



PROTECTOR PLACEMENT REPORT

for

Customer: XYZ

Well: 123

ANALYSIS: Contact force and torque analyses are attached.

ANALYSIS CONDITIONS: An analysis was performed on the hole considering **1: drilling an 8 1/2" hole to ± 4890m with maximum bit runs of 670m inside 9 5/8" casing set at ±4220m**

The condition of rotating off bottom was analysed for contact force. The condition of rotating on bottom was analysed for Torque. CoFs for casing and open hole were assumed to be 0.2 and .3, respectively. Survey data to 4020m was provided, I have assumed that angle is held from here to TD.

Three areas of high contact force were found:

1. from **100m to 600m**
2. from **1200m to 1700m** (the worst area)
3. from **2500m to 3050m**
4. there is also a point of high contact force at **3555m**

There is potential for casing wear in all these areas if they are subjected to a high number of rotations. It is strongly recommended to cover them all.

RESULTS: The recommendation for **torque reduction and casing protection in 9 5/8" casing is:**

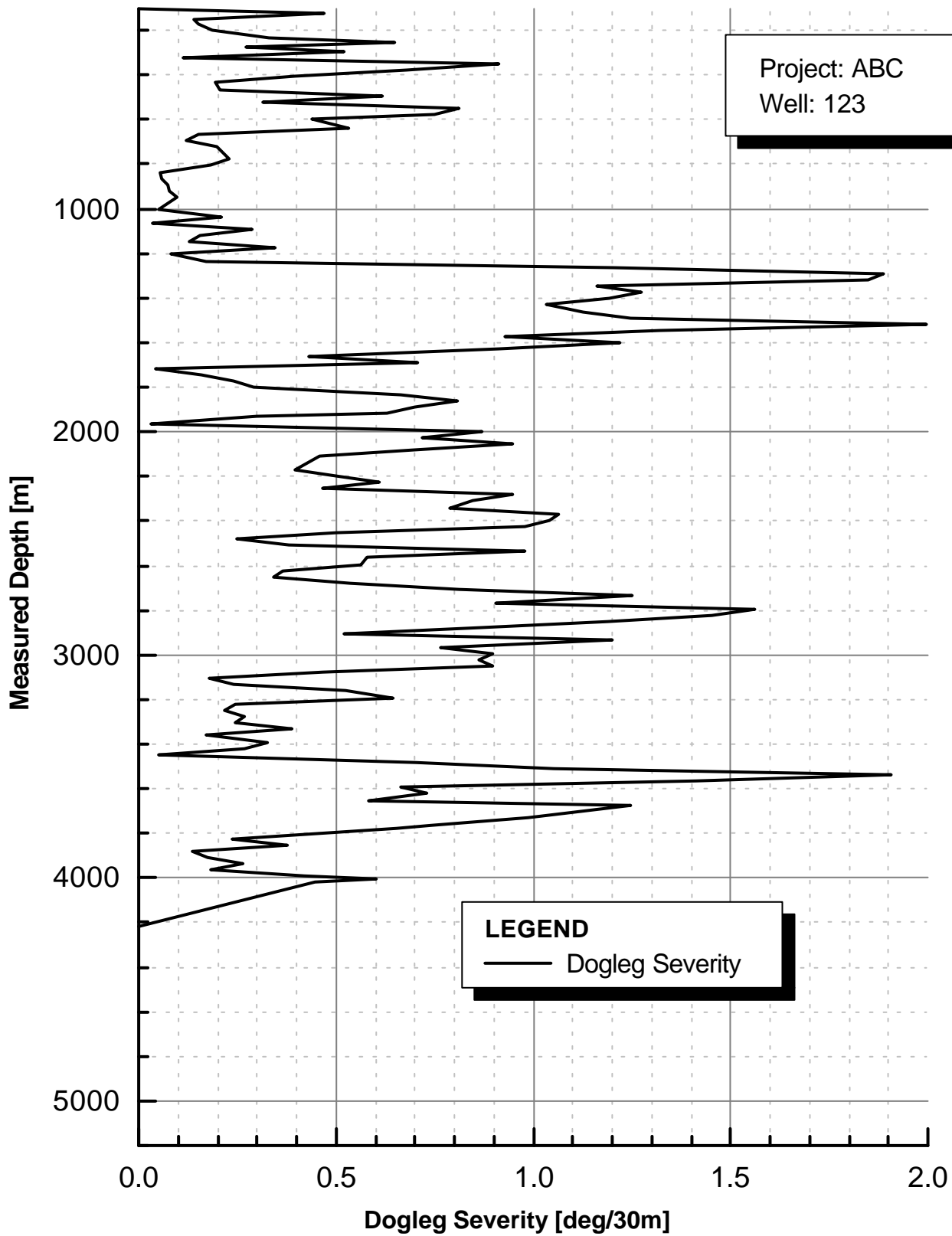
Interval MD	Stands	Protector/ Stand	No. Protectors	Type of Protector
670m bit run	24	3	72	5" poly
100m-600m	18	3	54	
670m bit run	24	3	72	
1200m-1700m	18	3	54	
670m of bit run	24	3	72	
2500m-3050m	19	3	57	

If you only wish to cover the area of highest contact force between 1200m and 1700m, plus 670m bit run, protector numbers required would total **126** plus spares.

Note: This proposal is based on the information supplied. If any of the parameters differ from those used, please inform us. We should re-calculate contact forces from the full survey data to TD once it is supplied

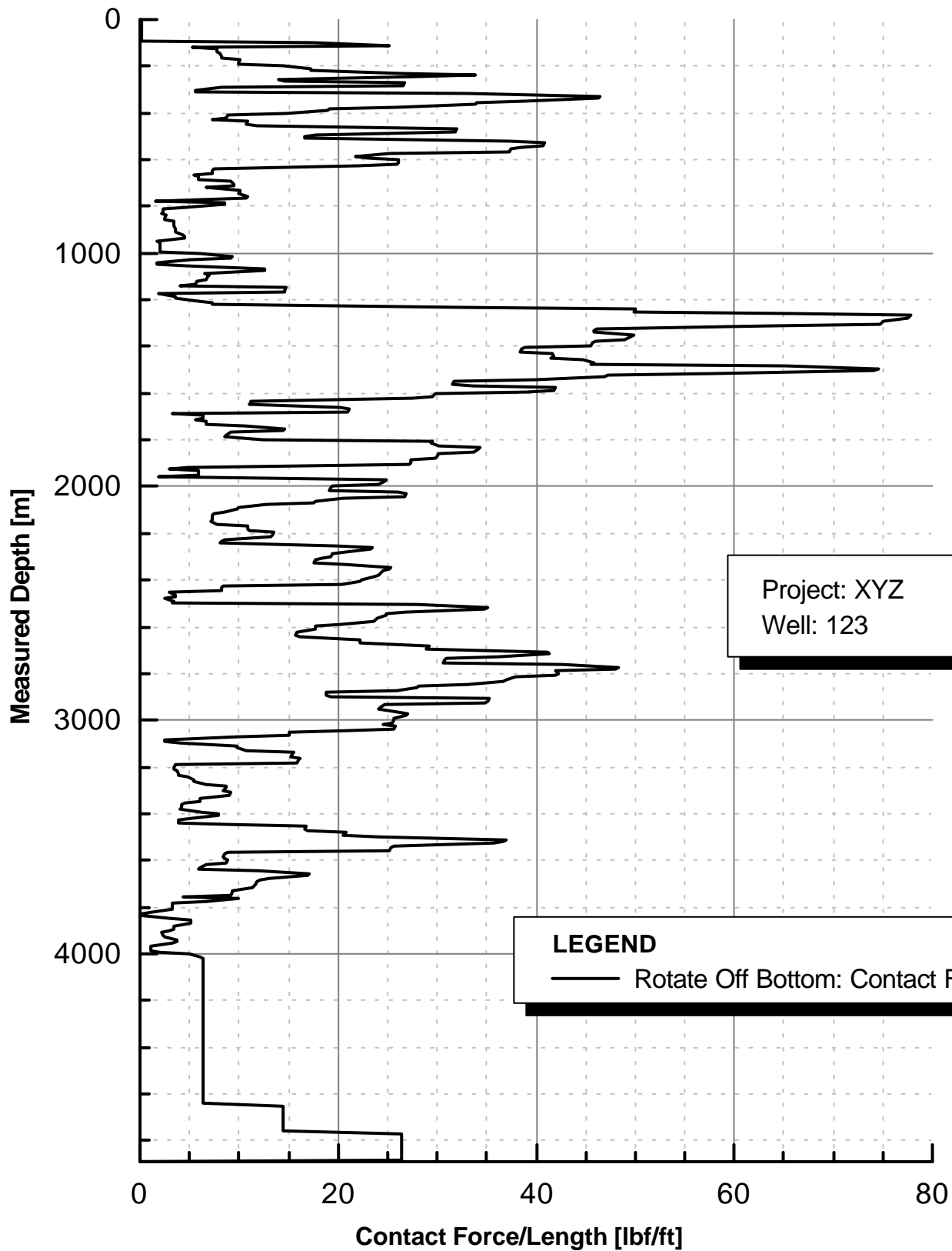
Dogleg Severity Graph

from definitive survey to 4020m



Rotate Off Bottom: Contact Force

8½" section



Rotate On Bottom: Torque

8½" section at TD

