APPENDIX

A. Seismic Acquisition Parameters

A.1 Acquisition Program

Estimated square km	:	1025.837
Actual square km	:	1063.48
Number of sail lines	:	103
Estimated CMP km	:	42,516.0000
Actual CMP km acquired	:	42,539.2125
Average sail line length	:	33.199 km
CMP columns per sail line	:	12
Sail line spacing	:	300m
CMP line spacing	:	25m
Bin width	:	25m
Bin inline	:	6.25m
Shot interval	:	18.75m
Nominal fold	:	32
First line number	:	1001
First shot number	:	1001
Line suffix	:	NBK
Survey rotation	:	322.801^0 and 142.810^0

A.2 Energy Source Specifications

Energy Source	Specifications
Gun Type	Bolt Airguns. Models 1500 and 1900
Gun Volume	Variable - 54 to 290 cubic inch
Array Volume	1,354 cubic inch.
Operating Pressure	2,000 psi
Operating Depth	4 metres
Timing Error Allowance	+/- 1.0ms
Pressure Release	Solenoid
Sensor Return	Piezoelectric
Gun Controller	Trisor
Gun Line Test Unit	Kalamos GLT
Number of guns	16 (2 strings x 8 elements)
Number of spares	Nil
Peak to Peak Pressure	36.0 Bar/m
Peak to Bubble Ratio	33.1
Far Field Signature	Supplied by Geco-Prakla
Compressors	4 x LMF (5187 scfm)

A.3 Seismic Recording and Streamer System Specifications

Seismic Recording System	Specification
Type	TRIACQ
Manufacturer	GETECH
Recording Format	SEG D
Recording Media	IBM 3590 compatible cartridge
Number of traces recorded.	6 x 192. TOTAL 1152
Record Length	5 seconds
Sample Rate	2 mseconds
Low Cut Filter	3Hz 18dB/Oct
High Cut Filter	180Hz 70dB/Oct
RTV	SPARC/VME based real time visual unit
Recording Computer	SS1000 from SUN
	4 Super SPARC Processors
	512 Mbyte Memory
Digital Streamer System	**Specifications**
Type	Nessie III Digital Streamer System.
Manufacturer	Fjord Instruments, Norway.
Maximum Capacity	2,000 channels at 2ms sample rate.
Group Length	12.50 metres
Hydrophones per Group	24
Hydrophone Type	Teledyne T2
Hydrophone Sensitivity	20μV/μB (Tested at 20.02μV/μB)
Section Length	100m
Maximum Streamer Length	8,000m (2,400m for this survey)
Cable Oil	Isopar M
Data Channels per Electronic Module	16
Auxiliary Channels Displayed	Field Time Break/Waterbreaks
Operating Depth (nominal)	5m
Shotpoint Interval	18.75m (flip/flop)

A.4 3D Binning and Binning Parameters

3D Binning System	TriNav
Mode of Shooting	Six streamers/Dual source
Shotpoint Interval	18.75m-alternating arrays (flip/flop)
True Shotpoint Distance	37.00m per source array
Number of CDP Sub-surface Lines	12
3D Bin Width	25m crossline
3D Bin Length	6.25m inline
Effective Fold	32
Number of Cable Segments	4
Flex Binning Allowance	NIL during prime acquisition
Centre Source - Centre 1st Active Group	130m nominal

A.5 3D Acquisition Parameters

No of Vessels:	Single
No. of Streamers:	4 x 2,400m
No. of Channels:	192 per 2,400m streamer
Group Interval:	12.5m
SP Interval:	18.75m flip/flop (37.50m per side)
Sample Rate:	2ms
Record Length:	5 seconds
Low Cut Filter:	3Hz 18dB/Oct
High Cut Filter:	180Hz 70dB/Oct
Cable Depth:	5m (+/- 1.5m)
Source Depth:	4m (+/- 0.5m)
Nominal Fold:	32
Crossline Spacing:	25m
Bin Size:	6.25m x 25m
Near Trace Group:	132m
Streamer Separation	100m
Source Separation	50m

B. Seismic Data Processing Parameters

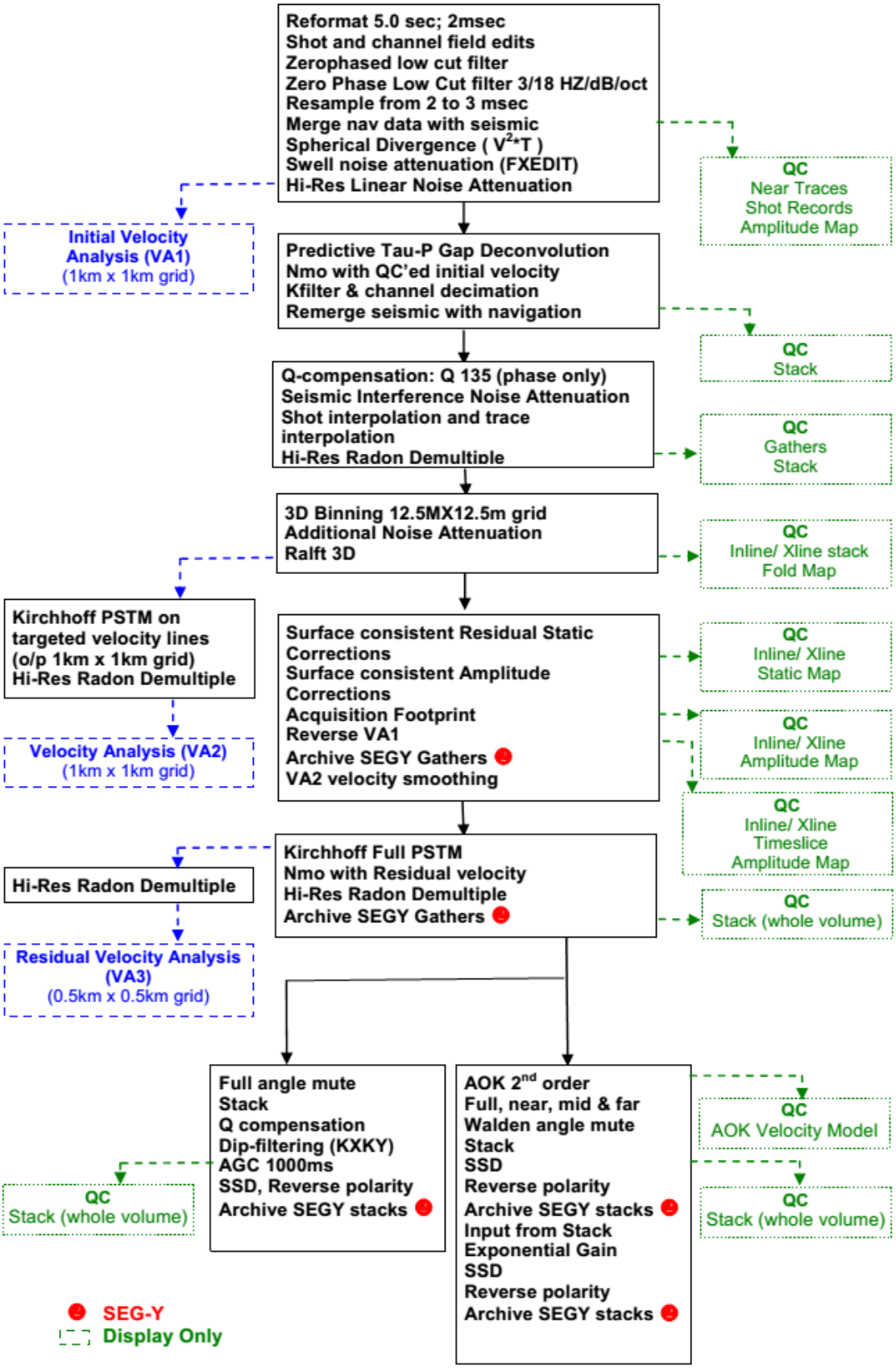
B.1 Summary of Pre-stack Time Migration Production

1. Reformat 5.0second record length; 2msec sample rate
2. Shot and channel field edits
3. Zero-phase de-signature filter
4. Zero Phase Low Cut filter 3/18 HZ/dB/octave
5. Resample from 2 to 3 ms (zero phase anti-alias filter)
6. Merge Seismic and Navigation
7. Spherical Divergence (V2T)
8. Swell Noise Attenuation:
   1st pass (0-24 Hz, Threshold 2.0), 2nd pass (0-80 Hz, Threshold 2.5)
9. Linear Noise Attenuation:
   Channels were interpolated and discarded after this process.
   No of P's =1024, start time of application 600 ms
10. Initial velocity analysis -1km x 1km grid
11. Predictive Gap Deconvolution in Tau-P Domain:
    P's -700 usec/m, design gate 240–4002 ms , apply 180–5000 ms
    P's 0 usec/m, design gate 210–4002 ms , apply 180–5000 ms
    P's 700 usec/m, design gate 21–3000 ms, apply 180–5000 ms
    White noise used 0.1 %
12. Trace drop after applying spatial Kfilter - pass zone is 60% of Nyquist

13. Seismic Interference Noise Attenuation: Applied from 2800ms to Tmax only
14. Q-compensation: Q 135 (phase only)
15. Shot interpolation and trace interpolation
16. Hi-Res Radon Demultiple:
    Frequency range = 3 to 110Hz (768p values); Transform moveout range: -800 to 5000 msec; Start time 300 msec, taper = 200 msec;
    Time variant Radon cuts: 200msec cut at time 1sec and 125 msec cut at time 2 sec
17. Discard interpolated traces
18. 3D Binning (Trace nearest to bin center are kept in the Binning process)
19. Additional Noise Attenuation in offset domain, in crossline direction (start at 3 sec)
20. RALFT 3D (3D algorithm):
    Anti-Leakage Fourier Transform for trace interpolation to bin center and filling in missing traces; Max no. of holes to fill = 7
21. Kirchhoff PSTM on targeted velocity lines
22. Velocity analysis 2 - 1 km x 1km grid
23. Hi-Res Radon Demultiple:
    Frequency range = 3 to 110Hz (768p values); Transform move-out range: -800 to 5000 msec; Start time 300msec, taper = 200msec;
    Time variant Radon cuts: 125msec cut at time 1sec and 100 msec cut at time 2 sec
24. Re-visit Velocity analysis 2 - 1 km x 1km grid
25. Input from item 20- Surface consistent Residual Static corrections:
    Time gate for residual static calculation: 1200ms (+/-500ms); Pilot traces generated by irregular smashing 37m x 75m
26. Surface consistent amplitude corrections:
    Accumulation time gate: near offset 500 ~ 2500ms, far offset 1500 ~ 2500ms
27. Acquisition Footprint Removal: Smoother 300m, Horizontal mix 2500m
28. Output CDP Bin gathers on 3590 and 3592 cartridges in SEG-Y format
29. Kirchhoff Full PSTM (3km half aperture; isotropic migration with curve ray algorithm)
30. Residual velocity analysis 3 - 0.5 x 0.5 km grid
31. Hi-Res Radon Demultiple:
    Frequency range = 3 to 110Hz (768p values); Transform moveout range: -800 to 5000 msec; Start time 300 msec, taper = 200 msec;
    Time variant Radon cuts: 100 msec cut at time 300 sec and 70 msec cut at time 1 sec

32. Re-visit Residual Velocity analysis – 0.5 km x 0.5 km grid
33. Input from item 28 - Nmo Correction with velocity (item 32) after final QC
34. Hi-Res Radon Demultiple:
    Frequency range = 3 to 110Hz (768p values); Transform moveout range: -800 to 5000 msec; Start time 300 msec, taper = 200 msec;
    Time variant Radon cuts: 100 msec cut at time 300sec and 70 msec cut at time 1 sec
35. Output NMO corrected PSTM CDP gathers on 3590 and 3592 cartridges in SEG-Y format
36. Mute (approximately 5 - 45 degree)
37. Stack 1/fold
38. Q-compensation of 135, 5dB Boost (amplitude only, Ref Freq Nyquist)
39. Dip-filtering (KXKY)
40. AGC 1000ms
41. Source and receiver depth static correction = 6.1688ms
42. Reverse Polarity: Compression = negative number = center of white trough = increase in acoustic impedance downwards
43. Output Final PSTM Full stacks on 3590 tapes and DLT cartridges in SEG-Y format
44. Input from item 34 – AOK 2nd order: Performed on every other inline and every other crossline with 375m diameter median smoothing
45. Walden calculated angle mute:
    Near angle: 8 - 22 degree
    Mid angle: 22 – 36 degree
    Far angle: 36 – 50 degree
46. Stack 1/fold
47. Source and receiver depth static correction = 6.1688 ms
48. Reverse Polarity: Compression = negative number = center of white trough = increase in impedance downwards
49. Output PSTM full and sub-stacks on 3590 tapes and DLT cartridges in SEG-Y format
50. Input from item 46, Exponential Gain (0ms-0dB; 300ms-0dB; 2000ms-12dB; 3000ms-18dB; 4000ms-24dB)
51. Source and receiver depth static correction = 6.1688ms
52. Reverse Polarity: Compression = negative number = center of white trough = increase in impedance downwards
53. Output PSTM full and sub-stacks on 3590 tapes and DLT cartridges in SEG-Y format

B.2 3D Processing Flow Chart



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