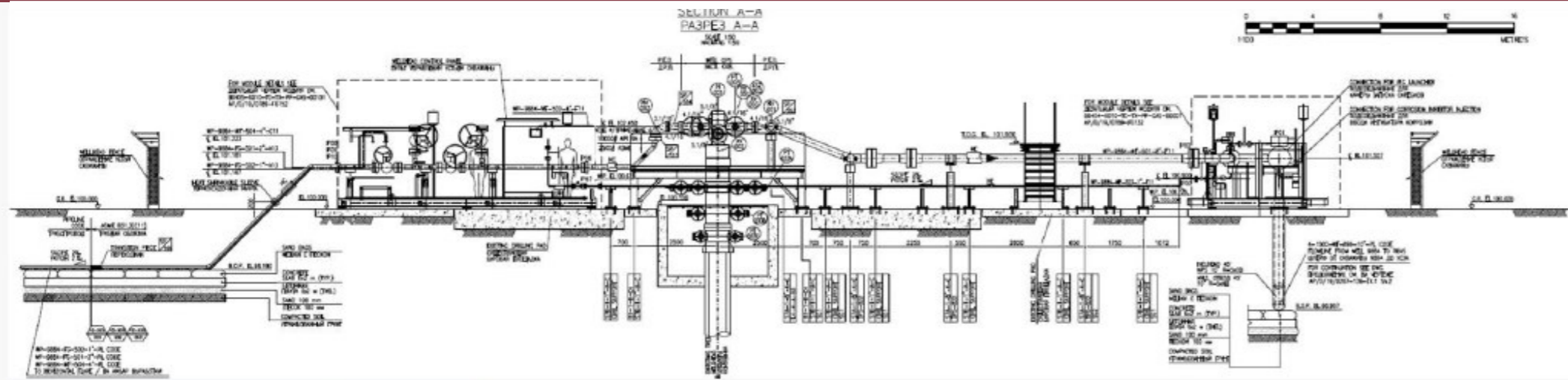
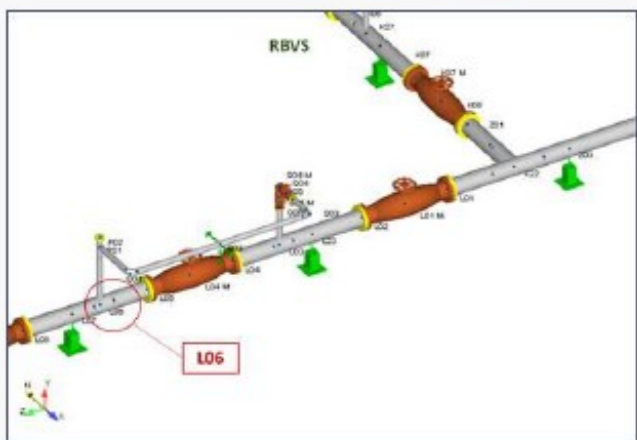
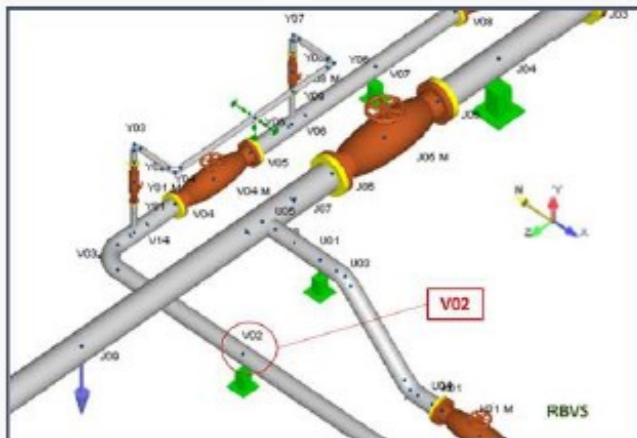
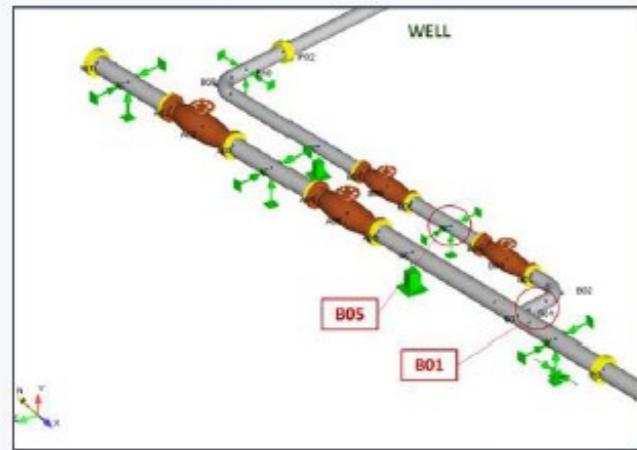


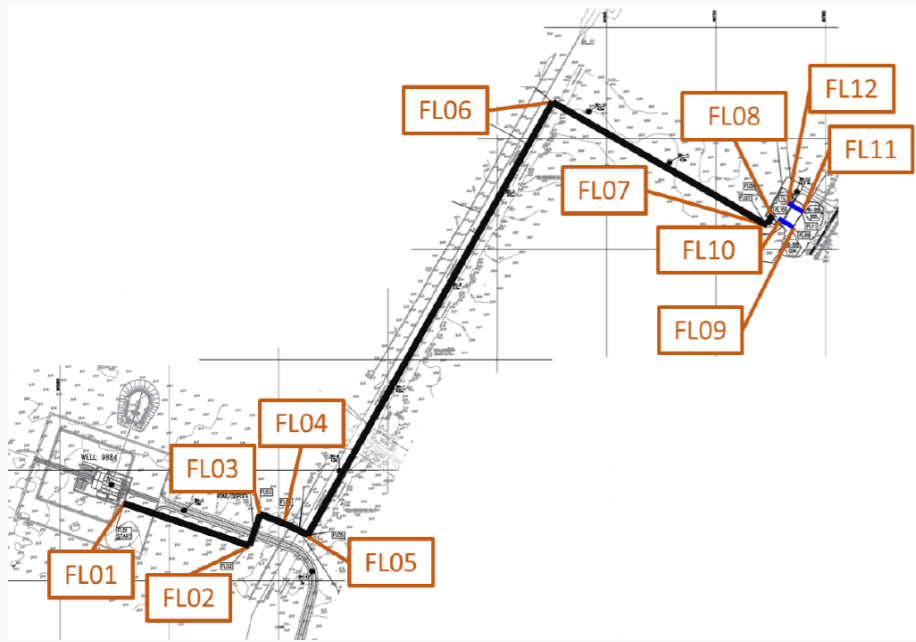
WELLS Arrangement Hook up and Connections



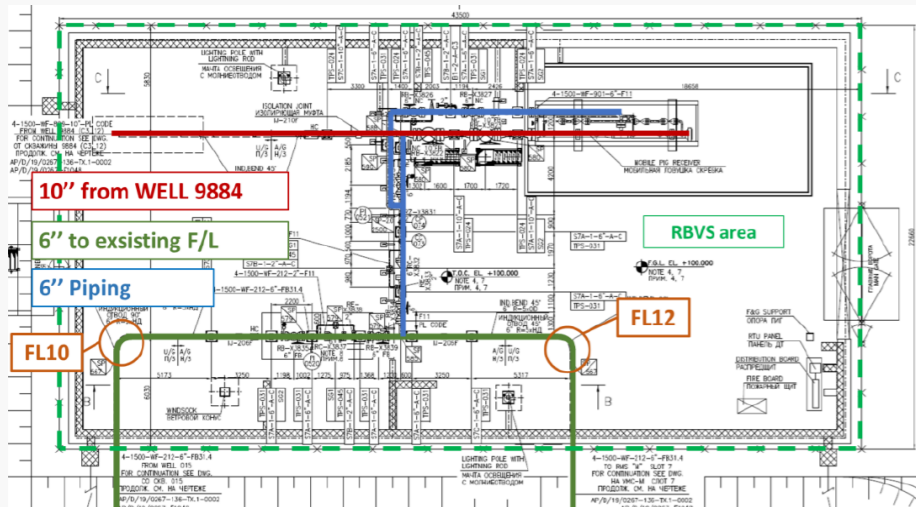
Piping & Pipeline Stress Analysis activities for:

- WELL 9884 (C3_12)
- WELL 9885 (C3_11)
- WELL 9886 (E3_02)
- WELL 9887 (C3_09)

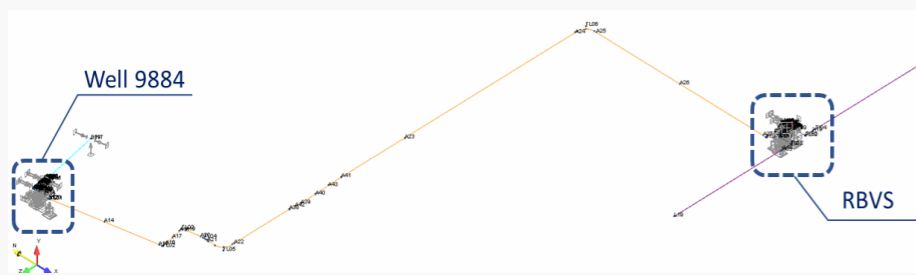




ND 10" Pipeline Route from Well 9884 to RBVS and ND 6" Pipeline Route from RBVS to the existing 6" flowline.



Piping detail in the RBVS area

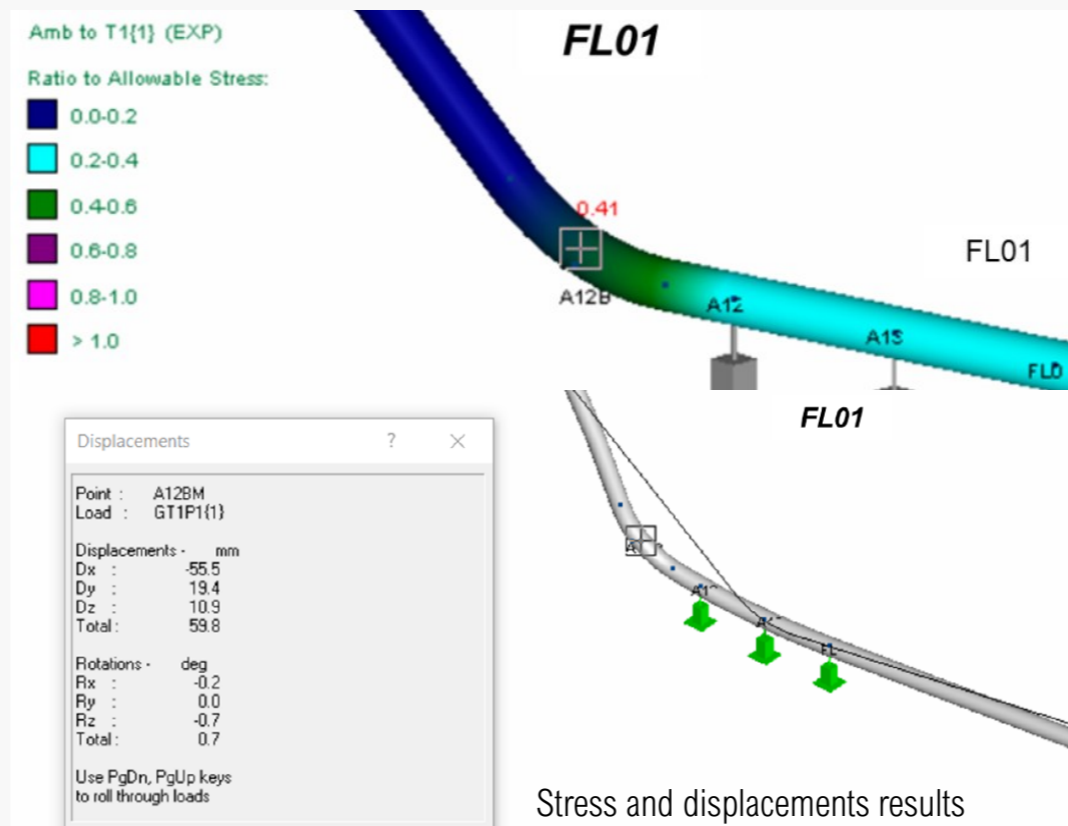


General overview of the calculation model – WELL9884 to RBVS & F/L

PIPELINE STRESS ANALYSIS

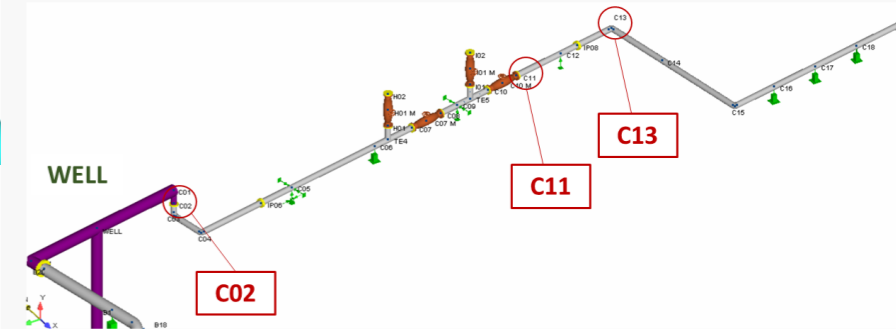
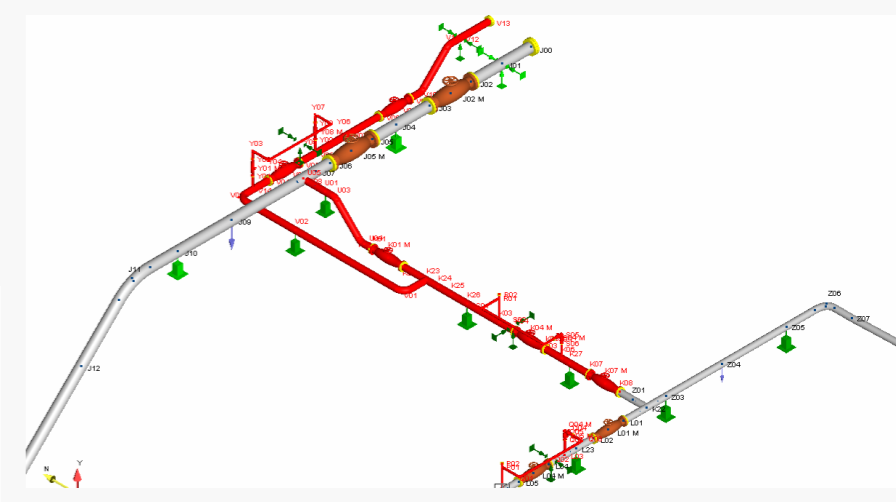
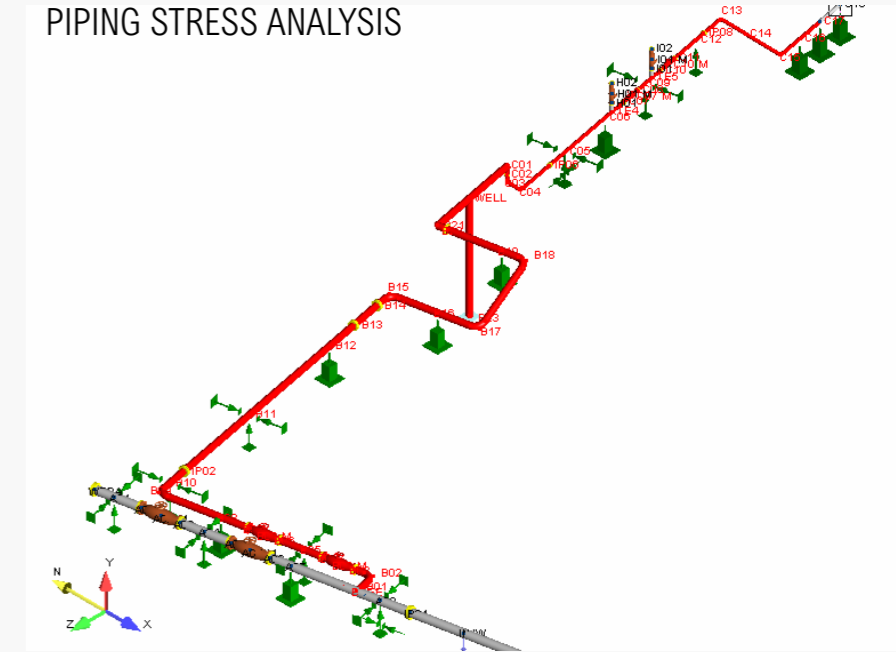
This Stress Analysis has been prepared to develop all the mechanical activities necessary for the 10" Flowline which is associated with the hook-up of Well 9884 (C3_12). The line will flow to a new RBVS to be installed near the existing 6" flowline from Well 15 to RMS-M. Pipeline scope includes installation of the new 10" flowline, demolition of a section of the existing 6" flowline and construction of new 6" sections at the tie-in.

Calc. Node	Description	Combination	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio
FL-01	5xOD	OPER	125.8	335.6	0.41
FL-02	60xOD	OPER	84.8	335.6	0.25
FL-03	60xOD	OPER	88.5	335.7	0.27
FL-04	60xOD	OPER	148.7	335.7	0.45
FL-05	60xOD	OPER	122.3	335.7	0.37
FL-06	60xOD	OPER	124.6	335.7	0.37
FL-07	5xOD	OPER	204.4	335.3	0.61
FL-08	5xOD	OPER	54.8	334.2	0.18
FL-09	5xOD	OPER	233.5	312.5	0.75
FL-10	5xOD	OPER	81.2	312.5	0.26
FL-11	5xOD	OPER	238.7	312.5	0.76
FL-12	5xOD	OPER	79.8	312.5	0.26

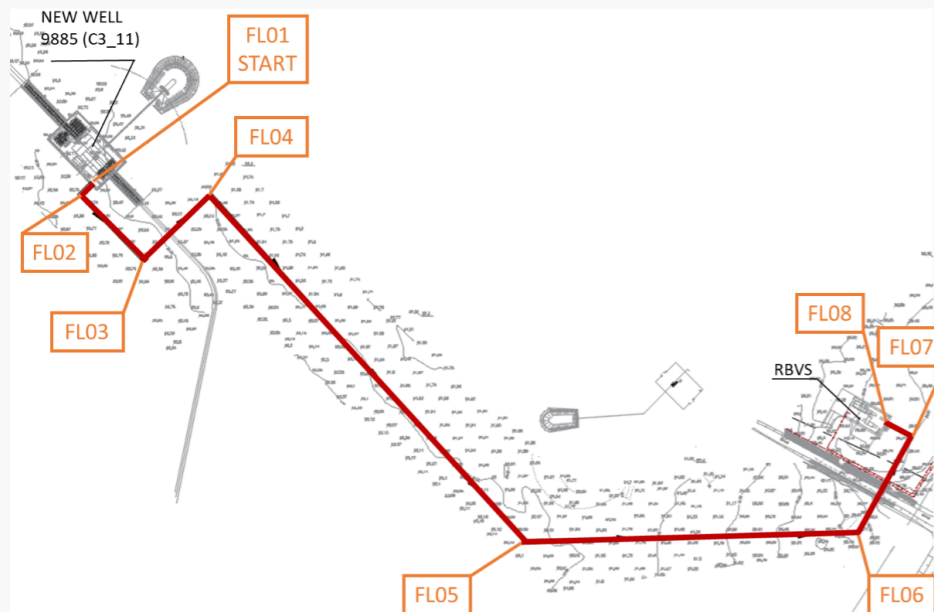


Stress and displacements results

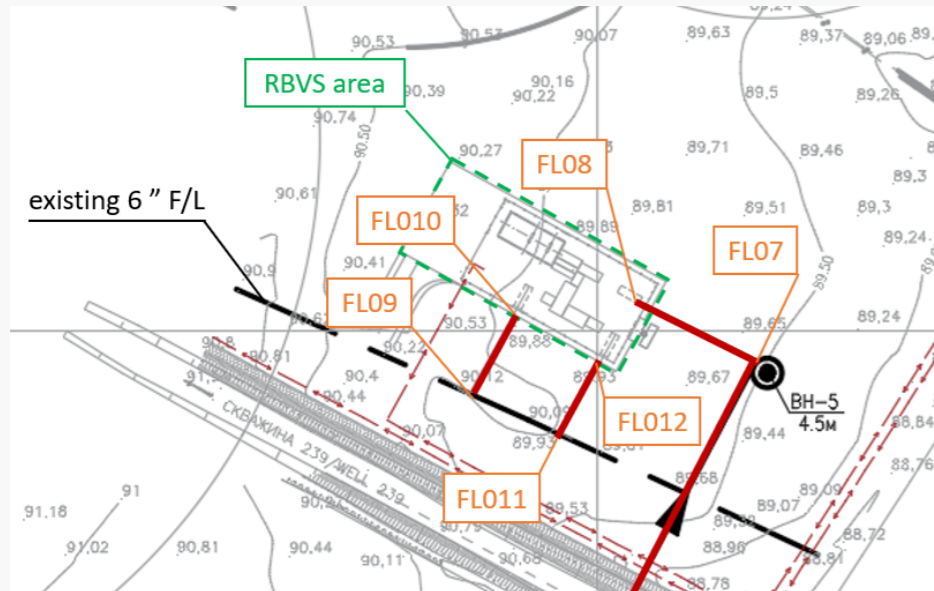
PIPING STRESS ANALYSIS



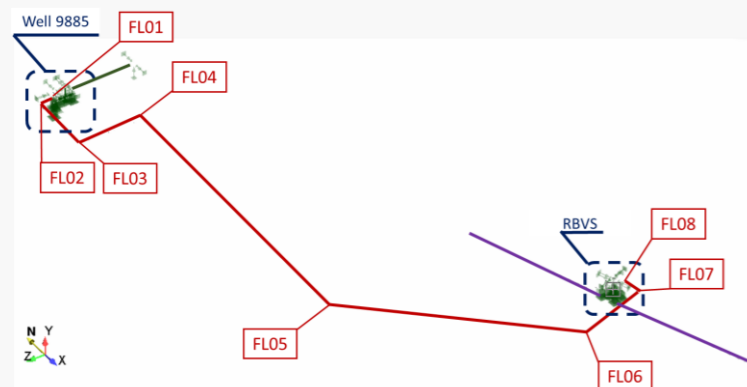
Stress Condition	Calc. Node	Position	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio
GR+MaxP	C11	See Fig. 7.3	85.2	137.9	0.62
Amb T	C13	See Fig. 7.3	213.6	276.0	0.77
Max P	L06	See Fig. 7.4	116.1	137.9	0.84



ND 6" Pipeline Route from Well 9885 (C3_11) to RBVS



ND 6" Pipeline Route from RBVS to existing 6" flowline

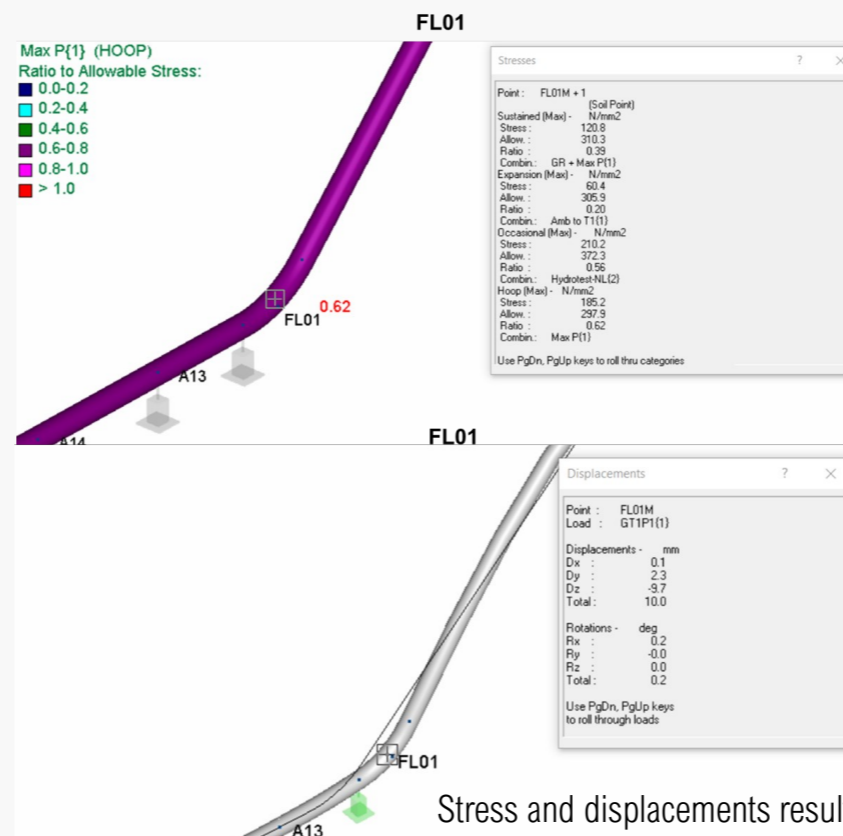


General overview of the calculation model – WELL9885 to RBVS & F/L

PIPELINE STRESS ANALYSIS

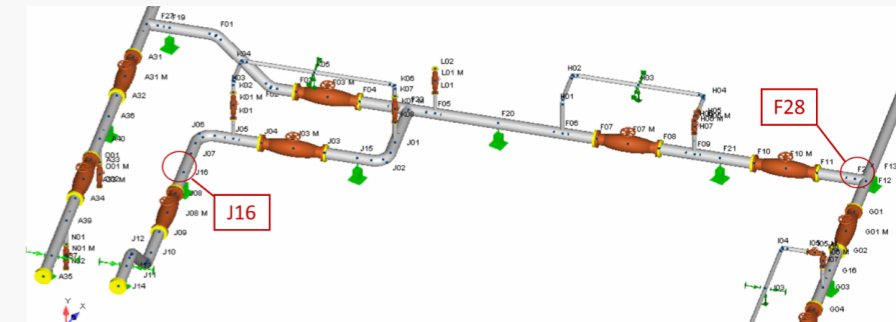
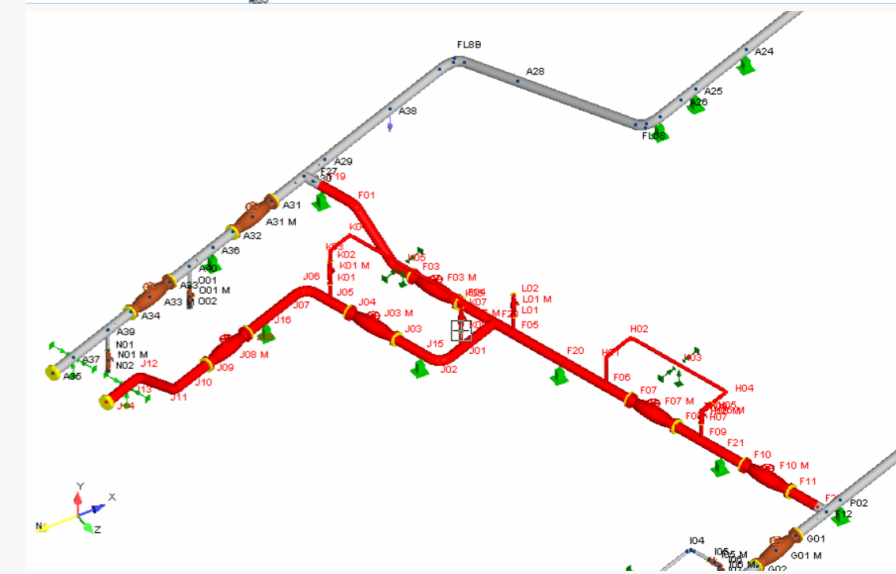
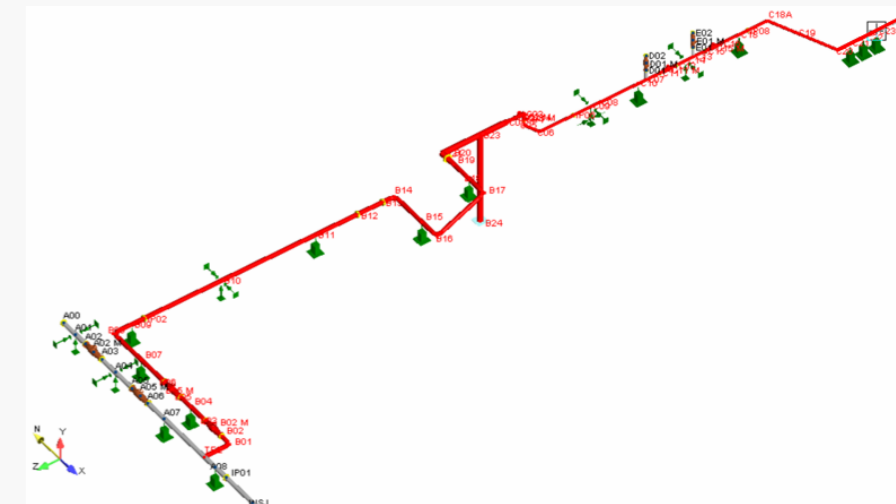
This study has been issued to develop the stress analysis for the 6" flowline which is associated with the hook-up of Well 9885 (C3_11). The pipeline start at the FL01 point (after the well and immediately before the underground section) and ends at the new RBVS area. The pipeline project includes installation of two new 6" branches, starting from RBVS area, to be connected with the existing 6" flowline from Well 239 to RMS-P.

Stress Condition	Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio	
Maximum sustained stress	GR+MaxP	A34	212.6	310.3	0.69
Maximum displacement stress	Amb to T1	FL11	247.9	284.7	0.87
Maximum occasional stress	Hydrotest	FL11	298.1	372.3	0.80
Maximum hoop stress	Max P	A00	185.2	297.9	0.62
Maximum restrained expansion stress	REST: Amb to T1	A57	126.2	372.3	0.34
Maximum Longitudinal stress	GRT1P	A57	94.0	372.3	0.25
Maximum Combined stress	GRT1P	A57	287.0	372.3	0.77

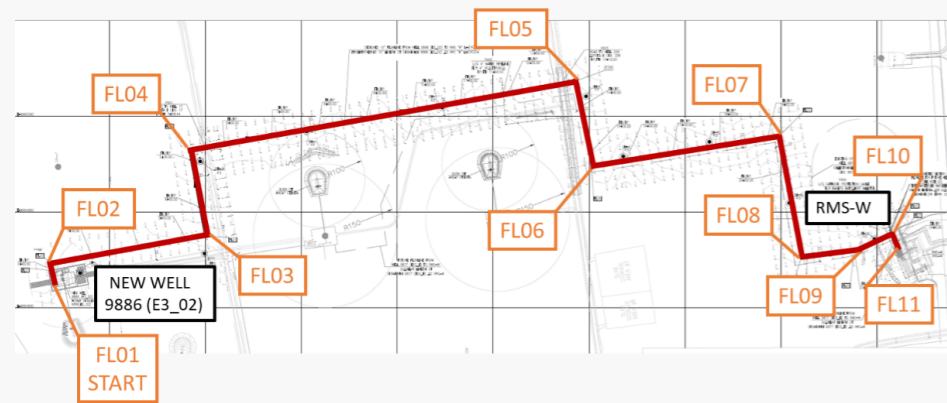


Stress and displacements results

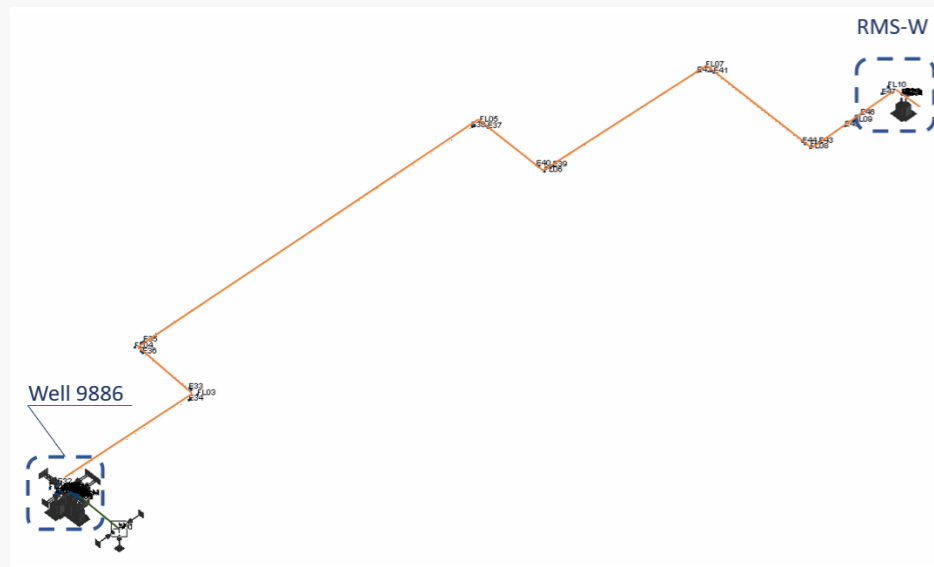
PIPING STRESS ANALYSIS



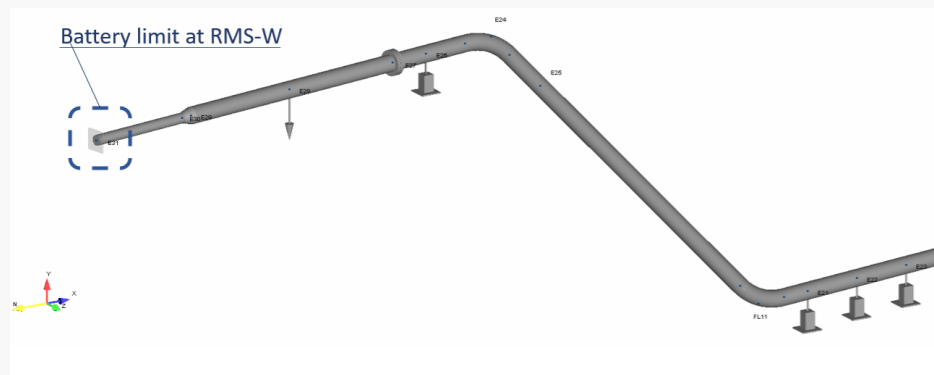
Stress Condition	Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio	
Maximum sustained stress	GR+MaxP	J16	102.8	173.7	0.59
Maximum displacement stress	Max Range	C18A	299.3	300.8	0.99
Maximum occasional stress	Hydrotest	C18A	176.9	217.2	0.81
Maximum hoop stress	Max P	F28	214.3	297.9	0.72



ND 10" Pipeline Route from Well 9886 (E3_02) to RMS-W



General overview of the calculation model – WELL9886 to RMS-W

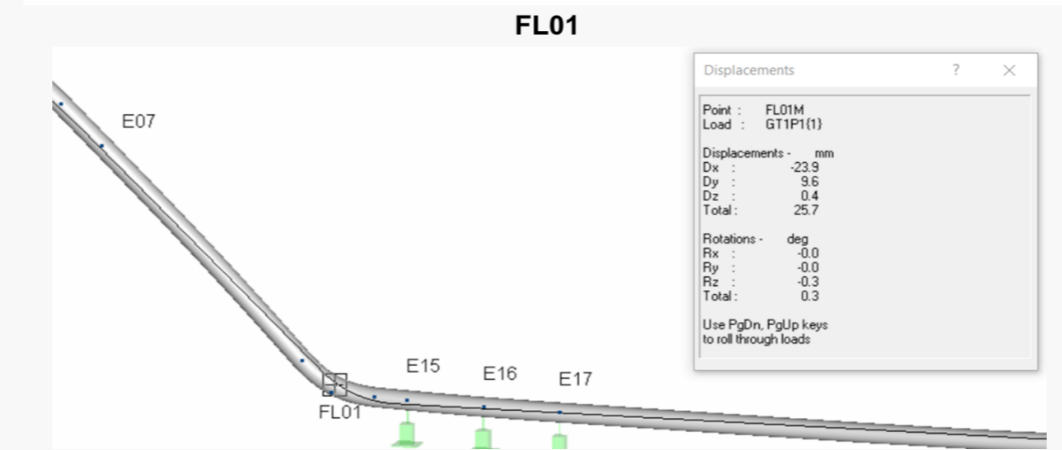
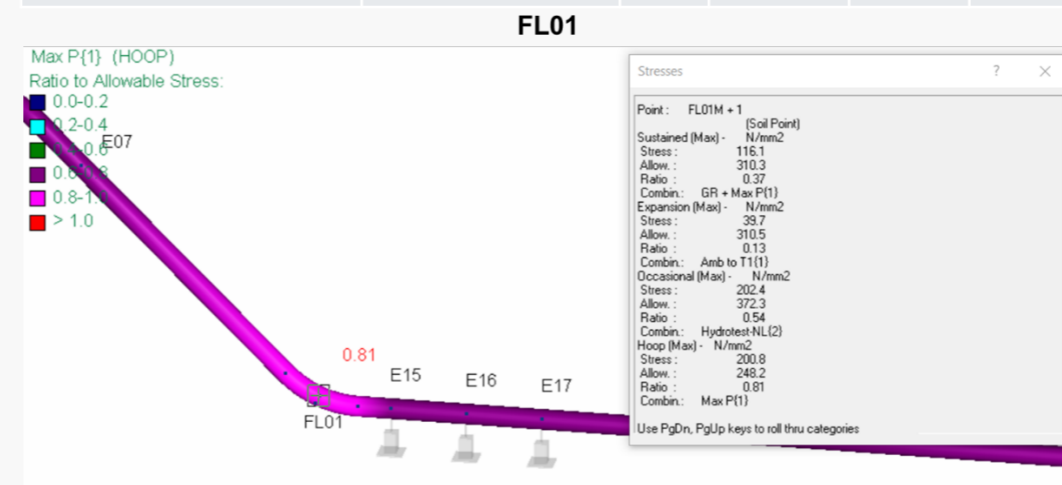


Calculation model detailed at RMS-W battery limit

PIPELINE STRESS ANALYSIS

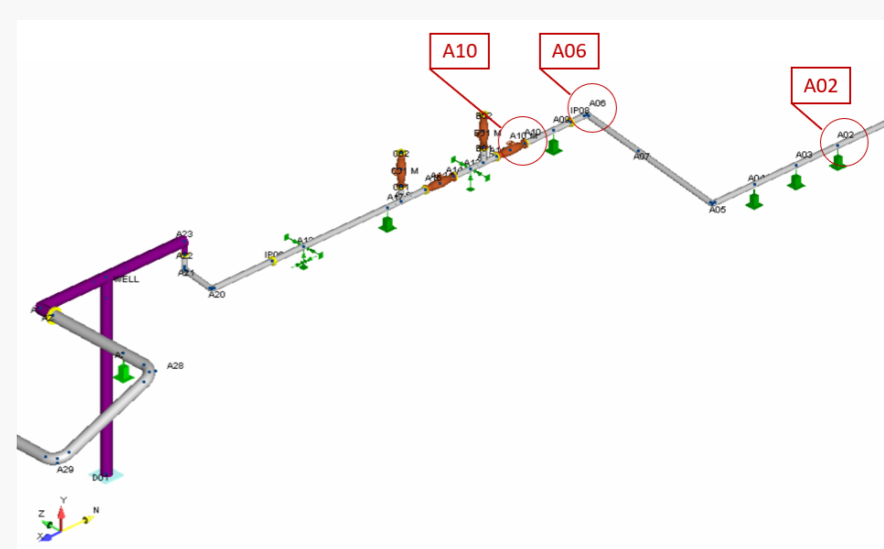
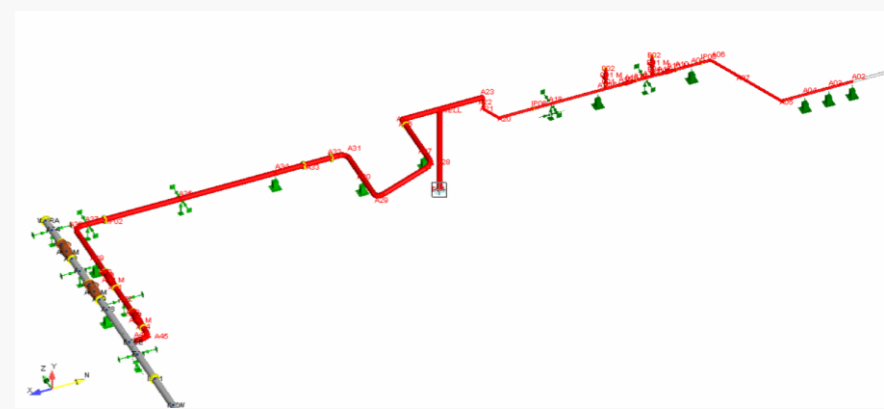
This Stress Analysis study is referred to the 10" flowline which is associated with the hook-up of Well 9886 (E3_02). The pipeline (flowline) start from Well 9886 (E3_02) area, at the point FL01, and ends to the RMS-W area, at the battery limit between AGP and other Contractor.

Stress Condition		Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio
Maximum sustained stress	GR+MaxP	E31	159.1	310.3	0.51
Maximum displacement stress	Amb toT1	FL10	215.0	333.1	0.65
Maximum occasional stress	Hydrotest	FL09	256.7	372.3	0.69
Maximum hoop stress	Max P	FL01	200.8	248.2	0.81
Maximum restrained expansion stress	REST: Amb toT1	E50	126.2	372.3	0.34
Maximum longitudinal stress	GRTP	E48	94.8	372.3	0.25
Maximum combined stress	GRTP	E48	248.0	372.3	0.67

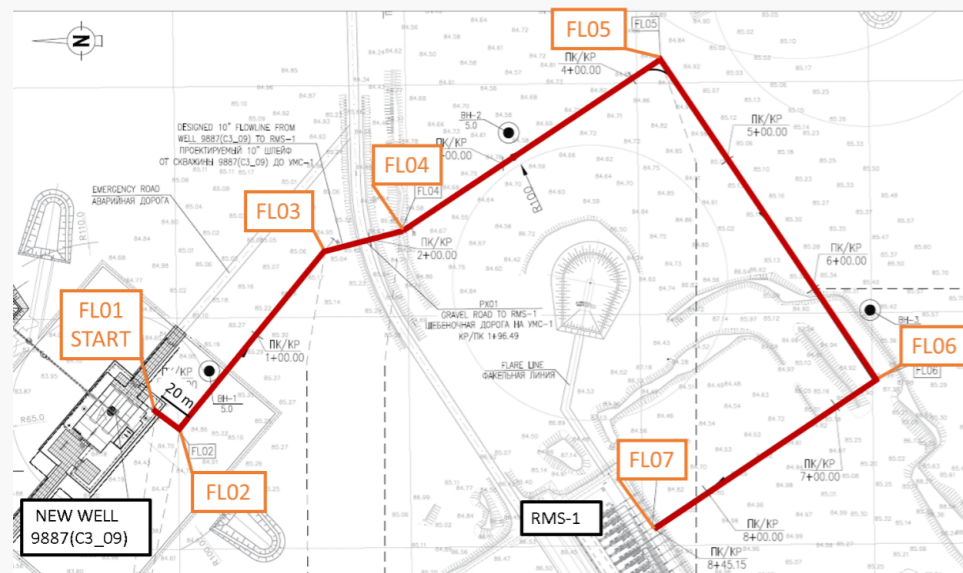


Stress and displacements results

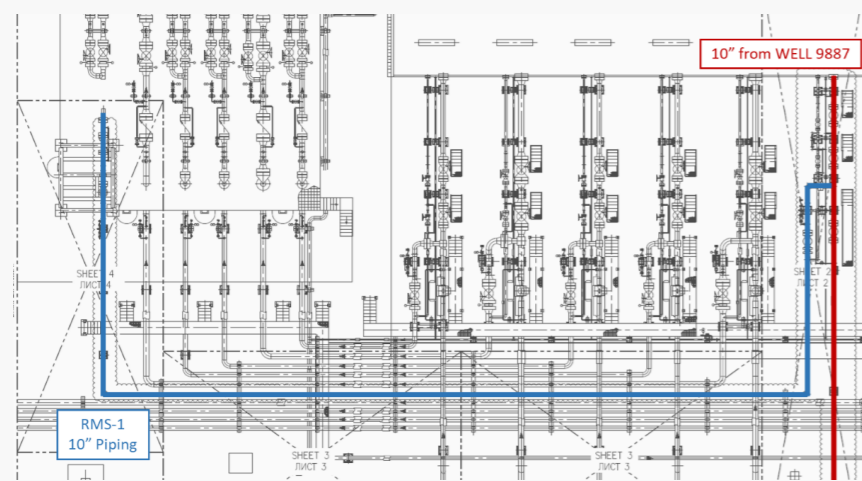
PIPING STRESS ANALYSIS



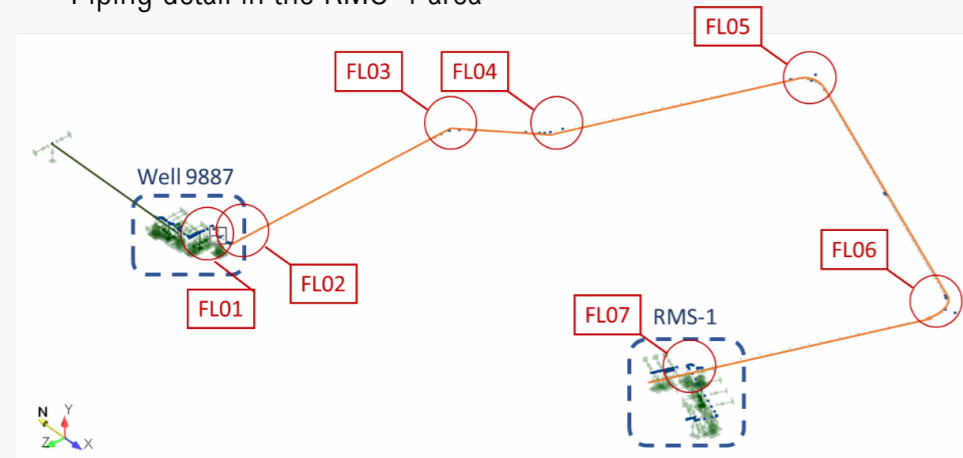
	Stress Condition	Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio
Maximum sustained stress	GR+MaxP	A02	77.9	297.9	0.26
Maximum displacement stress	Max Range	A06	295.9	320.3	0.92
Maximum occasional stress	Hydrotest	A06	185.3	217.2	0.85
Maximum hoop stress	Max P	A02	185.3	297.9	0.62
Maximum sustained stress ratio	GR+MaxP	A10	73.2	173.7	0.42
Maximum displacement stress ratio	Max Range	A06	204.6	206.8	0.99
Maximum occasional stress ratio	Hydrotest	A06	185.3	217.2	0.85
Maximum hoop stress ratio	Max P	A02	185.3	297.9	0.62



ND 10" Pipeline Route from Well 9887 (C3_09) to RMS-1



Piping detail in the RMS-1 area

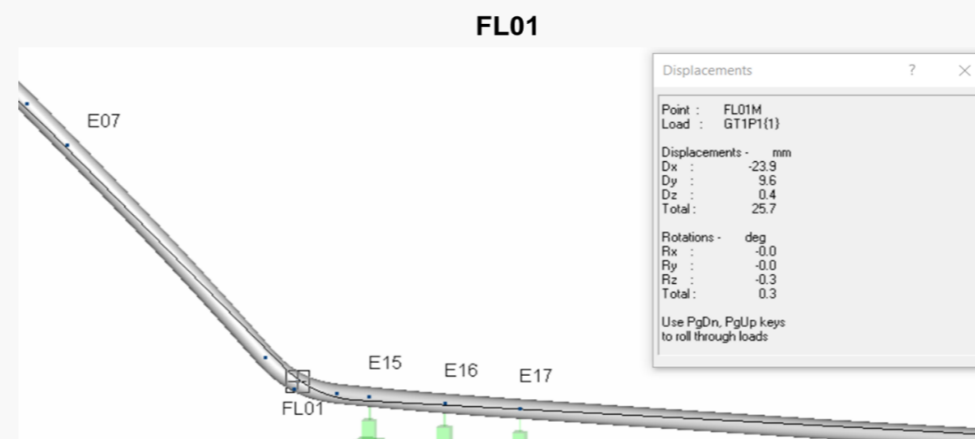
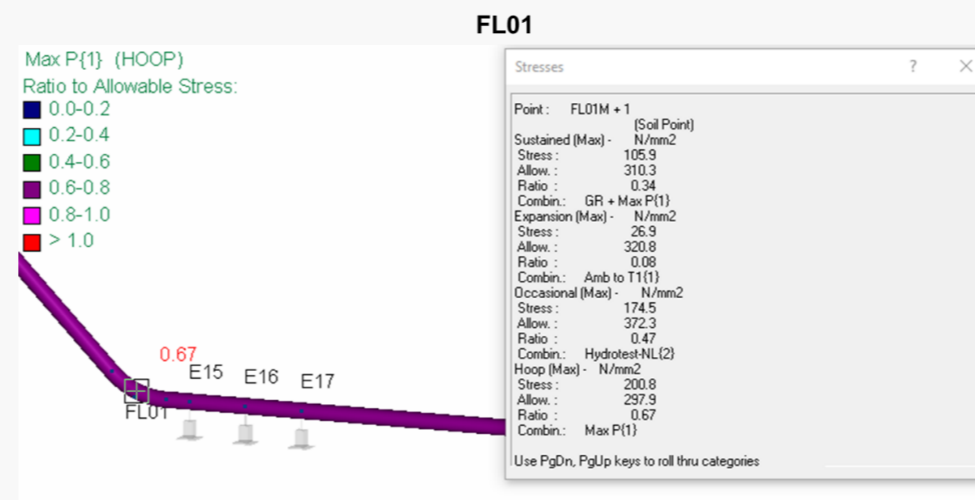


General overview of the calculation model – WELL9887 to RMS-1

PIPELINE STRESS ANALYSIS

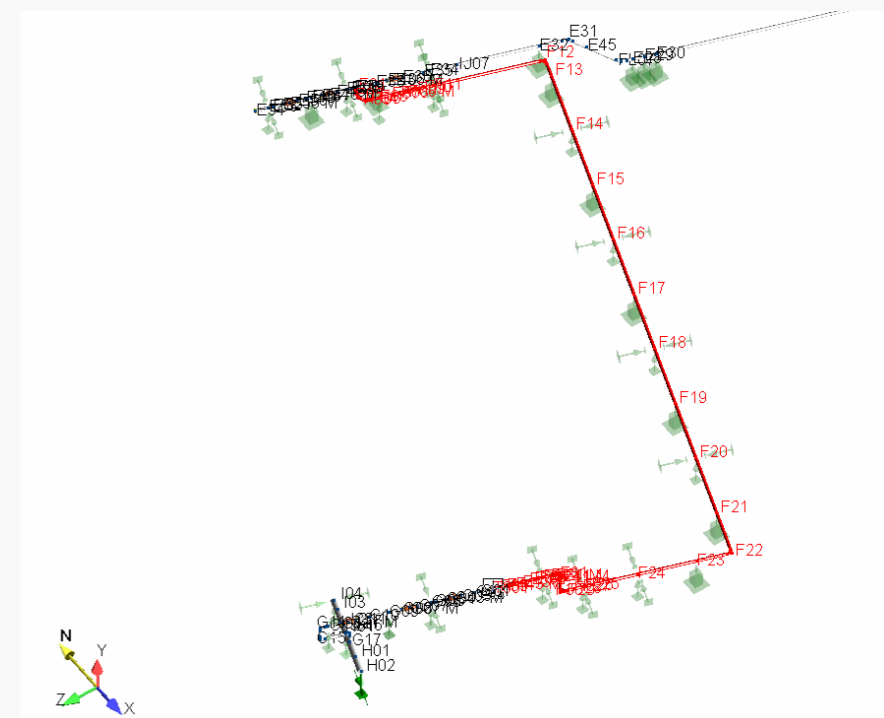
This Stress Analysis study is referred to the 10" flowline which is associated with the hook-up of Well 9887 (C3_09). The pipeline (flowline) start from Well 9887 (C3_09) area, at the point FL01, and ends to the RMS-1 area.

Stress Condition		Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio
Maximum sustained stress	GR+MaxP	E39	147.6	310.3	0.48
Maximum displacement stress	Amb toT1	FL02	169.4	305.3	0.55
Maximum occasional stress	Hydrotest	FL02	255.2	372.3	0.69
Maximum hoop stress	Max P	BTEE	200.8	297.9	0.67
Maximum restrained expansion stress	REST: Amb toT1	E58	125.9	372.3	0.34
Maximum longitudinal stress	GR+MaxP	E58	72.2	372.3	0.19
Maximum combined stress	GRTP	E58	272.9	372.3	0.73



Stress and displacements results

PIPING STRESS ANALYSIS



Stress Condition	Calc. Node	$\sigma_{calc.}$ [MPa]	$\sigma_{allow.}$ [MPa]	Ratio	
Maximum sustained stress	GR+MaxP	A10	80.0	173.7	0.46
Maximum displacement stress	Max Range	A06	311.2	317.3	0.98
Maximum occasional stress	Hydrotest	A06	178.4	217.2	0.82
Maximum hoop stress	Max P	A56	277.9	297.8	0.93
Maximum sustained stress ratio	GR+MaxP	A10	80.0	173.7	0.46
Maximum displacement stress ratio	Max Range	A06	311.2	317.3	0.98
Maximum occasional stress ratio	Hydrotest	A06	178.4	217.2	0.82
Maximum hoop stress ratio	Max P	F01	166.2	173.7	0.96