

PMSTPCOL PEmails

From: Tai, Tom
Sent: Wednesday, August 10, 2011 10:18 AM
To: Chakravorty, Manas
Cc: STPCOL
Subject: FW: Calc Pages for Punch List Item 111
Attachments: Calc pages for Punch List Item 111.pdf

FYI

Tom Tai
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(301) 415-8484
Tom.Tai@NRC.GOV

From: Price, John E [\[mailto:jeprice@STPEGS.COM\]](mailto:jeprice@STPEGS.COM)
Sent: Wednesday, August 10, 2011 9:42 AM
To: Tai, Tom
Cc: Chakrabarti, Samir
Subject: Calc Pages for Punch List Item 111

Tom,

Attached is a file containing calculation pages you requested relating to Punch List Item 111. If you have any questions please give me a call. Regards,

John E. Price

*Licensing Engineer - STP Units 3 & 4
972.754.8221 (cell)*

Hearing Identifier: SouthTexas34Public_EX
Email Number: 3034

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED13E6257D78F)

Subject: FW: Calc Pages for Punch List Item 111
Sent Date: 8/10/2011 10:18:09 AM
Received Date: 8/10/2011 10:18:13 AM
From: Tai, Tom

Created By: Tom.Tai@nrc.gov

Recipients:
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"Chakravorty, Manas" <Manas.Chakravorty@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	538	8/10/2011 10:18:13 AM
Calc pages for Punch List Item 111.pdf		954094

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
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Recipients Received:

Tornado missile

In Section 5.11, the local and overall effects of tornado missiles, W_m , in combination with the tornado differential pressure loads, W_p , and the tornado wind loads, W_w are evaluated for the pump house roof. The global effect of tornado missiles is evaluated in the SAP2000 static model.

5.8.2.4 SSE loads

The SSE loads are calculated using the equivalent static method outlined per Section 6.3.3.i, Ref. 7.9. The vertical ZPA of the slab spectrum is used for beams supported on walls that initiate the seismic motion of the beam. The acceleration value used for design will be the envelope of all slab spectra for the given floor and the controlling value between the spectra from the empty basin case and the full basin case, including a scale factor to account for the mesh sensitivity analysis (Attachment A20 of Ref. 7.33). Since the acceleration values are not reported exactly at 33 Hz, the values given for 31 Hz will be conservatively used.

5.8.2.5 Snow and rain loads

The rain and snow loads are not considered per Section 4.4

5.8.2.6 Internal flood loads

As outlined in Ref. 7.9, an internal flood may occur in which the entire pump house is flooded. This internal flood is a beyond design basis event. The internal flood considers the pump house flooded above and below the composite beams. Since this load is small and has the same allowable as a seismic load combination, the seismic load will govern over the internal flood load and the internal flood load will not be considered in this section.

5.8.3 Load combinations

5.8.3.1 Structural steel load combinations (COLA Rev. 4, Section 3H.6.4.3.4.2, Ref. 7.2):

1.) $S = D + L$

2.) $S = D + L + W$

3.) $1.6S = D + L + W_t$

4.) $1.6S = D + L + E'$

where

S = Allowable stress for allowable stress design method

D = Dead load

L = Live load

W = Wind load

Load Combination 4

The additional contingency load of 5 kips are not applicable during a seismic event.

Acceleration values are enveloping values between the full and empty basin conditions. The acceleration values are also scaled to account for the mesh sensitivity analysis. Values are taken from Attachment 20 of Ref 7.33.

$$V_{g_7\%_Rf_16539} := 0.836g$$

Node at center of west bay

$$V_{g_7\%_Rf_16544} := 1.076g$$

Node at center of middle bay

$$V_{g_7\%_Rf_16550} := 0.967g$$

Node at center of east bay

$$V_{g_7\%_Rf_FI} := \max(V_{g_7\%_Rf_16539}, V_{g_7\%_Rf_16544}, V_{g_7\%_Rf_16550})$$

$$V_{g_7\%_Rf_FI} = 1.076g$$

Enveloping value of the three nodes in the middle of the slabs at the roof elevation

The distributed load across the beam in load case 4:

$$w_{LC4} := w_{50g1_misc} + w_{roof} + w_{laydown} + \frac{V_{g_7\%_Rf_FI}}{g} \cdot (w_{50g1_misc} + w_{roof} + w_{laydown} + w_{eq_d1})$$

$$w_{LC4} = 10.077 \text{ klf}$$

Symmetric loading allows the use of the formulas from Ref. 7.43 to calculate the maximum moment.

**STP 3 & 4 Seismic and RBV
Response Spectra Report**

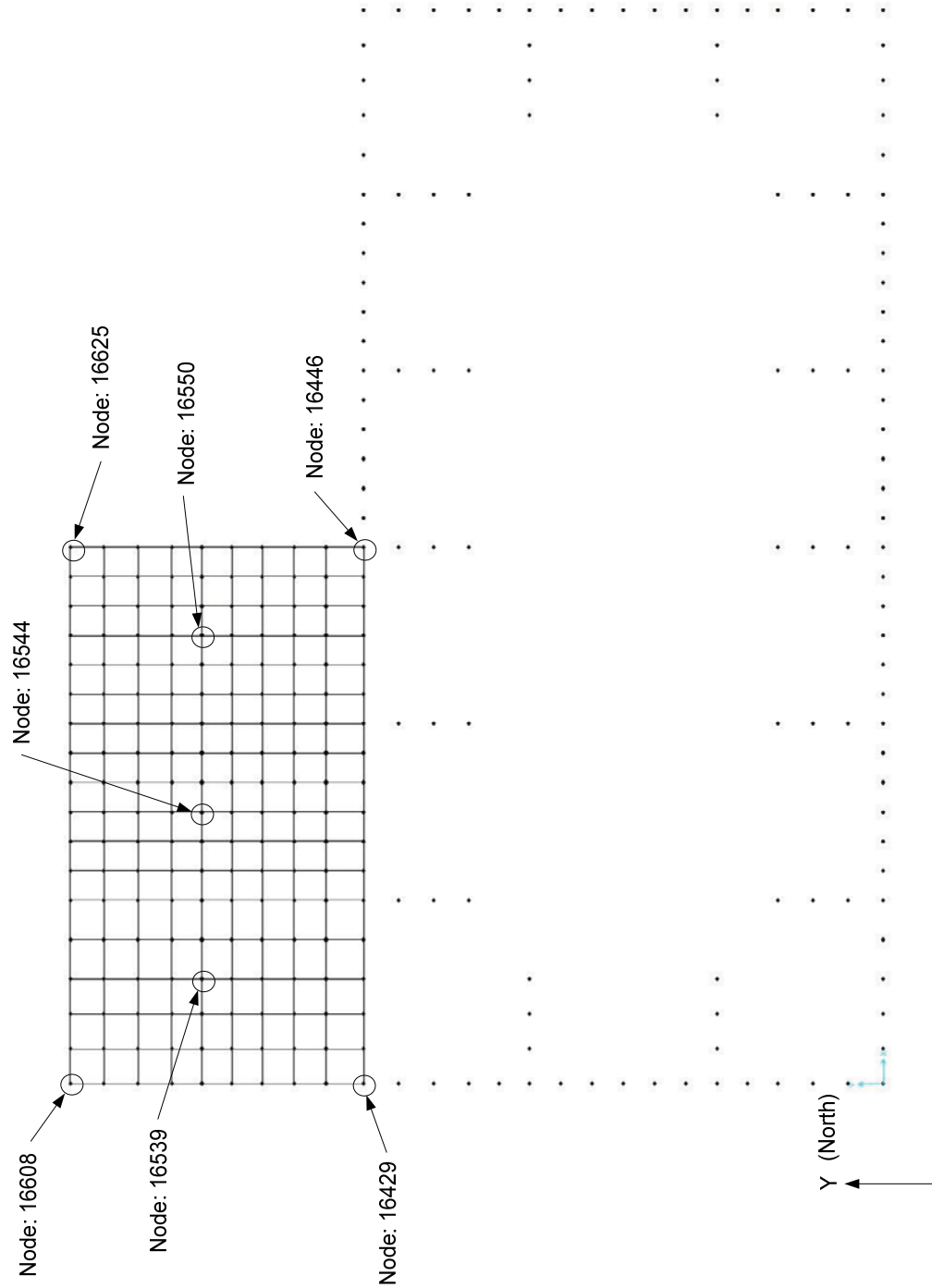


Figure 2.1.3.6 Pump House Roof – STP Elev. 50'-0" (16.86m TMSL)

PROJECT NO. 090282
 DATE 10 December 2010
 BY TFGolecki
 CHECKED BY DWeggers

CLIENT Sargent & Lundy LLC
 SUBJECT Soil-Structure Interaction Analyses of the UHS – Pump House Buildings, STP 3 & 4

Table 17 Envelope of Response Spectra Ratios from Mesh Sensitivity Study (Ref 16) and DIT-STP34-10-0402-01 (Ref 18)

Location	Direction	20% Damping		15% Damping		10% Damping		7% Damping		5% Damping	
		1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz
Pump House Roof	Vertical	1.444	1.331	1.495	1.346	1.577	1.372	1.629	1.409	1.667	1.463
Pump House Operating Floor	Vertical	1.223	1.190	1.243	1.194	1.294	1.198	1.362	1.202	1.469	1.204
Mid-Level of Basin Walls	Horizontal	1.310	1.113	1.338	1.110	1.404	1.112	1.461	1.117	1.458	1.129
CTSS Walls	Vertical	1.405	1.197	1.441	1.191	1.433	1.205	1.450	1.231	1.478	1.264
Location	Direction	4% Damping		3% Damping		2% Damping		1% Damping		0.5% Damping	
		1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz	1-30 Hz	30-33 Hz
Pump House Roof	Vertical	1.686	1.511	1.793	1.588	2.038	1.718	2.682	1.926	2.769	2.165
Pump House Operating Floor	Vertical	1.550	1.206	1.678	1.209	1.914	1.217	2.486	1.241	2.826	1.373
Mid-Level of Basin Walls	Horizontal	1.502	1.153	1.563	1.186	1.835	1.237	2.372	1.326	2.922	1.370
CTSS Walls	Vertical	1.540	1.289	1.585	1.321	1.749	1.364	1.966	1.418	2.593	1.574

CLIENT Sargent & Lundy LLCBY TFGoleckiSUBJECT Soil-Structure Interaction Analysis of the UHS - Pump House Buildings,
STP 3 & 4CHECKED BY DWEggers

A-21.1 PURPOSE AND SCOPE

The purpose of this attachment is to calculate and provide figures of the in-structure response spectra at selected nodes and node groups of the UHS – Pump House Buildings that envelope the empty and full basin results and accounts for results from the mesh sensitivity study (Calculation Ref 16). To account for the mesh refinement effects, the maximum of scale factors calculated in Calculation No U7-UHS-C-CALC-6005 Rev A (Calculation Ref 16) for empty and full basin SSI analyses and DIT-STP34-10-0402-01 (Calculation Ref 18) for fixed base mesh sensitivity studies are applied to the eight full basin and six empty basin spectra. Spectra presented here represent the envelope of:

- eight full basin analyses (Attachments 6 and 7), scaled;
- six empty basin analyses from Calculation No. U7-UHS-C-CALC-6007 Rev A (Calculation Ref 17), scaled and;
- spectra calculated in the mesh sensitivity study for refined mesh full and empty basin analyses with upper bound soil, Calculation No U7-UHS-C-CALC-6005 Rev A (Calculation Ref 16),

Figures are provided to show the final scaled enveloped and broadened spectra; the scaled and enveloped unbroadened spectra; and the scaled and enveloped full basin and empty basin together with the final broadened spectra and an intermediate processing step. Tables corresponding to these figures are provided in Attachment 20. All node references here are to the SASSI model node numbers.

A-21.2 DESIGN INPUTS

See main calculation body.

A-21.3 ASSUMPTIONS

None



Table A-20.190 - Broadened Z Direction Response Spectra at Node 16544 - PH Roof

Frequency (Hz)	Damping									
	0.5%	1%	2%	3%	4%	5%	7%	10%	15%	20%
0.10	0.017	0.017	0.016	0.016	0.016	0.015	0.015	0.015	0.014	0.014
0.11	0.021	0.020	0.019	0.018	0.017	0.017	0.016	0.015	0.015	0.015
0.12	0.026	0.025	0.023	0.022	0.021	0.020	0.018	0.017	0.016	0.018
0.13	0.028	0.027	0.026	0.025	0.024	0.024	0.023	0.021	0.020	0.021
0.15	0.031	0.031	0.031	0.031	0.031	0.030	0.030	0.029	0.028	0.028
0.16	0.062	0.060	0.057	0.054	0.052	0.049	0.046	0.042	0.037	0.034
0.18	0.073	0.070	0.064	0.060	0.056	0.054	0.049	0.044	0.039	0.035
0.19	0.082	0.077	0.070	0.065	0.060	0.057	0.050	0.044	0.039	0.035
0.20	0.085	0.081	0.074	0.069	0.064	0.060	0.053	0.046	0.039	0.036
0.21	0.095	0.091	0.085	0.079	0.073	0.068	0.060	0.050	0.043	0.041
0.22	0.107	0.102	0.094	0.086	0.079	0.073	0.064	0.053	0.046	0.044
0.23	0.135	0.127	0.114	0.103	0.093	0.085	0.072	0.060	0.054	0.050
0.25	0.136	0.127	0.114	0.103	0.093	0.085	0.078	0.070	0.061	0.054
0.28	0.136	0.127	0.114	0.103	0.098	0.094	0.086	0.076	0.065	0.060
0.30	0.136	0.127	0.118	0.112	0.107	0.103	0.095	0.085	0.073	0.065
0.33	0.256	0.226	0.179	0.148	0.128	0.112	0.095	0.085	0.073	0.065
0.36	0.256	0.226	0.179	0.156	0.140	0.127	0.109	0.097	0.083	0.074
0.40	0.256	0.226	0.198	0.179	0.163	0.149	0.128	0.108	0.090	0.081
0.43	0.319	0.272	0.207	0.183	0.166	0.152	0.131	0.112	0.093	0.087
0.47	0.319	0.272	0.207	0.183	0.166	0.152	0.132	0.112	0.094	0.087
0.50	0.319	0.272	0.207	0.185	0.170	0.158	0.138	0.118	0.101	0.095
0.55	0.336	0.294	0.249	0.217	0.193	0.175	0.156	0.144	0.126	0.113
0.60	0.336	0.294	0.249	0.217	0.193	0.175	0.161	0.149	0.132	0.120
0.65	0.336	0.294	0.249	0.217	0.193	0.175	0.165	0.152	0.135	0.122
0.70	0.366	0.333	0.282	0.244	0.215	0.193	0.165	0.152	0.135	0.122
0.75	0.495	0.407	0.299	0.255	0.224	0.202	0.172	0.152	0.135	0.122
0.80	0.495	0.407	0.319	0.273	0.238	0.213	0.178	0.152	0.135	0.125
0.85	1.401	1.176	0.707	0.513	0.410	0.354	0.285	0.243	0.207	0.185
0.90	1.401	1.176	0.707	0.513	0.410	0.375	0.327	0.274	0.221	0.192
0.95	1.401	1.176	0.707	0.513	0.411	0.378	0.327	0.275	0.223	0.194
1.00	1.647	1.302	0.754	0.550	0.445	0.388	0.327	0.277	0.235	0.205
1.10	1.716	1.302	0.754	0.551	0.466	0.432	0.375	0.307	0.246	0.220
1.20	1.736	1.517	0.907	0.641	0.502	0.436	0.375	0.307	0.246	0.220
1.30	1.967	1.643	0.959	0.675	0.529	0.461	0.398	0.333	0.262	0.230
1.40	2.198	1.769	1.010	0.707	0.555	0.484	0.417	0.351	0.279	0.241
1.50	2.425	1.897	1.065	0.740	0.579	0.505	0.435	0.367	0.296	0.252
1.60	2.563	1.983	1.099	0.764	0.598	0.526	0.452	0.383	0.309	0.264
1.70	2.820	2.143	1.163	0.807	0.635	0.564	0.486	0.414	0.333	0.287
1.80	2.939	2.217	1.192	0.827	0.652	0.581	0.504	0.429	0.344	0.298
1.90	3.053	2.288	1.221	0.846	0.668	0.599	0.521	0.444	0.355	0.308
2.00	3.162	2.356	1.248	0.865	0.683	0.616	0.537	0.458	0.367	0.318
2.10	3.267	2.421	1.274	0.883	0.698	0.632	0.553	0.472	0.378	0.328
2.13	3.273	2.425	1.275	0.884	0.699	0.633	0.554	0.472	0.379	0.329
2.20	3.464	2.544	1.322	0.916	0.726	0.663	0.583	0.497	0.400	0.347
2.30	3.499	2.556	1.342	0.936	0.743	0.677	0.597	0.509	0.411	0.356
2.40	3.540	2.571	1.364	0.958	0.762	0.694	0.613	0.523	0.423	0.366
2.50	3.566	2.580	1.379	0.973	0.775	0.705	0.623	0.532	0.430	0.369
2.60	3.713	2.648	1.405	0.999	0.803	0.724	0.636	0.540	0.435	0.374
2.70	3.865	2.748	1.428	1.022	0.828	0.742	0.647	0.547	0.439	0.383
2.80	3.966	2.815	1.463	1.043	0.845	0.758	0.654	0.552	0.442	0.390
2.87	3.973	2.820	1.465	1.045	0.846	0.759	0.654	0.552	0.443	0.390
2.90	4.012	2.845	1.479	1.055	0.852	0.763	0.657	0.554	0.446	0.393
2.92	4.054	2.873	1.493	1.065	0.858	0.767	0.660	0.556	0.449	0.395
3.00	4.125	2.916	1.548	1.108	0.883	0.783	0.674	0.570	0.461	0.406
3.15	4.188	2.955	1.557	1.119	0.894	0.807	0.695	0.585	0.472	0.415
3.19	4.276	3.023	1.581	1.136	0.911	0.825	0.711	0.597	0.480	0.422
3.28	4.288	3.031	1.584	1.138	0.913	0.827	0.712	0.598	0.480	0.423
3.30	4.320	3.052	1.594	1.144	0.918	0.831	0.715	0.600	0.482	0.424
3.37	4.476	3.155	1.640	1.172	0.941	0.853	0.732	0.612	0.490	0.431



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3.44	4.538	3.196	1.658	1.183	0.950	0.861	0.738	0.617	0.494	0.434
3.45	4.554	3.210	1.665	1.208	0.979	0.888	0.759	0.632	0.504	0.443
3.60	4.554	3.213	1.666	1.211	1.006	0.913	0.778	0.647	0.514	0.452
3.74	4.554	3.214	1.666	1.212	1.015	0.922	0.785	0.651	0.517	0.455
3.80	4.554	3.215	1.667	1.214	1.026	0.930	0.791	0.657	0.523	0.460
3.85	4.554	3.218	1.679	1.250	1.047	0.944	0.804	0.667	0.532	0.469
4.00	4.554	3.227	1.701	1.262	1.054	0.949	0.807	0.670	0.534	0.471
4.06	4.554	3.259	1.768	1.299	1.076	0.963	0.817	0.678	0.541	0.479
4.15	4.554	3.302	1.796	1.314	1.086	0.970	0.821	0.681	0.544	0.482
4.20	4.570	3.329	1.815	1.322	1.091	0.974	0.823	0.683	0.546	0.484
4.25	4.650	3.382	1.852	1.337	1.100	0.980	0.827	0.686	0.549	0.487
4.35	4.929	3.576	1.958	1.398	1.146	1.018	0.850	0.696	0.557	0.495
4.40	5.076	3.696	2.013	1.434	1.172	1.040	0.866	0.704	0.561	0.500
4.49	5.269	3.853	2.085	1.481	1.207	1.068	0.887	0.720	0.572	0.515
4.60	5.319	3.894	2.104	1.493	1.216	1.075	0.893	0.724	0.575	0.519
4.66	5.564	4.096	2.196	1.553	1.260	1.111	0.920	0.745	0.592	0.537
4.80	5.731	4.232	2.258	1.594	1.290	1.135	0.938	0.759	0.603	0.550
4.85	5.835	4.317	2.297	1.619	1.308	1.150	0.950	0.768	0.611	0.558
4.91	6.024	4.462	2.363	1.663	1.340	1.176	0.969	0.786	0.625	0.572
5.00	6.252	4.614	2.433	1.708	1.373	1.203	0.990	0.805	0.639	0.590
5.17	6.458	4.753	2.496	1.749	1.403	1.227	1.008	0.822	0.658	0.607
5.25	6.554	4.817	2.526	1.769	1.417	1.240	1.018	0.830	0.671	0.615
5.26	6.760	4.955	2.589	1.810	1.448	1.267	1.038	0.848	0.700	0.632
5.38	6.809	4.987	2.604	1.819	1.455	1.274	1.044	0.856	0.707	0.638
5.50	7.086	5.173	2.689	1.875	1.495	1.310	1.074	0.906	0.748	0.669
5.57	7.370	5.364	2.776	1.932	1.537	1.348	1.132	0.969	0.799	0.706
5.68	7.537	5.503	2.860	1.997	1.591	1.382	1.159	0.993	0.820	0.721
5.75	7.795	5.719	2.992	2.098	1.674	1.455	1.202	1.030	0.851	0.745
5.87	8.118	5.990	3.156	2.225	1.778	1.545	1.266	1.077	0.891	0.780
6.00	8.642	6.333	3.324	2.349	1.880	1.634	1.353	1.129	0.930	0.813
6.12	9.382	6.925	3.673	2.598	2.071	1.795	1.484	1.216	0.984	0.860
6.25	9.429	6.962	3.696	2.615	2.084	1.807	1.493	1.223	0.987	0.863
6.30	11.000	7.669	4.113	2.932	2.345	2.037	1.650	1.348	1.058	0.919
6.50	11.379	7.809	4.203	2.991	2.394	2.080	1.685	1.371	1.073	0.931
6.57	12.199	8.112	4.396	3.119	2.499	2.173	1.759	1.421	1.104	0.955
6.68	13.298	8.716	4.692	3.302	2.640	2.298	1.861	1.489	1.150	0.989
6.75	14.147	9.183	4.920	3.460	2.750	2.394	1.940	1.541	1.189	1.016
6.86	15.437	9.893	5.268	3.702	2.940	2.541	2.060	1.621	1.248	1.057
7.00	15.925	10.162	5.399	3.793	3.012	2.601	2.105	1.654	1.270	1.073
7.09	16.994	10.749	5.687	3.993	3.171	2.733	2.205	1.728	1.319	1.107
7.14	17.866	11.229	5.922	4.156	3.300	2.845	2.286	1.789	1.359	1.135
7.25	18.441	11.545	6.076	4.263	3.386	2.919	2.340	1.828	1.386	1.153
7.34	19.081	11.897	6.249	4.383	3.480	3.001	2.399	1.873	1.415	1.173
7.42	19.500	12.128	6.361	4.461	3.543	3.054	2.438	1.902	1.434	1.187
7.50	20.825	12.857	6.718	4.709	3.739	3.225	2.561	1.994	1.495	1.232
7.60	21.373	13.158	6.866	4.812	3.820	3.295	2.612	2.031	1.520	1.251
7.75	22.170	13.596	7.080	4.961	3.939	3.397	2.690	2.087	1.558	1.280
7.89	23.516	14.337	7.443	5.213	4.138	3.570	2.822	2.180	1.623	1.329
8.00	24.690	14.982	7.758	5.432	4.313	3.721	2.940	2.263	1.680	1.374
8.17	26.031	15.720	8.119	5.683	4.512	3.893	3.074	2.362	1.747	1.424
8.38	27.158	16.340	8.423	5.894	4.679	4.038	3.187	2.446	1.802	1.467
8.50	27.837	16.713	8.605	6.020	4.779	4.125	3.255	2.497	1.834	1.492
8.58	28.750	17.216	8.851	6.191	4.915	4.242	3.346	2.565	1.867	1.525
8.67	29.492	17.731	9.046	6.288	4.971	4.279	3.401	2.614	1.902	1.544
8.83	30.346	18.324	9.271	6.399	5.037	4.321	3.421	2.640	1.928	1.559
8.92	31.083	18.835	9.464	6.496	5.093	4.358	3.439	2.663	1.950	1.571
9.00	33.466	20.489	10.091	6.806	5.275	4.475	3.497	2.680	1.961	1.590
9.32	34.844	21.446	10.453	6.986	5.380	4.544	3.530	2.690	1.961	1.603
9.50	35.585	21.960	10.648	7.083	5.436	4.580	3.548	2.696	1.961	1.604
9.64	36.439	22.553	10.872	7.194	5.502	4.623	3.568	2.702	1.961	1.604
9.71	38.116	23.717	11.313	7.413	5.630	4.706	3.609	2.714	1.961	1.604
9.89	38.147	23.739	11.321	7.417	5.632	4.707	3.609	2.714	1.961	1.604
10.00	39.114	24.410	11.576	7.543	5.706	4.755	3.633	2.721	1.961	1.604



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10.15	40.271	25.213	11.880	7.694	5.794	4.812	3.660	2.730	1.961	1.604
10.26	42.249	26.586	12.400	7.952	5.945	4.910	3.708	2.744	1.961	1.604
10.50	43.079	27.163	12.618	8.060	6.008	4.951	3.728	2.750	1.961	1.604
10.63	43.112	27.185	12.626	8.065	6.011	4.953	3.729	2.751	1.961	1.604
10.72	44.442	28.108	12.976	8.238	6.112	5.019	3.761	2.760	1.961	1.604
10.87	44.648	28.251	13.030	8.265	6.128	5.029	3.766	2.762	1.961	1.604
11.00	45.778	29.036	13.327	8.412	6.214	5.085	3.793	2.770	1.961	1.604
11.09	46.027	29.208	13.393	8.445	6.233	5.097	3.799	2.772	1.961	1.604
11.21	47.141	29.982	13.685	8.590	6.318	5.152	3.826	2.780	1.961	1.604
11.35	48.375	30.838	14.010	8.751	6.412	5.213	3.856	2.789	1.961	1.604
11.50	48.525	30.942	14.049	8.771	6.424	5.221	3.859	2.790	1.961	1.604
11.63	49.688	31.750	14.355	8.922	6.512	5.278	3.887	2.799	1.961	1.604
11.80	50.877	32.576	14.668	9.078	6.603	5.337	3.916	2.807	1.961	1.604
12.00	52.480	33.688	15.089	9.287	6.726	5.416	3.955	2.819	1.961	1.604
12.20	53.292	34.252	15.302	9.393	6.788	5.457	3.974	2.825	1.961	1.604
12.35	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.961	1.604
12.50	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.959	1.604
12.75	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.959	1.604
13.00	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.959	1.604
13.26	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.955	1.600
13.50	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.949	1.586
13.76	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.945	1.578
14.00	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.942	1.569
14.20	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.938	1.559
14.33	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.935	1.552
14.50	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.932	1.545
14.64	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.928	1.535
14.81	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.927	1.534
15.00	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.923	1.523
15.25	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.918	1.512
15.50	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.914	1.503
15.75	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.914	1.502
16.00	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.910	1.491
16.13	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.906	1.481
16.35	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.902	1.473
16.56	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.900	1.468
16.75	53.292	34.252	15.302	9.393	6.788	5.470	3.990	2.830	1.897	1.462
17.00	52.071	33.480	14.970	9.196	6.691	5.470	3.990	2.830	1.895	1.456
17.33	50.604	32.553	14.571	8.961	6.527	5.341	3.909	2.812	1.892	1.450
17.66	46.884	30.203	13.558	8.363	6.111	5.015	3.699	2.680	1.832	1.433
18.00	44.818	28.897	12.996	8.030	5.879	4.834	3.582	2.607	1.817	1.424
18.33	42.784	27.613	12.443	7.704	5.652	4.656	3.467	2.535	1.782	1.415
18.66	40.783	26.348	11.898	7.382	5.428	4.480	3.354	2.464	1.747	1.396
19.00	38.034	24.611	11.150	6.940	5.120	4.239	3.199	2.367	1.701	1.369
19.33	36.412	23.586	10.708	6.679	4.938	4.097	3.107	2.309	1.674	1.353
19.66	33.080	21.481	9.801	6.144	4.565	3.805	2.919	2.192	1.617	1.320
20.00	30.637	19.938	9.136	5.751	4.292	3.591	2.781	2.109	1.576	1.296
20.33	28.240	18.423	8.484	5.366	4.023	3.380	2.645	2.028	1.536	1.272
20.66	26.063	17.048	7.891	5.016	3.780	3.194	2.522	1.958	1.500	1.251
20.96	25.817	16.892	7.825	4.976	3.752	3.173	2.508	1.950	1.496	1.249
21.33	23.508	15.434	7.196	4.605	3.494	2.985	2.378	1.879	1.460	1.226
21.66	21.241	14.001	6.579	4.241	3.240	2.800	2.250	1.811	1.425	1.204
22.00	18.947	12.551	5.955	3.872	2.989	2.613	2.124	1.741	1.389	1.181
22.33	16.759	11.169	5.359	3.520	2.768	2.434	2.019	1.674	1.355	1.160
22.66	14.608	9.810	4.774	3.174	2.551	2.266	1.915	1.609	1.321	1.140
23.00	12.429	8.433	4.181	2.835	2.331	2.107	1.811	1.550	1.287	1.120
23.33	10.619	7.290	3.688	2.587	2.170	1.975	1.724	1.506	1.259	1.103
23.66	10.350	7.120	3.615	2.551	2.146	1.955	1.711	1.499	1.255	1.101
24.00	8.303	5.827	3.058	2.271	1.966	1.817	1.622	1.449	1.224	1.082
24.50	6.472	4.669	2.593	2.059	1.806	1.701	1.553	1.404	1.199	1.065
25.00	4.313	3.265	2.197	1.825	1.658	1.601	1.484	1.350	1.167	1.045
25.19	3.939	2.855	1.962	1.651	1.523	1.476	1.388	1.278	1.123	1.017
25.66	3.877	2.822	1.944	1.627	1.501	1.456	1.373	1.268	1.117	1.012



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26.13	3.668	2.727	1.883	1.580	1.442	1.396	1.325	1.234	1.098	1.000
26.60	3.251	2.540	1.770	1.488	1.363	1.323	1.259	1.180	1.060	0.976
27.07	3.050	2.450	1.717	1.446	1.325	1.288	1.229	1.154	1.044	0.964
27.53	2.908	2.361	1.664	1.407	1.292	1.258	1.202	1.132	1.029	0.954
28.00	2.824	2.270	1.611	1.367	1.261	1.230	1.178	1.112	1.014	0.944
29.50	2.703	2.149	1.535	1.312	1.218	1.190	1.143	1.084	0.994	0.930
31.00	2.432	1.989	1.384	1.205	1.126	1.108	1.076	1.029	0.954	0.901
34.00	2.119	1.826	1.287	1.130	1.060	1.046	1.018	0.981	0.919	0.874