r	0.0125	u	1.115889
sigma	0.8	d	0.896146
K	4	p	0.472615
F0	4.034	1-p	0.527385
del t	0.018787		
N	7		
EXP(-rdelt)	0.999765		

European Put

							8.691278
						7.788656	
					6.979775		6.979775
				6.254899		6.254899	
			5.605304		5.605304		5.605304
		5.023173		5.023173		5.023173	
	4.501497		4.501497		4.501497		4.501497
4.034		4.034		4.034		4.034	
	3.615054		3.615054		3.615054		3.615054
		3.239617		3.239617		3.239617	
			2.903171		2.903171		2.903171
				2.601666		2.601666	
					2.331473		2.331473
						2.089341	
							1.872355

							0
						0	
					0		0
				0		0	
			0.029751		0		0
		0.114984		0.056426		0	
	0.262198		0.191416		0.107017		0
0.462081		0.394241		0.312472		0.202967	
	0.641411		0.576177		0.496729		0.384946
		0.863198		0.812751		0.760204	
			1.120797		1.096314		1.096829
				1.39735		1.398006	
					1.667744		1.668527
						1.910211	
							2.127645

						0
					0	
				0		0
			-0.04581		0	
		-0.146461		-0.096952		0
	-0.282313		-0.258849		-0.205189	
-0.427792		-0.43405		-0.439636		-0.434259
	-0.590342		-0.62977		-0.701472	
		-0.765041		-0.842252		-1
			-0.916369		-0.999765	
				-0.99953		-1
					-0.999765	
						-1

F	4.034	0.00846408	ln(F/K)	
K	4	0.04208219	tau*(.5sigma^2)	
tau	0.13150685	0.05054627		
r	0.0125	0.29011098	sigma*sqrt(tau)	
sigma	0.8	0.1742308	d1	
		-0.11588018	d2	
		0.56915796	N(d1)	
		0.45387375	N(d2)	
	1c	0.47969901	call price	
		0.43084204	N(-d1)	
		0.54612625	N(-d2)	
	1a	0.44575486	put price	
		0.44575486	Put-call parity	
	1b	-0.43013439	put delta	Buy 4301 MMBTU offutures to hedge long 10KMMBTU puts
	1b-1c	0.33520021	Gamma	Sell 4301 MMBTU offutures to replicate long 10KMMBTU puts
	1c	0.57387145	Vega	
	1c	0.56822313	Call Delta	Buy 5682 MMBTU of futures to hedge short calls on 10K MMBTU
				Sell 5682 MMBTU to replicate short calls on 10KMMBTU

F	4.034	-0.05216054	ln(F/K)	
K	4.25	0.04208219	tau*(.5sigma^2)	
tau	0.13150685	-0.01007835		
r	0.0125	0.29011098	sigma*sqrt(tau)	
sigma	0.8	-0.03473964	d1	
		-0.32485063	d2	
		0.48614368	N(d1)	
		0.37264706	N(d2)	
	1d	0.37673377	call price	
		0.51385632	N(-d1)	
		0.62735294	N(-d2)	
		0.59237899	put price	
		0.59237899		
		-0.51301232	put delta	
		0.34012145	Gamma	
		0.58229674	Vega	
		0.48534519	Call Delta	Sell 48535 MMBTU to hedge long call on 100KMMBTU

F	82.94	-0.000723
K	83	0.009514
tau	0.183562	0.008791
r	0.015	0.137945
sigma	0.32197	0.06373
		-0.074215
		0.525407
		0.47042
		4.52
		0.474593
		0.52958
		4.579835

Implied vol is .322

F	4.034	0.008464	ln(F/K)	F	4.034	-0.040326	ln(F/K)
K	4	0.042082	tau*.5sigm	K	4.2	0.042082	tau*.5sigma^2
tau	0.131507	0.050546		tau	0.131507	0.001756	
r	0.015	0.290111	sigma*sqrt	r	0.015	0.290111	sigma*sqrt(tau)
sigma	0.8	0.174231	d1	sigma	0.8	0.006053	d1
		-0.11588	d2			-0.284058	d2
		0.569158	N(d1)			0.502415	N(d1)
		0.453874	N(d2)			0.388183	N(d2)
		0.479541	call price			0.395592	call price
		0.430842	N(-d1)			0.497585	N(-d1)
		0.546126	N(-d2)			0.611817	N(-d2)
		0.445608	put price			0.561265	put price
		0.568036	call delta			0.501425	call delta
		-0.429993	put delta			-0.496605	put delta
		0.33509	gamma			0.340209	call gamma
	3a	0.573683				0.582446	call vega
3b	delta	42.9993	100	3f		98.49545	Ncalls
3b	gamma	-33.509	Short			49.38806	Ncalls* Delta
3b	vega	-57.36828	Puts	3f`		-92.38736	Futures to Hedge Delta
						57.36828	Ncalls*CVega

3c Large negative gamma--large loss potential limited upside

3d sell 40.66 June Futures 0 Position Vega

3e Due to large negative gamma, delta changes, so need to adjust delta hedge frequently to limit risk e

a

xposure