.4575	2306.0844	1555.4736	0
18	1252.5225	721.64915	-7153.0532	2356.5085	1589.485	0
19	1274.9315	728.4667	-7578.5434	2397.1489	1616.8974	0
20	1297.3405	735.40745	-8011.8444	2428.1298	1637.7942	0
21	1319.75	742.47205	-8452.4556	2449.4515	1652.1759	0
22	1342.1595	749.6611	-8901.1411	2461.2409	1660.1279	0
23	1364.5685	756.97515	-9357.3895	2463.5417	1661.6799	0
24	1386.9775	764.41485	-9821.5366	2456.3997	1656.8625	0
25	1409.3865	771.98085	-10293.914	2439.862	1645.7077	0
26	1431.7955	779.67375	-10774.004	2414.0197	1628.2768	0
27	1454.25	787.5104	-11262.707	2102.2825	1418.0075	0
28	1476.75	795.492	-11760.777	1507.8134	1017.033	0
29	1499.25	803.60365	-12267.045	908.3637	612.69906	0
30	1521.75	811.84605	-12781.396	304.02095	205.06472	0

Slices of Slip Surface: 3

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	758.4892	618.66895	-75.834656	252.23898	117.62097	0
2	761.00755	617.3225	-0.86254289	5118.6296	0	5001.3
3	774.2775	610.7271	378.40146	5606.1981	0	5052.3
4	800.75915	598.3632	1058.8969	6424.729	0	5144.9
5	826.47575	587.8135	1627.7459	7048.7863	0	5223.8
6	846.97575	580.31675	2019.7015	5240.2525	2012.4236	70
7	866.75	574.04095	2348.3049	6521.9375	2607.9751	70

8	890.25	567.4733	2677.8462	8207.0673	3455.0408	70
9	913.75	561.9334	2943.3155	9572.3701	4142.293	70
10	937.25	557.392	3146.535	10676.867	4705.4736	70
11	949.5	555.2923	3228.3232	11164.848	4959.2914	70
12	962.32505	553.63325	3338.2955	11603.888	5164.9155	70
13	986.9752	550.98795	3503.2251	12301.966	5498.0634	70
14	1011.6252	549.3811	3603.4579	12828.244	5764.286	70
15	1036.2755	548.80425	3639.4222	13200.151	5974.2066	70
16	1060.926	549.2543	3611.3646	13431.301	6136.1773	70
17	1085.576	550.73365	3519.0886	13533.183	6257.5009	70
18	1110.226	553.25015	3362.1717	13512.942	6342.9054	70
19	1134.876	556.81715	3139.7334	13377.34	6397.1668	70
20	1159.526	561.4541	2850.5858	13131.051	6423.9478	70
21	1184.176	567.187	2493.1313	12776.762	6425.9259	70
22	1208.7015	574.0086	2067.6026	12316.631	0	5327.2
23	1233.103	581.9484	1572.5341	11939.947	0	5267.7
24	1257.5045	591.08515	1002.8654	11478.117	0	5199.2
25	1281.9055	601.4798	354.82785	10929.325	0	5121.3
26	1294.1545	607.02325	-1.4493685	10622.244	0	5078.5
27	1306.898	613.52325	-395.02592	10294.668	4800.4826	0
28	1331.934	627.0628	-1239.6463	9333.9151	6295.8053	0
29	1356.6155	642.01035	-2171.2428	8514.9587	5743.4122	0
30	1381.2965	658.68395	-3210.2193	7637.8953	5151.8254	0
31	1405.978	677.2707	-4368.2684	6704.0609	4521.9462	0
32	1430.6595	698.01285	-5659.9456	5714.8053	3854.6848	0
33	1458	724.07495	-7271.6236	4321.3335	2914.7763	0
34	1488	756.76815	-9302.3165	2570.3115	1733.697	0
35	1518	795.17175	-11682.556	842.49708	568.27145	0

Slices of Slip Surface: 103

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	861.79545	620.83335	-562.73875	416.28219	280.78588	0
2	874.35175	615.33885	-254.06914	1960.75	914.31276	0
3	885.30915	610.5978	-4.3162982	6363.2171	0	5051.7
4	896.08805	606.47915	224.06038	6930.326	0	5083.6
5	917.2528	598.90665	624.19198	7933.1399	0	5140.3
6	938.4176	592.3233	962.65376	8804.843	0	5189.7
7	949.5	589.1413	1116.1249	9213.2025	0	5212.6
8	961.091	586.3365	1297.2767	9607.5258	0	5234.6
9	983.273	581.48835	1599.5842	10274.036	0	5271
10	1005.455	577.62115	1840.7194	10831.929	0	5299.9
11	1027.0625	574.76475	2018.0713	11691.281	6044.492	70
12	1048.095	572.85625	2137.0908	12101.993	6226.7618	70
13	1069.1275	571.78705	2203.7922	12387.748	6363.6419	70
14	1090.1605	571.55215	2218.4581	12561.041	6462.7634	70
15	1111.1935	572.1504	2181.1062	12630.956	6529.7909	70
16	1132.7845	573.64565	2088.5924	12243.147	0	5329.7
17	1154.934	576.09125	1936.0799	12211.666	0	5311.4
18	1177.084	579.48505	1724.4784	12104.122	0	5286
19	1199.234	583.84575	1452.5355	11921.304	0	5253.3
20	1221.384	589.19795	1118.8284	11664.883	0	5213.2
21	1243.534	595.5731	721.33154	11334.841	0	5165.4
22	1265.6835	603.0104	257.5987	10930.489	0	5109.7
23	1276.8315	607.02835	-1.7673708	10701.004	0	5078.5
24	1292.233	613.52835	-389.74096	10341.912	4822.5128	0
25	1318.8475	625.51425	-1144.9672	9608.1249	6480.7621	0
26	1341.4205	637.22845	-1875.1577	8896.8952	6001.0316	0
27	1363.9935	650.3713	-2694.2525	8135.4646	5487.4401	0
28	1386.567	665.07195	-3610.3443	7325.6008	4941.1802	0
29	1409.1405	681.4942	-4633.3254	6468.4553	4363.0282	0

30	1431.7135	699.84975	-5776.5608	5565.5142	3753.9867	0
31	1454.25	720.38145	-7055.1929	4445.9747	2998.8478	0
32	1476.75	743.4628	-8491.4486	3148.3221	2123.57	0
33	1499.25	769.6659	-10120.363	1864.7395	1257.7827	0
34	1521.75	799.81415	-11991.753	609.27518	410.9613	0

Slices of Slip Surface: 28

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	786.19875	617.88155	-120.17797	389.14872	181.46303	0
2	790.39	615.7329	-1.6796209	5092.3148	0	5013.2
3	802.22505	610.1164	318.6704	5492.9415	0	5056.5
4	824.25	600.18305	860.66604	6130.5504	0	5130.7
5	844.75	591.9447	1304.6266	6613.1968	0	5192.5
6	864.80365	584.74015	1685.1042	7296.9002	0	5246.4
7	887.00605	577.7864	2046.7311	6966.8792	3074.4497	70
8	911.8036	571.0974	2379.4159	8626.6847	3903.7268	70
9	936.6012	565.5734	2639.4459	9945.423	4565.2812	70
10	949.5	563.0099	2746.651	10520.179	4857.4392	70
11	963.12045	560.9334	2884.1977	11038.353	5095.2815	70
12	989.36145	557.56795	3094.0228	11856.827	5475.6076	70
13	1015.6025	555.4168	3228.1379	12466.507	5772.7735	70
14	1041.8435	554.46625	3287.4144	12892.09	6001.6676	70
15	1068.0845	554.7104	3272.1984	13152.473	6173.8805	70
16	1094.3255	556.1508	3182.3894	13262.109	6298.5077	70
17	1120.566	558.7965	3017.4055	13231.402	6382.4133	70
18	1146.8065	562.6643	2776.2534	13067.705	6430.8126	70
19	1173.0475	567.7794	2457.3499	12776.79	6448.3019	70
20	1199.2275	574.1584	2059.5378	12318.109	0	5326.2

21	1225.3465	581.83975	1580.6501	11968.279	0	5268.7
22	1251.466	590.89145	1016.3852	11518.793	0	5200.9
23	1277.5855	601.38385	362.33821	10968.617	0	5122.3
24	1290.6975	607.02425	-1.5128876	10656.612	0	5078.5
25	1303.939	613.52425	-394.12451	10323.864	4814.0968	0
26	1329.715	626.98825	-1234.4363	9396.4812	6338.0066	0
27	1354.8895	641.82355	-2158.9582	8571.9274	5781.838	0
28	1380.064	658.46345	-3195.7825	7684.934	5183.5534	0
29	1405.2385	677.1072	-4357.0136	6737.263	4544.3413	0
30	1430.413	698.01505	-5659.0791	5730.0973	3864.9994	0
31	1454.25	720.13755	-7040.9327	4547.269	3067.1717	0
32	1476.75	743.59015	-8500.7613	3230.5462	2179.0309	0
33	1499.25	769.96795	-10141.328	1920.6677	1295.5067	0
34	1521.75	799.97935	-12005.968	630.77619	425.46391	0

SLOPE/W

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File Information

Revision Number: 27
Date: 3/4/2008
Time: 8:54:56 AM
File Name: NSIntStaticLtoRStagedFillCase1_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\Internal\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Auto-Search
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °

Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Dry)

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	11,12,13,14,15,16,17,18
Region 3	Dike I	18,17,16,19,20
Region 4	Dike III	3,11,12,13,14,7,8,9,10,6,32,2
Region 5	Saprolite	5,4,3,11,18,20,19,21,22,23,36,38,24,25,26,27,28,29
Region 6	PWR	31,29,28,27,26,25,24,38,39
Region 7	Ash (Dry)	14,7,40,42,37,35,34,33
Region 8	Ash (Dry)	35,34,33,14,15,16,19,21,22,23,36
Region 9	Ash Fill	40,41,43,42

Points

	X	Y
Point 1	0	640
Point 2	630	640

Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	655	645
Point 7	755	620
Point 8	740	625
Point 9	715	625
Point 10	685	630
Point 11	540	575
Point 12	640	625
Point 13	655	625
Point 14	665	620
Point 15	685	610
Point 16	655	610
Point 17	640	610
Point 18	570	575
Point 19	716	585.75
Point 20	650	575
Point 21	730	588
Point 22	950	578
Point 23	1400	564
Point 24	1400	550
Point 25	950	548
Point 26	740	537
Point 27	650	555
Point 28	350	566
Point 29	0	566
Point 30	1400	530
Point 31	0	530
Point 32	640	645
Point 33	730	619

Point 34	950	607
Point 35	2400	607
Point 36	2400	564
Point 37	2400	620
Point 38	2400	550
Point 39	2400	530
Point 40	855	620
Point 41	885	630
Point 42	1565	620
Point 43	1535	630

Tension Crack

Tension Crack Option: (none)

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
- Material: RAB Ash

Material: Ash Fill
Material: Dike II
Material: Dike I
Material: Fill
Material: Alluvium
Material: Saprolite
Material: PWR
Material: Dike III
Material: Ash (Dry)

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.077	(1544.19, 715.963)	19.17588	(1529.94, 630)	(1568.4, 620)
2	903	3.966	(1544.19, 715.963)	101.115	(1490.95, 630)	(1576.06, 620)

Slices of Slip Surface: Optimized

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1530.7365	629.2079	-1385.7651	47.848788	32.274415	0
2	1532.098	627.79635	-1297.7047	128.41305	86.615693	0
3	1533.232	626.55745	-1220.3675	200.60631	135.31067	0
4	1534.3995	625.35775	-1145.4943	283.811	191.43294	0
5	1535.3435	624.4456	-1088.6289	332.57614	224.32544	0
6	1536.354	623.54055	-1032.1332	383.19721	258.46978	0
7	1537.6875	622.39425	-960.59469	427.9571	288.66071	0
8	1539.021	621.24795	-889.0562	472.717	318.85164	0

9	1540.131	620.3374	-832.24909	528.19434	356.27158	0
10	1540.817	619.90135	-805.05091	646.6768	301.55034	0
11	1541.6105	619.63495	-788.42322	675.04251	314.77749	0
12	1542.711	619.29945	-767.48217	672.45204	313.56954	0
13	1543.811	618.96395	-746.54981	669.86158	312.36158	0
14	1544.996	618.64975	-726.9472	685.22975	319.52788	0
15	1546.266	618.35685	-708.66704	674.08668	314.33178	0
16	1547.5355	618.064	-690.39455	662.95129	309.13926	0
17	1548.8595	617.81575	-674.89951	671.37525	313.06742	0
18	1550.238	617.61205	-662.18777	648.6793	302.48413	0
19	1551.616	617.40835	-649.4832	625.98335	291.90083	0
20	1552.8945	617.26605	-640.60223	623.76744	290.86753	0
21	1554.073	617.1852	-635.55771	595.00695	277.4563	0
22	1555.2515	617.10435	-630.5132	566.25492	264.04901	0
23	1556.536	617.06125	-627.81995	547.92776	255.50291	0
24	1557.926	617.05595	-627.48899	504.36263	235.18816	0
25	1559.365	617.1316	-632.21687	477.49955	222.6617	0
26	1560.853	617.2882	-641.98863	411.85765	192.05238	0
27	1562.2095	617.5248	-656.75064	372.62139	173.75621	0
28	1563.435	617.8414	-676.50159	293.28578	136.76141	0
29	1564.524	618.21145	-699.59341	238.55882	111.24181	0
30	1565.7985	618.77845	-734.97909	149.64996	69.782921	0
31	1567.497	619.56685	-784.17295	54.330875	25.334903	0

Slices of Slip Surface: 903

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1492.284	629.20075	-1384.4668	63.379924	42.750299	0
2	1494.956	627.6566	-1288.1608	185.59335	125.18429	0

3	1497.628	626.21855	-1198.4484	301.79626	203.56415	0
4	1500.3	624.88165	-1115.056	412.05221	277.93272	0
5	1502.972	623.6414	-1037.6973	516.42235	348.33127	0
6	1505.644	622.49395	-966.13962	614.93878	414.78145	0
7	1508.316	621.436	-900.13271	707.692	477.34428	0
8	1510.988	620.4645	-839.53351	794.67591	536.01567	0
9	1513.741	619.5524	-782.54279	886.62616	413.44057	0
10	1516.5755	618.7024	-729.54231	965.64157	450.28606	0
11	1519.41	617.9417	-682.09693	1037.9721	484.01434	0
12	1522.2445	617.2683	-640.08546	1103.6111	514.62229	0
13	1525.079	616.6804	-603.40112	1162.5639	542.11245	0
14	1527.9135	616.1764	-571.9588	1214.8771	566.50651	0
15	1530.748	615.7551	-545.66682	1260.4603	587.76228	0
16	1533.5825	615.4155	-524.50104	1299.2891	605.86844	0
17	1536.3635	615.1601	-508.59713	1290.0813	601.5748	0
18	1539.091	614.98535	-497.72395	1232.2989	574.63041	0
19	1541.8185	614.8845	-491.40319	1167.0001	544.18109	0
20	1544.5455	614.8573	-489.73884	1094.0935	510.18418	0
21	1547.2725	614.9037	-492.62925	1013.4779	472.59249	0
22	1550	615.02375	-500.097	924.97081	431.32097	0
23	1552.7275	615.21775	-512.21516	828.38563	386.28257	0
24	1555.4545	615.4862	-528.95999	723.49862	337.37295	0
25	1558.1815	615.82965	-550.39229	610.16307	284.52371	0
26	1560.909	616.24885	-576.51091	488.02555	227.57005	0
27	1563.6365	616.74475	-607.46626	356.80862	166.38259	0
28	1566.382	617.32295	-643.49992	259.71885	121.10889	0
29	1569.146	617.9859	-684.85587	197.1831	91.947989	0
30	1571.91	618.7319	-731.41083	125.53978	58.540162	0
31	1574.674	619.56295	-783.24767	44.341607	20.676831	0

SLOPE/W

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File Information

Revision Number: 26
Date: 3/4/2008
Time: 8:57:48 AM
File Name: NSIntStaticLtoRStagedFillCase2_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\Internal\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
    Minimum Slice Thickness: 0.1
    Ignore seismic load in strength: No
Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
    Optimization Maximum Iterations: 10000
    Optimization Convergence Tolerance: 1e-007
    Starting Optimization Points: 8
    Ending Optimization Points: 16
    Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °
Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Dry)

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	11,12,13,14,15,16,17,18
Region 3	Dike I	18,17,16,19,20
Region 4	Dike III	3,11,12,13,14,6,7,8,9,10,32,2
Region 5	Saprolite	5,4,3,11,18,20,19,21,22,23,36,38,24,25,26,27,28,29
Region 6	PWR	31,29,28,27,26,25,24,38,39
Region 7	Ash (Dry)	14,6,40,43,37,35,34,33
Region 8	Ash (Dry)	35,34,33,14,15,16,19,21,22,23,36
Region 9	RAB Ash	40,41,42,43

Points

	X	Y
Point 1	0	640
Point 2	630	640
Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	755	620
Point 7	740	625
Point 8	715	625
Point 9	700	630

Point 10	685	630
Point 11	540	575
Point 12	640	625
Point 13	655	625
Point 14	665	620
Point 15	685	610
Point 16	655	610
Point 17	640	610
Point 18	570	575
Point 19	716	585.75
Point 20	650	575
Point 21	730	588
Point 22	950	578
Point 23	1400	564
Point 24	1400	550
Point 25	950	548
Point 26	740	537
Point 27	650	555
Point 28	350	566
Point 29	0	566
Point 30	1400	530
Point 31	0	530
Point 32	640	645
Point 33	730	619
Point 34	950	607
Point 35	2400	607
Point 36	2400	564
Point 37	2400	620
Point 38	2400	550
Point 39	2400	530
Point 40	855	620
Point 41	945	650

Point 42	1475	650
Point 43	1565	620

Tension Crack

Tension Crack Option: (none)

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (1346, 650)
Left-Zone Right Coordinate: (1467.4377, 650)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1551, 624.66667)
Right-Zone Right Coordinate: (1711, 620)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered

Material: RAB Ash
Material: Ash Fill
Material: Dike II
Material: Dike I
Material: Fill
Material: Alluvium
Material: Saprolite
Material: PWR
Material: Dike III
Material: Ash (Dry)

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.448	(1679.74, 1199.82)	46.51764	(1467.44, 650)	(1565.16, 620)
2	101	1.488	(1679.74, 1199.82)	589.382	(1467.44, 650)	(1551, 624.667)

Slices of Slip Surface: Optimized

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1469.589	649.4564	-2649.2117	46.17925	21.533738	0
2	1472.934	648.5098	-2590.2305	120.44889	56.166242	0
3	1474.564	647.92445	-2553.6823	160.34724	74.771148	0
4	1476.5605	647.0893	-2501.5815	184.69425	86.124341	0
5	1479.681	645.78365	-2420.1101	205.19809	95.685442	0
6	1482.8015	644.478	-2338.6386	225.70194	105.24654	0
7	1486.015	643.1727	-2257.1743	246.99061	115.17361	0
8	1489.3215	641.8677	-2175.733	262.86814	122.57743	0

9	1492.3935	640.68165	-2101.7286	278.42387	129.83118	0
10	1495.231	639.61455	-2035.16	288.01002	134.30128	0
11	1498.0685	638.5475	-1968.5584	297.59947	138.77291	0
12	1500.9085	637.50445	-1903.4702	308.24871	143.73874	0
13	1503.751	636.4854	-1839.881	313.97174	146.40743	0
14	1506.593	635.46635	-1776.2918	319.69477	149.07612	0
15	1509.404	634.4821	-1714.8929	326.61045	152.30096	0
16	1512.1845	633.5327	-1655.6355	328.43481	153.15167	0
17	1515.4465	632.4366	-1587.234	330.94524	154.3223	0
18	1519.1895	631.19375	-1509.7016	330.53958	154.13314	0
19	1522.671	630.0713	-1439.6595	331.40552	154.53693	0
20	1525.8905	629.06925	-1377.1095	325.56277	151.81241	0
21	1529.1095	628.06715	-1314.5891	319.74968	149.10173	0
22	1532.19	627.1415	-1256.8213	315.57204	147.15366	0
23	1535.132	626.2923	-1203.851	304.63834	142.05519	0
24	1538.074	625.4431	-1150.848	293.70789	136.95824	0
25	1541.2095	624.58435	-1097.2656	282.83795	131.8895	0
26	1544.5385	623.71605	-1043.0811	262.44318	122.37927	0
27	1547.867	622.8477	-988.89653	242.04841	112.86903	0
28	1550.953	622.11055	-942.89066	223.79378	104.35675	0
29	1553.7965	621.5046	-905.08835	194.05069	90.487325	0
30	1556.6395	620.8986	-867.28604	164.30417	76.616291	0
31	1560.314	620.2978	-829.77992	115.77178	53.985268	0
32	1562.8405	619.96385	-808.93851	69.2426	32.288355	0
33	1564.057	619.96105	-808.78172	36.297683	16.925888	0
34	1565.0795	619.9972	-811.02261	0.28853144	0.13454442	0

Slices of Slip Surface: 101

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)

1	1468.698	649.51665	-2652.9451	38.495558	17.950774	0
2	1471.2185	648.5565	-2593.0117	114.97575	53.614074	0
3	1473.7395	647.6095	-2533.9458	190.75863	88.952212	0
4	1476.4075	646.622	-2472.3011	232.70835	108.51368	0
5	1479.2225	645.5955	-2408.2379	240.3895	112.09546	0
6	1482.037	644.5851	-2345.1904	246.80843	115.08866	0
7	1484.8515	643.5908	-2283.1392	251.96104	117.49136	0
8	1487.6665	642.61255	-2222.0968	255.84677	119.30331	0
9	1490.4815	641.65015	-2162.0438	258.46215	120.52288	0
10	1493.2965	640.70355	-2102.9913	259.80031	121.14687	0
11	1496.1115	639.77275	-2044.8838	259.85806	121.1738	0
12	1498.926	638.85765	-1987.8016	258.6394	120.60553	0
13	1501.7405	637.9581	-1931.6538	256.13142	119.43604	0
14	1504.5555	637.07405	-1876.4851	252.33501	117.66575	0
15	1507.3705	636.20545	-1822.3074	247.24811	115.29369	0
16	1510.1855	635.35225	-1769.0618	240.86174	112.31567	0
17	1513	634.51435	-1716.759	233.17759	108.7325	0
18	1515.8145	633.69165	-1665.4433	224.18733	104.54027	0
19	1518.6295	632.88415	-1615.0556	213.88953	99.738324	0
20	1521.4445	632.09175	-1565.605	202.27959	94.324522	0
21	1524.2595	631.3144	-1517.1011	189.35322	88.296857	0
22	1527.074	630.55205	-1469.518	175.10618	81.65335	0
23	1529.8885	629.80455	-1422.8988	159.5311	74.390573	0
24	1532.7035	629.07195	-1377.1823	142.63097	66.509913	0
25	1535.5185	628.35415	-1332.378	124.39203	58.004954	0
26	1538.3335	627.6511	-1288.5267	104.81415	48.875642	0
27	1541.1485	626.96275	-1245.5676	83.890735	39.118892	0
28	1543.963	626.289	-1203.5081	61.618729	28.733285	0
29	1546.7775	625.6299	-1162.3895	37.991809	17.715872	0
30	1549.5925	624.98535	-1122.1846	13.004896	6.0642824	0

SLOPE/W

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File Information

Revision Number: 25
Date: 3/4/2008
Time: 9:00:39 AM
File Name: NSIntStaticLtoRStagedFillCase3_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\Internal\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Entry and Exit
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °

Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Dry)

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	11,12,13,14,15,16,17,18
Region 3	Dike I	18,17,16,19,20
Region 4	Dike III	3,11,12,13,14,6,7,8,9,10,32,2
Region 5	Saprolite	5,4,3,11,18,20,19,21,22,23,36,38,24,25,26,27,28,29
Region 6	PWR	31,29,28,27,26,25,24,38,39
Region 7	Ash (Dry)	14,6,40,43,37,35,34,33
Region 8	Ash (Dry)	35,34,33,14,15,16,19,21,22,23,36
Region 9	Ash Fill	40,41,42,43

Points

	X	Y
Point 1	0	640
Point 2	630	640

Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	755	620
Point 7	740	625
Point 8	715	625
Point 9	700	630
Point 10	685	630
Point 11	540	575
Point 12	640	625
Point 13	655	625
Point 14	665	620
Point 15	685	610
Point 16	655	610
Point 17	640	610
Point 18	570	575
Point 19	716	585.75
Point 20	650	575
Point 21	730	588
Point 22	950	578
Point 23	1400	564
Point 24	1400	550
Point 25	950	548
Point 26	740	537
Point 27	650	555
Point 28	350	566
Point 29	0	566
Point 30	1400	530
Point 31	0	530
Point 32	640	645
Point 33	730	619

Point 34	950	607
Point 35	2400	607
Point 36	2400	564
Point 37	2400	620
Point 38	2400	550
Point 39	2400	530
Point 40	855	620
Point 41	1005	670
Point 42	1415	670
Point 43	1565	620

Tension Crack

Tension Crack Option: (none)

Slip Surface Entry and Exit

Left-Zone Increment: 4
Left Projection: Range
Left-Zone Left Coordinate: (1331, 670)
Left-Zone Right Coordinate: (1434, 663.66667)
Right-Zone Increment: 4
Right Projection: Range
Right-Zone Left Coordinate: (1536, 629.66667)
Right-Zone Right Coordinate: (1752, 620)
Radius Increments: 4

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
- Material: RAB Ash
- Material: Ash Fill
- Material: Dike II
- Material: Dike I
- Material: Fill
- Material: Alluvium
- Material: Saprolite
- Material: PWR
- Material: Dike III
- Material: Ash (Dry)

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.918	(1527.07, 746.234)	84.95558	(1411.02, 670)	(1574.48, 620)
2	83	1.997	(1527.07, 746.234)	140.528	(1409.02, 670)	(1588.82, 620)

Slices of Slip Surface: **Optimized**

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1413.0095	667.8904	-3799.5578	120.17912	81.061838	0
2	1416.0855	664.63	-3596.0674	285.29623	192.43474	0
3	1418.9895	661.85925	-3423.309	416.75512	281.10488	0
4	1423.1005	658.55615	-3217.0757	574.46399	387.48085	0
5	1427.6855	655.1899	-3006.9874	695.22519	468.93531	0
6	1432.271	651.82365	-2797.0749	815.96882	550.37792	0
7	1437.0215	648.4816	-2588.4216	958.18814	646.30606	0
8	1441.9365	645.1638	-2381.3479	1071.6908	722.8646	0
9	1446.8515	641.84605	-2174.4428	1185.1767	799.41177	0
10	1451.767	638.5283	-1967.369	1298.6794	875.97032	0
11	1456.663	635.29335	-1765.4209	1426.7012	962.3221	0
12	1461.5385	632.14125	-1568.8133	1531.3347	1032.8983	0
13	1466.721	628.80795	-1360.8178	1646.4635	1110.5537	0
14	1472.211	625.29345	-1141.5092	1762.2928	1188.6815	0
15	1477.7005	621.7789	-922.20061	1877.9687	1266.7059	0
16	1480.4825	620.0108	-811.87615	2342.6492	1580.1368	0
17	1480.842	619.9076	-805.43816	2339.8237	1091.0777	0
18	1483.814	619.2107	-761.94548	2385.0575	1112.1706	0
19	1489.1145	618.00165	-686.50879	2337.2312	1089.8688	0
20	1494.415	616.79255	-611.05371	2289.5889	1067.6529	0
21	1499.5845	615.75225	-546.13543	2295.4935	1070.4062	0
22	1504.6235	614.88075	-491.75458	2224.3154	1037.2153	0
23	1509.6625	614.00925	-437.37374	2153.1373	1004.0244	0
24	1515.285	613.22065	-388.17491	2123.4594	990.18537	0
25	1521.4915	612.51495	-344.13362	1999.3881	932.33	0
26	1527.6985	612.0106	-312.65484	1924.7849	897.54192	0
27	1533.9055	611.70765	-293.76263	1758.3918	819.95156	0
28	1541.086	611.686	-292.40519	1607.4624	749.57204	0
29	1549.1475	612.2415	-327.07197	1346.6935	627.97351	0

30	1557.198	613.59055	-411.24813	1004.4445	468.38017	0
31	1563.132	615.28895	-517.22808	678.93139	316.59091	0
32	1567.3715	617.048	-627.00375	375.7738	175.2262	0
33	1572.114	619.016	-749.79483	125.25858	58.409036	0

Slices of Slip Surface: 83

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1412.0105	665.7272	-3654.0172	224.65319	151.53049	0
2	1418.145	657.58945	-3148.0492	624.78444	421.42242	0
3	1424.4355	650.35745	-2698.5651	957.99495	646.17576	0
4	1430.726	644.02555	-2304.7284	1264.3795	852.83477	0
5	1437.0165	638.43315	-1956.6072	1543.8168	1041.3176	0
6	1443.307	633.4692	-1647.4027	1796.691	1211.8834	0
7	1449.5975	629.0533	-1372.3174	2023.4721	1364.8491	0
8	1455.888	625.1251	-1127.5823	2224.606	1500.5157	0
9	1462.1785	621.6382	-910.27679	2400.2807	1619.0098	0
10	1468.3755	618.59655	-720.86744	2591.8662	1208.6071	0
11	1474.479	615.961	-556.56863	2703.2422	1260.5425	0
12	1480.583	613.65875	-413.04389	2789.6463	1300.8334	0
13	1486.6865	611.6726	-289.21479	2850.7239	1329.3144	0
14	1492.79	609.9887	-184.22789	2886.3853	1345.9436	0
15	1498.8935	608.59595	-97.388627	2896.14	1350.4923	0
16	1504.997	607.48555	-28.15304	2879.6964	1342.8245	0
17	1511.22	606.6399	24.745883	2834.1438	1310.0438	0
18	1517.5615	606.0646	60.616434	2756.7798	1257.2416	0
19	1523.903	605.77785	78.496541	2647.8159	1198.0933	0
20	1530.2445	605.77785	78.496541	2506.4162	1132.1575	0
21	1536.586	606.0646	60.616434	2331.0867	1058.7377	0

22	1542.9275	606.6399	24.745883	2119.8895	976.98149	0
23	1549.2485	607.50355	-29.133072	1868.027	871.07531	0
24	1555.549	608.65915	-101.18353	1569.6284	731.92975	0
25	1561.8495	610.11605	-192.01995	1221.1442	569.42887	0
26	1567.978	611.82715	-298.96821	942.13373	439.32418	0
27	1573.934	613.787	-421.16566	740.84637	345.46234	0
28	1579.89	616.04875	-562.17366	489.80173	228.3983	0
29	1585.8455	618.62845	-722.98549	180.2584	84.055874	0

SLOPE/W

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File Information

Revision Number: 32
Date: 3/4/2008
Time: 9:02:52 AM
File Name: NSIntStaticLtoRStagedFillCase4_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\Internal\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Auto-Search
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °

Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Dry)

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	11,12,13,14,15,16,17,18
Region 3	Dike I	18,17,16,19,20
Region 4	Dike III	3,11,12,13,14,6,7,8,9,10,32,2
Region 5	Saprolite	5,4,3,11,18,20,19,21,22,23,36,38,24,25,26,27,28,29
Region 6	PWR	31,29,28,27,26,25,24,38,39
Region 7	Ash (Dry)	14,6,40,43,37,35,34,33
Region 8	Ash (Dry)	35,34,33,14,15,16,19,21,22,23,36
Region 9	Ash Fill	40,41,42,43

Points

	X	Y
Point 1	0	640
Point 2	630	640

Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	755	620
Point 7	740	625
Point 8	715	625
Point 9	700	630
Point 10	685	630
Point 11	540	575
Point 12	640	625
Point 13	655	625
Point 14	665	620
Point 15	685	610
Point 16	655	610
Point 17	640	610
Point 18	570	575
Point 19	716	585.75
Point 20	650	575
Point 21	730	588
Point 22	950	578
Point 23	1400	564
Point 24	1400	550
Point 25	950	548
Point 26	740	537
Point 27	650	555
Point 28	350	566
Point 29	0	566
Point 30	1400	530
Point 31	0	530
Point 32	640	645
Point 33	730	619

Point 34	950	607
Point 35	2400	607
Point 36	2400	564
Point 37	2400	620
Point 38	2400	550
Point 39	2400	530
Point 40	855	620
Point 41	1065	690
Point 42	1355	690
Point 43	1565	620

Tension Crack

Tension Crack Option: (none)

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
- Material: RAB Ash

Material: Ash Fill
Material: Dike II
Material: Dike I
Material: Fill
Material: Alluvium
Material: Saprolite
Material: PWR
Material: Dike III
Material: Ash (Dry)

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.896	(1523.88, 776.372)	111.8505	(1354.68, 690)	(1573.92, 620)
2	915	1.950	(1523.88, 776.372)	166.1	(1389.74, 678.42)	(1579.89, 620)

Slices of Slip Surface: Optimized

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1354.8375	689.90555	-5173.3044	6.6627905	4.4941089	0
2	1358.081	688.0209	-5055.7303	67.170252	45.306907	0
3	1364.2425	684.4405	-4832.3347	174.85763	117.94296	0
4	1370.404	680.8601	-4608.939	282.55624	190.58659	0
5	1376.931	677.13895	-4376.7321	395.83755	266.9958	0
6	1383.8225	673.27705	-4135.7182	507.42042	342.25939	0
7	1390.714	669.41515	-3894.7043	619.00329	417.52299	0
8	1397.2695	665.74595	-3665.7448	725.35966	489.26127	0

9	1403.489	662.26945	-3448.7671	825.51187	556.81478	0
10	1410.4825	658.3546	-3204.509	937.81195	632.56215	0
11	1418.2495	654.0014	-2932.9367	1063.6135	717.41638	0
12	1425.782	649.7792	-2669.3835	1185.5892	799.69001	0
13	1433.08	645.688	-2414.0865	1303.8553	879.4615	0
14	1440.2075	641.683	-2164.252	1417.9539	956.42196	0
15	1447.1645	637.7642	-1919.6606	1531.9212	1033.2939	0
16	1453.44	634.22025	-1698.4845	1632.536	1101.1594	0
17	1459.034	631.05115	-1500.7946	1725.2372	1163.6872	0
18	1466.001	627.10125	-1254.2814	1840.2246	1241.2472	0
19	1474.3405	622.37055	-959.11956	1978.836	1334.7417	0
20	1478.5225	620.0026	-811.36765	2512.1422	1694.4613	0
21	1482.617	619.12715	-756.73836	2445.4882	1140.3499	0
22	1490.7815	617.3815	-647.80646	2361.1693	1101.0313	0
23	1498.959	615.869	-553.42472	2327.4792	1085.3214	0
24	1507.1495	614.5896	-473.59028	2198.2821	1025.0758	0
25	1514.9205	613.60035	-411.86614	2126.7698	991.72906	0
26	1522.2715	612.90125	-368.23385	1965.4847	916.52057	0
27	1529.2565	612.4637	-340.92819	1863.5354	868.98082	0
28	1535.875	612.2877	-329.94756	1668.9955	778.26536	0
29	1544.6575	612.5193	-344.39864	1438.1863	670.63727	0
30	1555.5825	613.8248	-425.86604	1016.2446	473.88263	0
31	1563.017	615.6091	-537.21831	646.81843	301.61639	0
32	1569.4615	618.20375	-699.10979	229.97676	107.23992	0

Slices of Slip Surface: 915

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1392.9945	674.24775	-4187.6795	168.28551	113.51001	0

2	1399.5055	666.3932	-3699.2669	491.34703	331.41776	0
3	1406.017	659.42995	-3265.9317	794.37079	535.80986	0
4	1412.5285	653.20515	-2878.3483	1076.1371	725.86363	0
5	1419.04	647.6108	-2529.8482	1336.1933	901.27377	0
6	1425.5515	642.56735	-2215.6001	1574.2454	1061.842	0
7	1432.0625	638.0142	-1931.8052	1790.4192	1207.653	0
8	1438.574	633.90415	-1675.6042	1984.5594	1338.6022	0
9	1445.0855	630.19965	-1444.7531	2156.5859	1454.6356	0
10	1451.5965	626.87045	-1237.1843	2306.6124	1555.8297	0
11	1458.108	623.8919	-1051.4857	2434.3368	1641.9809	0
12	1464.6195	621.24375	-886.36326	2539.5777	1712.9668	0
13	1471.1125	618.915	-741.18891	2630.9651	1226.8392	0
14	1477.5875	616.8902	-614.92724	2678.2845	1248.9046	0
15	1484.0625	615.15075	-506.46017	2701.3408	1259.6559	0
16	1490.5375	613.68755	-415.20135	2699.8299	1258.9514	0
17	1497.0125	612.49315	-340.72542	2673.0136	1246.4467	0
18	1503.4875	611.56165	-282.62909	2620.1545	1221.7981	0
19	1509.9625	610.8887	-240.66376	2540.2114	1184.52	0
20	1516.4375	610.4711	-214.62763	2432.1482	1134.1293	0
21	1522.9125	610.3069	-204.38523	2294.3342	1069.8656	0
22	1529.3875	610.39535	-209.89457	2125.0301	990.91782	0
23	1535.8625	610.73685	-231.19614	1922.5784	896.51303	0
24	1542.3375	611.33305	-268.37968	1684.2218	785.36551	0
25	1548.8125	612.18665	-321.60566	1406.9637	656.07794	0
26	1555.2875	613.3017	-391.14947	1087.33	507.03032	0
27	1561.7625	614.68365	-477.32905	720.83513	336.13094	0
28	1568.7225	616.4861	-589.01141	411.8903	192.0676	0
29	1576.1675	618.76505	-731.09891	153.94709	71.786708	0

SLOPE/W

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File Information

Revision Number: 34
Date: 3/4/2008
Time: 9:05:20 AM
File Name: NSIntStaticLtoRStagedFillCase5_Slope3to1.gsz
Directory: S:\1356\PROJECTS\2006\1356-06-825 Duke Power - Allen Steam Station Ash Landfill\Calculations\Slope Stability\SLOPEW\North-South\Internal\

SLOPE/W

Kind: SLOPE/W
Method: Spencer
Convergence
- Minimum Slice Thickness: 0.1
- Ignore seismic load in strength: No

Number of Slices: 30
Optimization Tolerance: 0.01
Direction of movement: Left to Right
Allow Passive Mode: 0
Slip Surface Option: Auto-Search
PhreaticCorrection: No
FOS Distribution Calculation: Constant
Optimize Critical Slip Surface Location: Yes
Cap Suction: No
Rapid Drawdown: No
IncludeAirFlow: No
PWP Conditions Source: Piezometric Line
ConsolSatOnly: No
MovingBoundary: No
NumCritialSlipSurfaces: 1
Optimize Critical Slip Surface
- Optimization Maximum Iterations: 10000
- Optimization Convergence Tolerance: 1e-007
- Starting Optimization Points: 8
- Ending Optimization Points: 16
- Complete Passes per Insertion: 1

Materials

Material 1: RAB Ash

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Material 2: Ash Fill

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 3: Dike II

Model: Mohr-Coulomb
Weight: 115 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 4: Dike I

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 600 psf
Phi: 26 °
Phi-B: 0 °

Material 7: Saprolite

Model: Mohr-Coulomb
Weight: 110 pcf
Cohesion: 70 psf
Phi: 32 °
Phi-B: 0 °

Material 8: PWR

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 500 psf
Phi: 45 °

Phi-B: 0 °

Material 9: Dike III

Model: Mohr-Coulomb
Weight: 120 pcf
Cohesion: 0 psf
Phi: 34 °
Phi-B: 0 °

Material 10: Ash (Dry)

Model: Mohr-Coulomb
Weight: 90 pcf
Cohesion: 0 psf
Phi: 25 °
Phi-B: 0 °

Regions

	Material	Points
Region 1	RAB Ash	1,2,3,4,5
Region 2	Dike II	11,12,13,14,15,16,17,18
Region 3	Dike I	18,17,16,19,20
Region 4	Dike III	3,11,12,13,14,6,7,8,9,10,32,2
Region 5	Saprolite	5,4,3,11,18,20,19,21,22,23,36,38,24,25,26,27,28,29
Region 6	PWR	31,29,28,27,26,25,24,38,39
Region 7	Ash (Dry)	14,6,40,43,37,35,34,33
Region 8	Ash (Dry)	35,34,33,14,15,16,19,21,22,23,36
Region 9	Ash Fill	40,41,42,43

Points

	X	Y
Point 1	0	640
Point 2	630	640

Point 3	500	575
Point 4	350	587
Point 5	0	587
Point 6	755	620
Point 7	740	625
Point 8	715	625
Point 9	700	630
Point 10	685	630
Point 11	540	575
Point 12	640	625
Point 13	655	625
Point 14	665	620
Point 15	685	610
Point 16	655	610
Point 17	640	610
Point 18	570	575
Point 19	716	585.75
Point 20	650	575
Point 21	730	588
Point 22	950	578
Point 23	1400	564
Point 24	1400	550
Point 25	950	548
Point 26	740	537
Point 27	650	555
Point 28	350	566
Point 29	0	566
Point 30	1400	530
Point 31	0	530
Point 32	640	645
Point 33	730	619

Point 34	950	607
Point 35	2400	607
Point 36	2400	564
Point 37	2400	620
Point 38	2400	550
Point 39	2400	530
Point 40	855	620
Point 41	1125	710
Point 42	1295	710
Point 43	1565	620

Tension Crack

Tension Crack Option: (none)

Slip Surface Limits

Left Coordinate: (0, 640)
Right Coordinate: (2400, 620)

Piezometric Lines

Piezometric Line 1

Coordinates
- Coordinate: (0, 640)
- Coordinate: (630, 640)
- Coordinate: (650, 620)
- Coordinate: (730, 619)
- Coordinate: (950, 607)
- Coordinate: (2400, 607)

Adjust Piez Line By: 0 ft
Bound by Surface Layer: Yes
Materials Considered
- Material: RAB Ash

Material: Ash Fill
Material: Dike II
Material: Dike I
Material: Fill
Material: Alluvium
Material: Saprolite
Material: PWR
Material: Dike III
Material: Ash (Dry)

Seismic Loads

Horz Seismic Load: 0
Vert Seismic Load: 0

Critical Slip Surfaces

	Number	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.800	(1479.66, 851.808)	195.3808	(1265.75, 710)	(1657.34, 620)
2	826	1.864	(1479.66, 851.808)	284.446	(1233.09, 710)	(1644.51, 620)

Slices of Slip Surface: Optimized

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1270.655	704.70825	-6096.9736	307.99852	207.74763	0
2	1280.463	694.1248	-5436.5807	924.02329	623.26158	0
3	1290.1835	683.59195	-4779.3315	1531.9063	1033.2839	0
4	1299.9845	672.92725	-4113.8422	2054.1041	1385.5107	0
5	1309.953	662.0802	-3437.0149	2490.5698	1679.9106	0
6	1321.426	650.5473	-2717.3709	3107.0494	2095.7313	0
7	1334.404	638.3285	-1954.9003	3591.2583	2422.3343	0
8	1347.382	626.10955	-1192.4123	4075.4639	2748.9351	0

9	1359.467	616.75	-608.40359	5314.4818	2478.1836	0
10	1370.659	610.25	-202.79725	5519.553	2573.8098	0
11	1383.1265	603.00885	249.04677	5768.1805	2573.6143	0
12	1396.87	595.02655	747.16549	6060.4402	2477.6207	0
13	1409.4865	588.93725	1127.1118	6728.253	2611.8551	0
14	1420.976	584.741	1388.9627	6767.7391	2508.1646	0
15	1432.466	580.54475	1650.8136	6807.307	2404.5123	0
16	1443.956	576.34845	1912.6646	6846.7931	2300.8219	0
17	1456.473	573.10485	2115.022	7271.1389	2404.3368	0
18	1470.017	570.81395	2257.9988	7074.9463	2246.1795	0
19	1483.561	568.52305	2400.9755	6878.6809	2087.9883	0
20	1496.137	567.45535	2467.5853	7069.0469	2145.6968	0
21	1507.745	567.61085	2457.8514	6685.0319	1971.1666	0
22	1519.353	567.7664	2448.2036	6300.9307	1796.5561	0
23	1532.3285	569.2768	2353.9128	6191.823	1789.6469	0
24	1546.672	572.14205	2175.1303	5409.6923	1508.301	0
25	1559.422	575.88085	1941.82	5052.2772	1450.43	0
26	1570.797	580.58345	1648.3582	4334.6425	1252.6349	0
27	1582.3905	585.3764	1349.2799	3828.234	1155.9553	0
28	1593.984	590.1694	1050.2016	3321.8256	1059.2757	0
29	1605.5775	594.9624	751.14725	2815.4172	962.58489	0
30	1621.1615	602.17945	300.80439	2147.7386	861.23957	0
31	1637.5475	610.25	-202.80021	1216.0263	567.0424	0
32	1650.7445	616.75	-608.40064	405.33532	189.01096	0

Slices of Slip Surface: 826

	X (ft)	Y (ft)	PoreWaterPressure (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	1239.278	700.18425	-5787.1537	509.32638	343.54498	0

2	1251.6605	682.05275	-4663.5669	1516.2861	1022.7479	0
3	1264.0435	666.5317	-3699.5914	2493.7051	1682.0253	0
4	1276.426	652.99725	-2857.9479	3434.8902	2316.8627	0
5	1288.8085	641.06115	-2115.0781	4337.7685	2925.8618	0
6	1304.908	627.7271	-1271.4091	5233.8568	3530.281	0
7	1324.82	613.5	-386.97881	6301.1848	2938.2907	0
8	1341.594	603.2396	242.17216	6877.8881	3094.2852	0
9	1355.1335	596.18125	682.01539	7276.2471	3074.9407	0
10	1368.673	590.01315	1066.4279	7595.8765	3044.7319	0
11	1382.213	584.67335	1399.2539	7840.2343	3003.4785	0
12	1395.753	580.1129	1683.4988	8012.1251	2951.0869	0
13	1409.2925	576.293	1921.672	8113.9966	2887.5284	0
14	1422.832	573.18305	2115.4971	8147.6593	2812.8435	0
15	1436.372	570.7594	2266.6576	8112.6709	2726.0408	0
16	1449.912	569.0044	2376.0631	8009.8121	2627.0603	0
17	1463.452	567.9056	2444.5703	7838.9043	2515.4193	0
18	1476.9915	567.4554	2472.592	7598.0345	2390.0331	0
19	1490.531	567.65075	2460.4161	7286.1259	2250.2654	0
20	1504.071	568.4929	2407.9516	6900.0428	2094.6965	0
21	1517.611	569.9877	2314.7426	6436.2976	1921.9126	0
22	1531.1505	572.14565	2180.1654	5890.4703	1730.1436	0
23	1544.69	574.9823	2003.3487	5256.6157	1517.0233	0
24	1558.23	578.51885	1782.8715	4526.8754	1279.55	0
25	1572.438	583.03245	1502.7762	3926.5843	1130.2403	0
26	1587.3135	588.6423	1153.153	3453.611	1072.7212	0
27	1602.189	595.2367	742.27685	2860.841	987.90268	0
28	1617.0645	602.8943	265.24036	2127.1012	868.19996	0
29	1634.506	613.5	-386.97881	922.27994	430.0662	0

ATTACHMENT 2
SEISMIC DESIGN FIGURES AND CALCULATIONS

S&ME

JOB NO.

SHEET NO. 1/1

DATE

JOB NAME Plant Allen - Global Stability

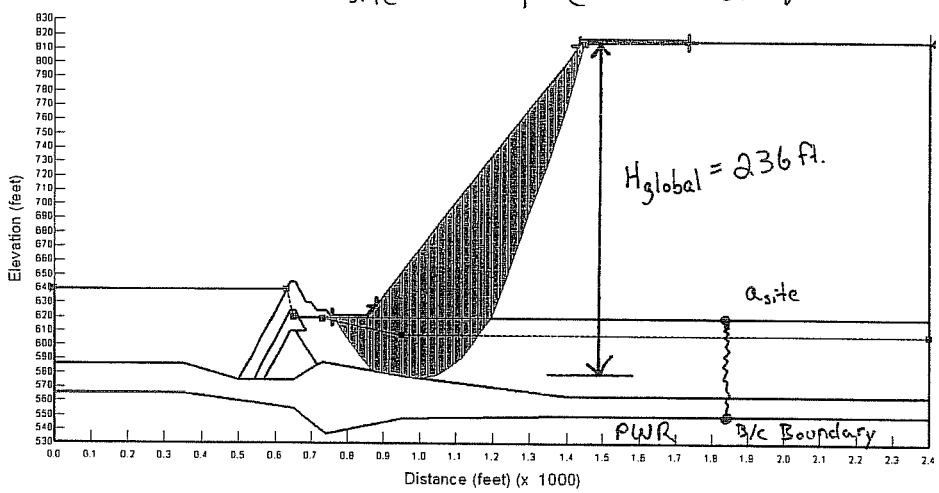
COMPUTED BY

SUBJECT K_{max} Calculation

CHECKED BY

① USGS B/C Boundary $a_{max} = 0.15g$ PGA (Peak-Ground Acceleration)

② Free-field Acceleration $a_{site} = 0.20g$ (JAVA PROGRAM)



③ Convert a_{site} free-field to k_{max} = Peak Horizontal Acceleration of Failure Mass

A. waste $T_s = \dfrac{4\,H_{global}}{V_s}$ ↳ Shear Wave Velocity = 400 ft/s

$$T_s = \frac{4(236)}{400} = 2.36$$

Fig. 2(b) (Rathje, 1998) B. $T_{m-EQ} = 0.7$ $T_s / T_{m-EQ} = 3.37$

C. From Fig. 7a (Bray, 1998)

$$\frac{MHEA}{MHA * NRF} = 0.22$$

MHA ↳ 0.2, NRF ↳ 1.2

$$MHEA = (0.22)(0.2)(1.2)$$

$$\boxed{MHEA = 0.0528g = K_{max}}$$

Interpolation of USGS hazard maps based on the site coordinates

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 35.18319
Longitude = -81.00881
Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0
Data are based on a 0.05 deg grid spacing

Period (sec)	Sa (g)
0.2	0.322 (Ss, Site Class B)
1.0	0.106 (S1, Site Class B)

Use of amplification factors to compute ground surface spectral accelerations:

Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 35.18319
Longitude = -81.00881
Spectral Response Accelerations SMs and SM1
SMs = FaSs and SM1 = FvS1
Site Class D - Fa = 1.542 ,Fv = 2.374

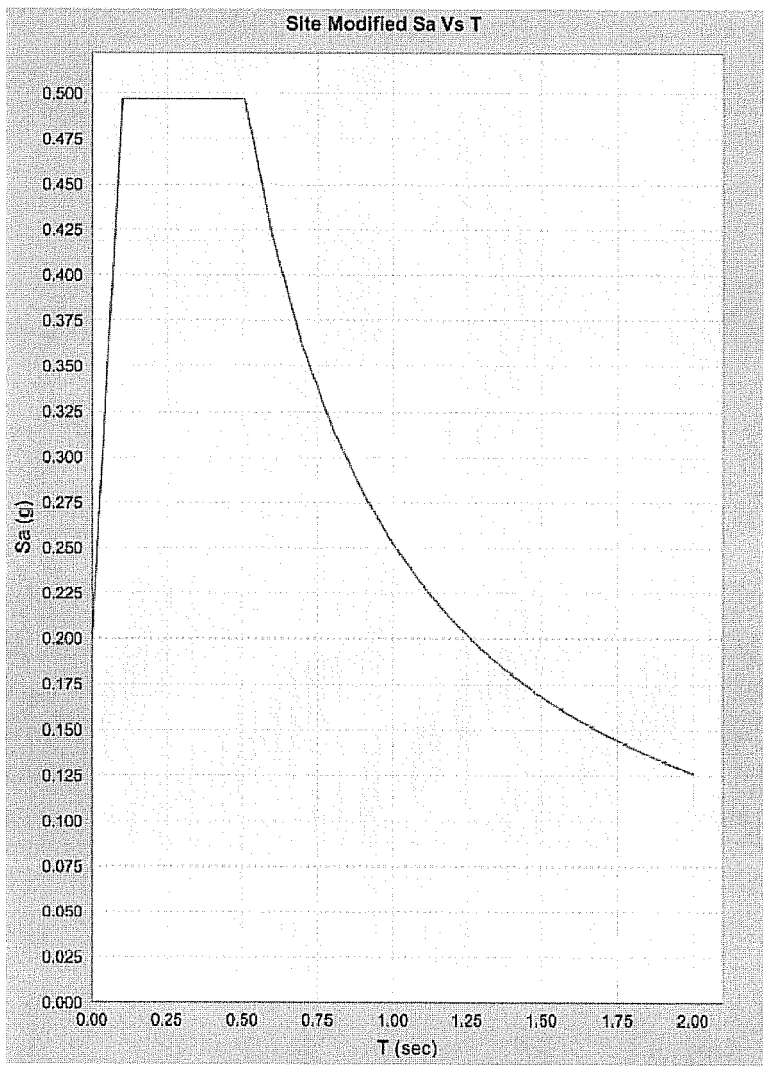
Period (sec)	Sa (g)
0.2	0.497 (SMs, Site Class D)
1.0	0.253 (SM1, Site Class D)

Construction of ground surface response spectrum based on Site Class D factors::
Conterminous 48 States
2003 NEHRP Seismic Design Provisions
Latitude = 35.18319
Longitude = -81.00881
Site Modified Response Spectra for Site Class Site Class D
SMs = FaSs and SM1 = FvS1
Site Class D - Fa = 1.542 ,Fv = 2.374

Period (sec)	Sa (g)	Sd (inches)
0.000	0.199	0.000
0.102	0.497	0.050
0.200	0.497	0.194
0.508	0.497	1.254
0.600	0.421	1.481
0.700	0.361	1.728
0.800	0.316	1.975
0.900	0.281	2.221
1.000	0.253	2.468
1.100	0.230	2.715
1.200	0.211	2.962
1.300	0.194	3.209
1.400	0.180	3.456
1.500	0.168	3.702
1.600	0.158	3.949
1.700	0.149	4.196
1.800	0.140	4.443
1.900	0.133	4.690
2.000	0.126	4.937

Plot of ground surface spectrum

<u>PGA = 0.20</u>



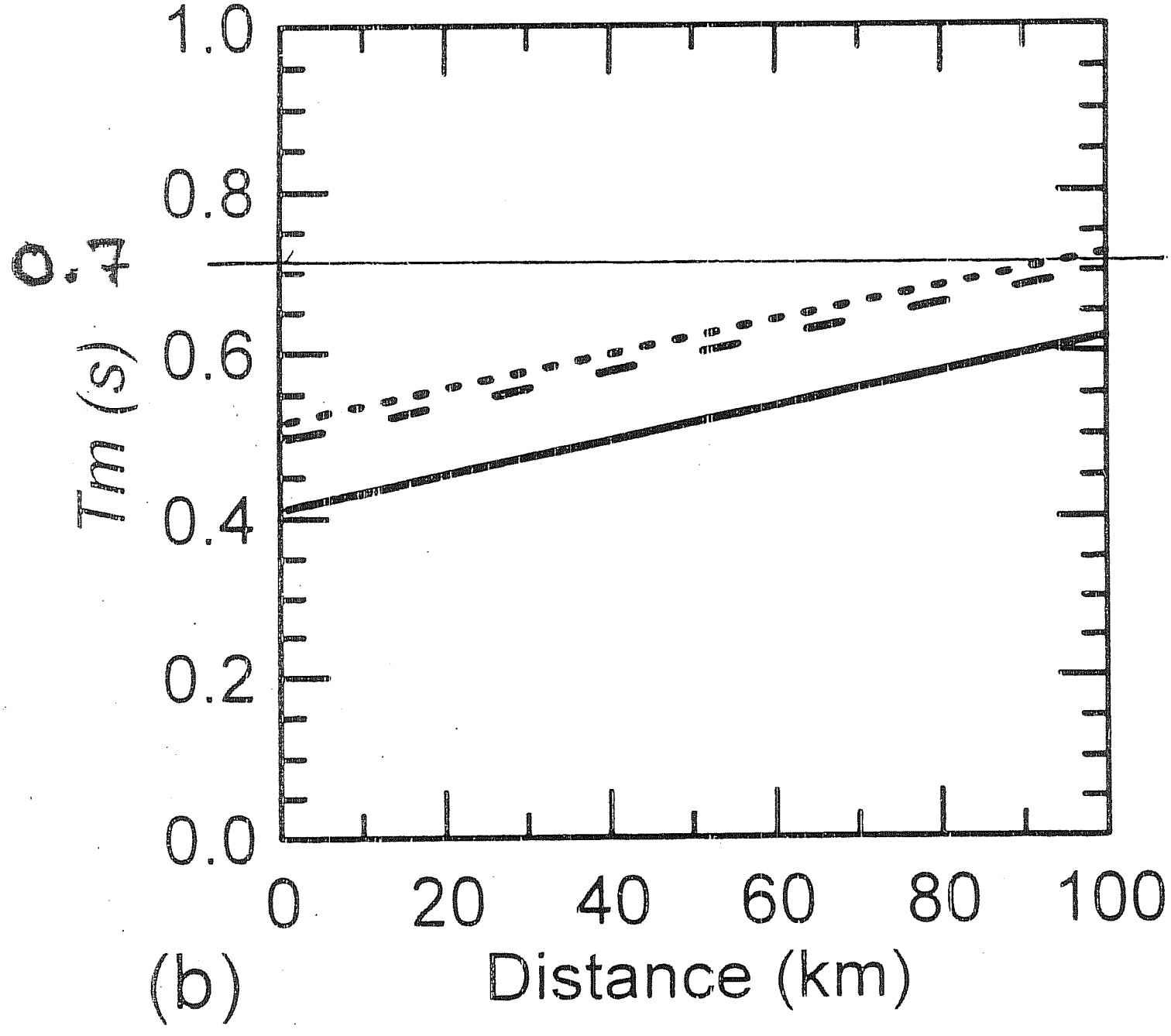


Fig. 2 (b) (Rathje, 1998)

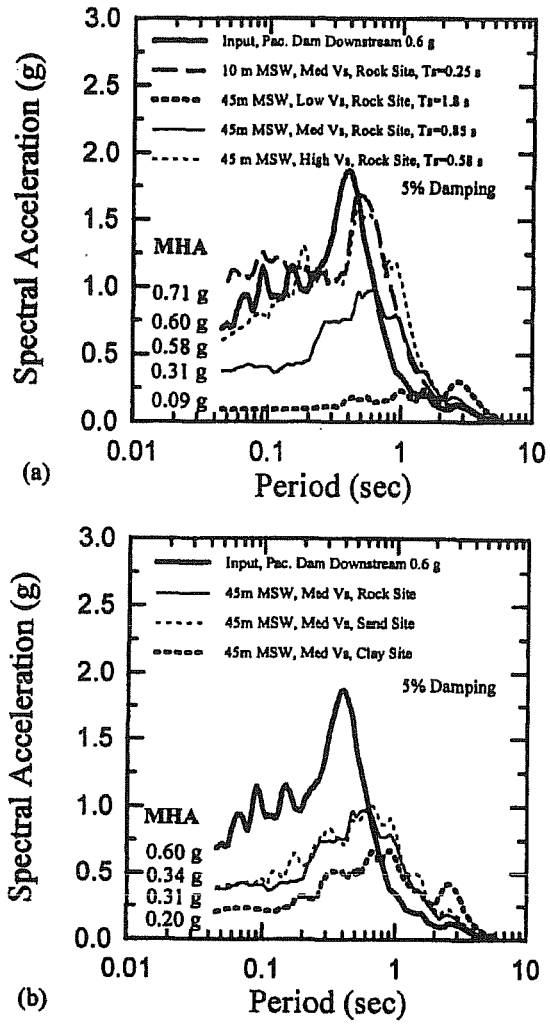


FIG. 5. Comparison of Responses from Different Landfill Configurations: (a) Effect of Waste Fill Height and Stiffness; (b) Effect of Site Conditions

an MSWLF depends on its dynamic response and strength characteristics, as well as the design rock motions, developing good waste fill property characterizations remains a top priority. Moreover, a simplified design procedure that does not capture the importance of the waste fill dynamic stiffness and height (i.e., its fundamental period) is judged to be inappropriate.

SEISMIC LOADING

Equivalent Acceleration

The pseudostatic slope stability method (Seed and Martin 1966) is often used in practice because of its relative simplicity, its general consistency with case histories for nondegrading materials (Seed 1979), and its citation in governing state and federal regulations and guidelines [e.g., "Solid Waste" (1993)]. With this method, the seismic loading is represented by a seismic coefficient that acts as a horizontal destabilizing force on the landfill. The seismic coefficient, in conjunction with compatible factor of safety (FS) and dynamic strengths, is crucial if the results of a pseudostatic analysis are to be meaningful. A simplified seismically induced permanent deformation analysis [e.g., Makdisi and Seed (1978)] also requires an estimate of the seismic loading.

As developed by Seed and Martin (1966) for earth embankments, the horizontal equivalent acceleration (HEA) represents the shear stress at the base of a potential sliding mass, and thus is an appropriate parameter to represent seismic loading. The equivalent acceleration captures the cumulative effect of the nonuniform acceleration profile in the potential sliding mass, and hence, it is used herein to represent the seismic loading for a potential sliding mass. Its maximum value, the MHEA, which acts for only an instant during the earthquake, can be expressed as MHEA = $(\tau_{h,max}/\sigma_v)g$, where MHEA = maximum horizontal equivalent acceleration acting on column of fill above depth z; $\tau_{h,max}$ = maximum horizontal shear stress at depth z; and σ_v = total vertical stress at depth z (Bray et al. 1995).

Base Stability

At lower levels of acceleration, where the landfill response is fairly linear, Bray et al. (1995) found that MHEA for base sliding increased proportionally with the peak acceleration (MHA) of the earthquake rock motion. Numerous studies [e.g., Borcherdt (1994); Seed et al. (1991)] have shown that the peak ground acceleration at the top of a soil site is amplified at low rock input peak accelerations and attenuated at high rock input peak accelerations. As an example, the semiempirical/semianalytical Seed et al. (1991) MHA-site versus MHA-rock relationship for a deep cohesionless or stiff cohesive soil site is shown in Fig. 6(a). To account for the nonlinearity expressed in this type of relationship, the nonlinear response factor [(NRF) = MHA-site/MHA-rock] was developed. This factor recognizes that the MHEA for a potential sliding mass will not be directly proportional to the input MHA-rock across a wide range of shaking intensities. The nonlinear response factor shown in Fig. 6(b) is based on the Seed et al. (1991) relationship shown in Fig. 6(a), because the range in dynamic

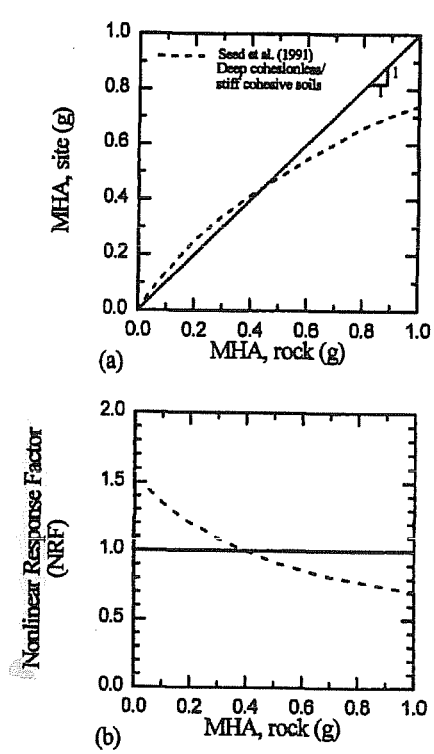


FIG. 6. Diagram of: (a) Site Amplification Factor (Seed et al. 1991); (b) Nonlinear Response Factor

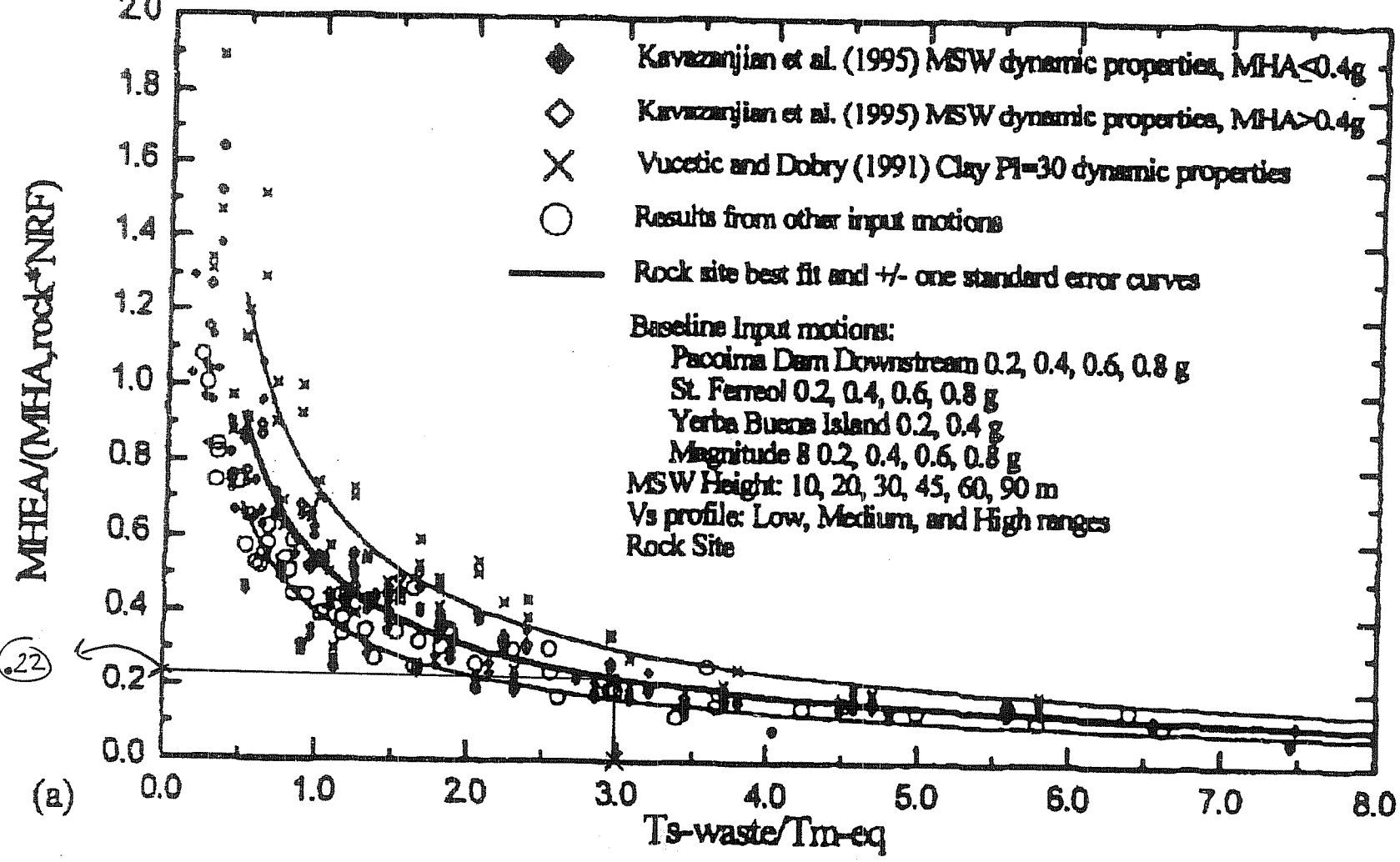


Fig. 7a (Bray 1998)