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Subject: Andritz delay
Date: Wednesday, December 7, 2016 2:49:13 PM
Attachments: [M40..delay adj.pdf](#)
[M48.pdf](#)
[M24 with Andritz delay adj.pdf](#)
[C2 -M 32 -Pit free...pdf](#)
[image001.jpg](#)

Good afternoon,

Kindly find attached, the critical path analysis on the pit free milestones, in summary you can notice a delay of 44 days in unit 1 resulting from a having:

POWERHOUSE UNIT 1 - INSTALLATION OF DRAFT TUBE CONE BY OTHERS (OD:24); STARTING ON July 10th instead of April 20th as planned in January, as well as the link between the mezzanine to the lower pit liner which wasn't considered in the previous submittals prior to December meeting. Delays on Unit 2, 3 and 4 were less severe, and was around 10 days as shown in the attached files. I am available anytime to clarify the delay and walk over the links of the schedule to prove the above.

Another check can be performed, by simply using November schedule and removing links between mezzanine and lower pit liner as well changing the Installation starting date back to April 20th or any date around June 1st.

Thank you

Georges Bader

Deputy Project Manager, P. Eng., M. Eng.

Lower Churchill Project

Muskrat Falls Generation - Civil Works



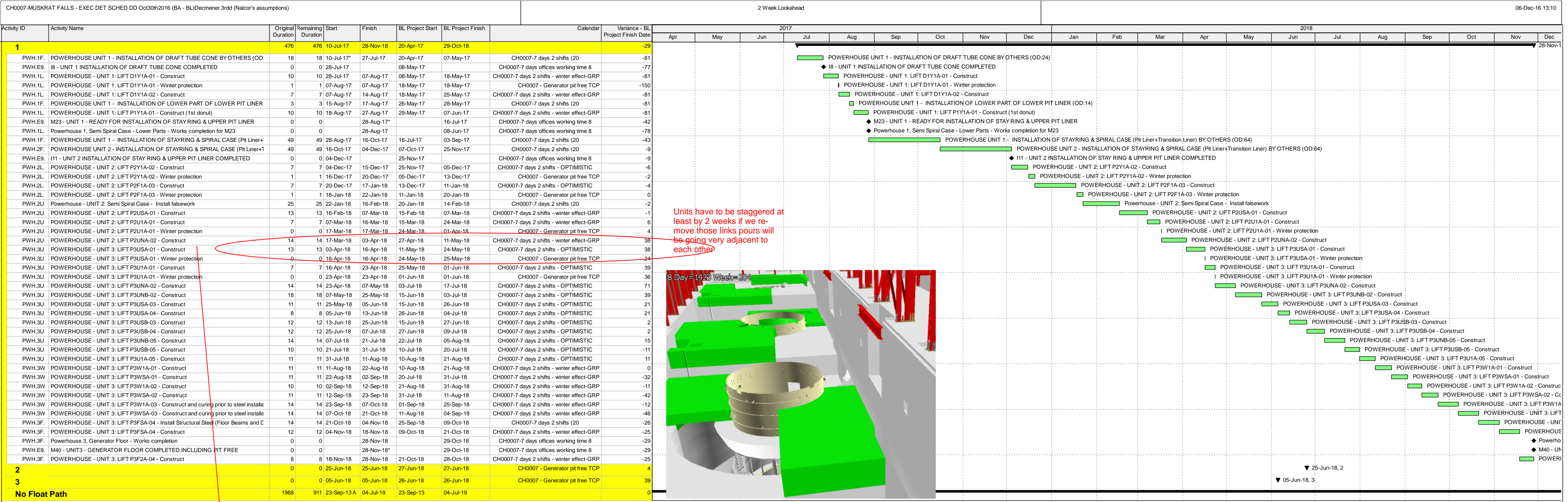
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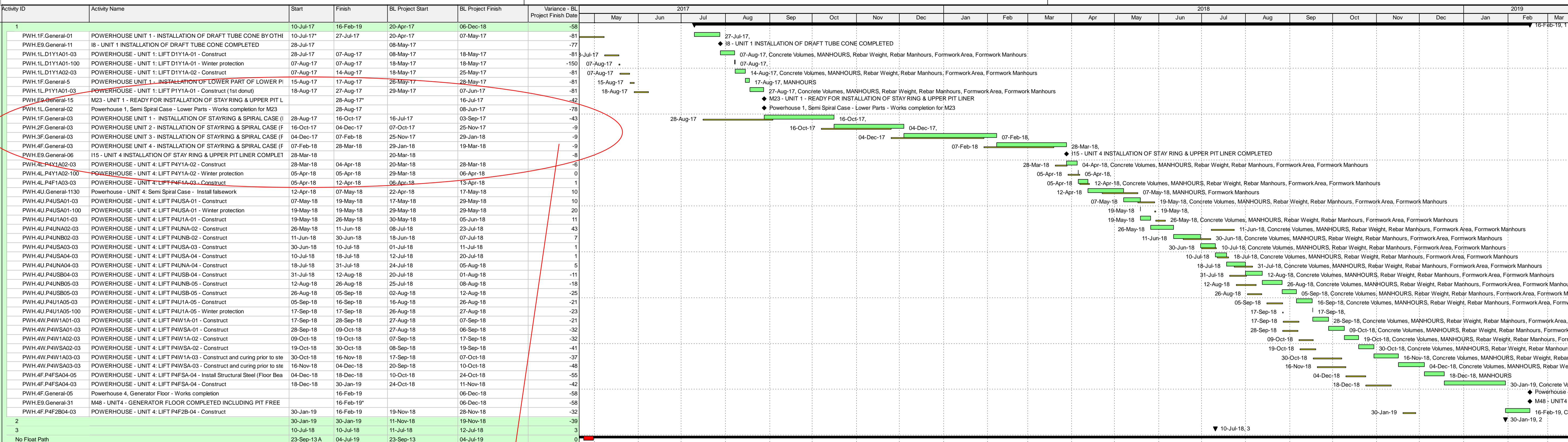
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Even though we remove those links, following the predecessors of staying installation shows that the staying is pushed by unit 2 and unit 2 pushed by 1 delay due to Andritz mobilization:

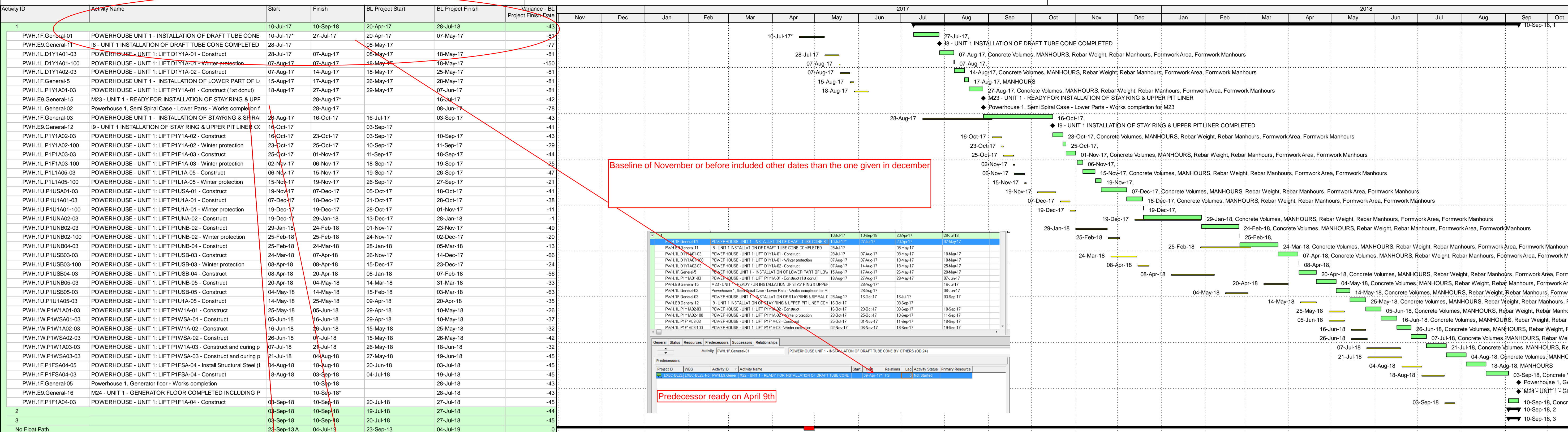
Delay = Dec 4th - November 25th = 9 days

Activity ID	Activity Name	Original Duration	Remaining Duration	Start	Finish	BL Project Start	BL Project Finish	Calendar	Variance - BL Project Finish Date
1	POWERHOUSE UNIT 1 - INSTALLATION OF DRAFT TUBE CONE BY OTHERS (OD)	476	476	10-Jul-17	28-Nov-18	20-Apr-17	29-Oct-18		-29
PWH.1F.	POWERHOUSE UNIT 1 - INSTALLATION OF DRAFT TUBE CONE BY OTHERS (OD)	18	18	10-Jul-17	27-Jul-17	20-Apr-17	07-May-17		-81
PWH.E9.	I8 - UNIT 1 INSTALLATION OF DRAFT TUBE CONE COMPLETED	0	0	28-Jul-17		08-May-17			-77
PWH.1L.	POWERHOUSE - UNIT 1: LIFT D1Y1A-01 - Construct	10	10	28-Jul-17	07-Aug-17	08-May-17	18-May-17		-81
PWH.1L.	POWERHOUSE - UNIT 1: LIFT D1Y1A-01 - Winter protection	1	1	07-Aug-17	07-Aug-17	18-May-17	18-May-17		-150
PWH.1L.	POWERHOUSE - UNIT 1: LIFT D1Y1A-02 - Construct	7	7	07-Aug-17	14-Aug-17	18-May-17	25-May-17		-81
PWH.1F.	POWERHOUSE UNIT 1 - INSTALLATION OF LOWER PART OF LOWER PIT LINER	3	3	15-Aug-17	17-Aug-17	26-May-17	28-May-17		-81
PWH.1L.	POWERHOUSE - UNIT 1: LIFT P1Y1A-01 - Construct (1st donut)	10	10	18-Aug-17	27-Aug-17	07-Jun-17	29-May-17		-81
PWH.E9.	M23 - UNIT 1 - READY FOR INSTALLATION OF STAYRING & UPPER PIT LINER	0	0		28-Aug-17*	16-Jul-17			-42
PWH.1L.	Powerhouse 1, Semi Spiral Case - Lower Parts - Works completion for M23	0	0		28-Aug-17	08-Jun-17			-78
PWH.1F.	POWERHOUSE UNIT 1 - INSTALLATION OF STAYRING & SPIRAL CASE (Pit Liner+)	49	49	28-Aug-17	16-Oct-17	16-Jul-17	03-Sep-17		-43
PWH.2F.	POWERHOUSE UNIT 2 - INSTALLATION OF STAYRING & SPIRAL CASE (Pit Liner+)	49	49	16-Oct-17	04-Dec-17	07-Oct-17	25-Nov-17		-9
PWH.E9.	I11 - UNIT 2 INSTALLATION OF STAYRING & UPPER PIT LINER COMPLETED	0	0	04-Dec-17		25-Nov-17			-9
PWH.2L.	POWERHOUSE - UNIT 2: LIFT P2Y1A-02 - Construct	7	7	04-Dec-17	15-Dec-17	25-Nov-17	05-Dec-17		-6
PWH.2L.	POWERHOUSE - UNIT 2: LIFT P2Y1A-02 - Winter protection	1	1	16-Dec-17	20-Dec-17	05-Dec-17	13-Dec-17		-2
PWH.2L.	POWERHOUSE - UNIT 2: LIFT P2F1A-03 - Construct	7	7	20-Dec-17	17-Jan-18	13-Dec-17	11-Jan-18		-4
PWH.2L.	POWERHOUSE - UNIT 2: LIFT P2F1A-03 - Winter protection	1	1	18-Jan-18	22-Jan-18	11-Jan-18	20-Jan-18		0
PWH.2U.	Powerhouse - UNIT 2: Semi Spiral Case - Install falsework	25	25	22-Jan-18	16-Feb-18	20-Jan-18	14-Feb-18		-2
PWH.2U.	POWERHOUSE - UNIT 2: LIFT P2USA-01 - Construct	13	13	16-Feb-18	07-Mar-18	15-Feb-18	07-Mar-18		-1
PWH.2U.	POWERHOUSE - UNIT 2: LIFT P2U1A-01 - Construct	7	7	07-Mar-18	16-Mar-18	15-Mar-18	24-Mar-18		6
PWH.2U.	POWERHOUSE - UNIT 2: LIFT P2U1A-01 - Winter protection	0	0	17-Mar-18	17-Mar-18	24-Mar-18	01-Apr-18		4
PWH.2U.	POWERHOUSE - UNIT 2: LIFT P2UNA-02 - Construct	14	14	17-Mar-18	03-Apr-18	11-May-18	11-May-18		38
PWH.2U.	POWERHOUSE - UNIT 3: LIFT P3USA-01 - Construct	13	13	03-Apr-18	16-Apr-18	11-May-18	24-May-18		38
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USA-01 - Winter protection	0	0	16-Apr-18	16-Apr-18	24-May-18	25-May-18		24
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3U1A-01 - Construct	7	7	16-Apr-18	23-Apr-18	25-May-18	01-Jun-18		39
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3U1A-01 - Winter protection	0	0	23-Apr-18	23-Apr-18	01-Jun-18	11-Jun-18		36
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3UNA-02 - Construct	14	14	23-Apr-18	07-May-18	03-Jul-18	17-Jul-18		71
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3UNB-02 - Construct	18	18	07-May-18	25-May-18	15-Jun-18	03-Jul-18		39
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USA-03 - Construct	11	11	25-May-18	05-Jun-18	15-Jun-18	26-Jun-18		21
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USA-04 - Construct	8	8	05-Jun-18	13-Jun-18	26-Jun-18	04-Jul-18		21
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USB-03 - Construct	12	12	13-Jun-18	25-Jun-18	15-Jun-18	27-Jun-18		2
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USB-04 - Construct	12	12	25-Jun-18	07-Jul-18	27-Jun-18	09-Jul-18		2
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3UNB-05 - Construct	14	14	07-Jul-18	21-Jul-18	22-Jul-18	05-Aug-18		15
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3USB-05 - Construct	10	10	21-Jul-18	31-Jul-18	10-Jul-18	20-Jul-18		-11
PWH.3U.	POWERHOUSE - UNIT 3: LIFT P3U1A-05 - Construct	11	11	31-Jul-18	11-Aug-18	10-Aug-18	21-Aug-18		11
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3W1A-01 - Construct	11	11	11-Aug-18	22-Aug-18	10-Aug-18	21-Aug-18		0
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3W1A-01 - Winter protection	0	0	23-Aug-18	02-Sep-18	20-Jul-18	31-Jul-18		-32
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3W1A-02 - Construct	10	10	02-Sep-18	12-Sep-18	21-Aug-18	31-Aug-18		-11
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3WSA-01 - Construct	11	11	12-Sep-18	23-Sep-18	31-Jul-18	11-Aug-18		-42
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3W1A-03 - Construct and curing prior to steel installa	14	14	23-Sep-18	07-Oct-18	01-Sep-18	25-Sep-18		-12
PWH.3W.	POWERHOUSE - UNIT 3: LIFT P3WSA-03 - Construct and curing prior to steel installa	14	14	07-Oct-18	21-Oct-18	11-Aug-18	04-Sep-18		-46
PWH.3F.	POWERHOUSE - UNIT 3: LIFT P3FSA-04 - Install Structural Steel (Floor Beams and C	14	14	21-Oct-18	04-Nov-18	25-Sep-18	09-Oct-18		-26
PWH.3F.	POWERHOUSE - UNIT 3: LIFT P3FSA-04 - Construct	12	12	04-Nov-18	18-Nov-18	09-Oct-18	21-Oct-18		-25
PWH.3F.	Powerhouse 3, Generator Floor - Works completion	0	0		28-Nov-18	29-Oct-18	29-Oct-18		-29
PWH.E9.	M40 - UNIT3 - GENERATOR FLOOR COMPLETED INCLUDING PIT FREE	0	0		28-Nov-18*	29-Oct-18			-29
PWH.3F.	POWERHOUSE - UNIT 3: LIFT P3F2A-04 - Construct	8	8	18-Nov-18	28-Nov-18	21-Oct-18	28-Oct-18		-25
2		0	0	25-Jun-18	25-Jun-18	27-Jun-18	27-Jun-18		4
3		0	0	05-Jun-18	05-Jun-18	26-Jun-18	26-Jun-18		39
No Float Path		1968	911	23-Sep-13A	04-Jul-19	23-Sep-13	04-Jul-19		0



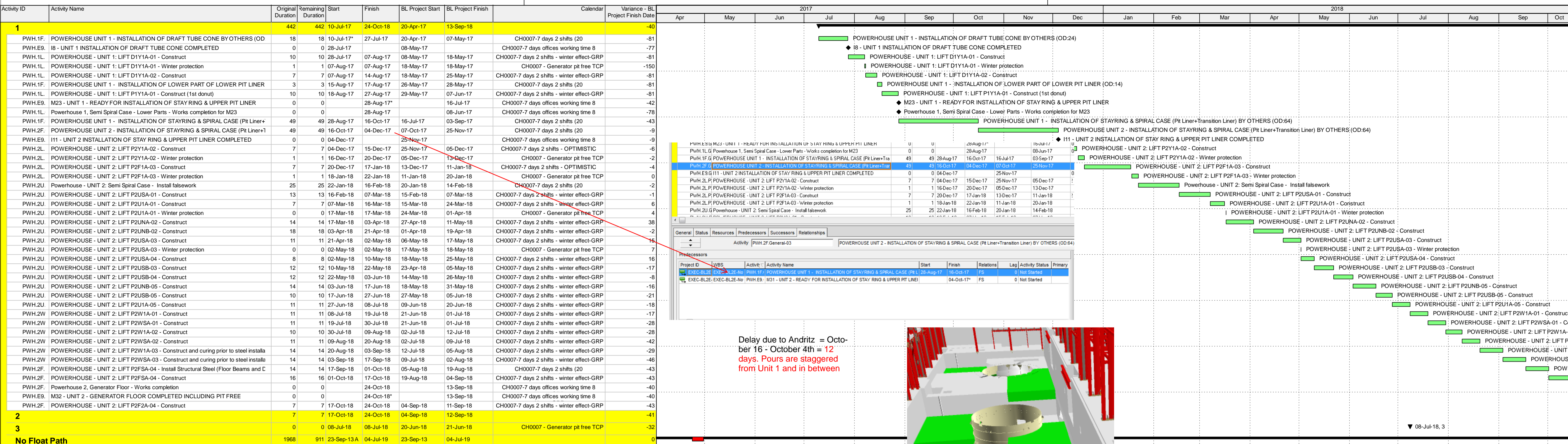
9 days delay

Staying 4 was pushed as well by the staying of other units in the baseline, unit 2 an 3 were pushed so subsequently unit gets pushed.



Activity ID	Activity Name	Start	Finish	BL Project Start	BL Project Finish	Variance - BL Project Finish Date
PWH.1F.General-01	POWERHOUSE UNIT 1 - INSTALLATION OF DRAFT TUBE CONE	10-Jul-17	10-Sep-18	20-Apr-17	28-Jul-18	-43
PWH.E9.General-11	18 - UNIT 1 INSTALLATION OF DRAFT TUBE CONE COMPLETED	10-Jul-17	27-Jul-17	20-Apr-17	07-May-17	-81
PWH.1L.D1Y1A01-03	POWERHOUSE - UNIT 1: LIFT D1Y1A-01 - Construct	28-Jul-17	07-Aug-17	08-May-17	18-May-17	-77
PWH.1L.D1Y1A01-100	POWERHOUSE - UNIT 1: LIFT D1Y1A-01 - Winter protection	07-Aug-17	07-Aug-17	18-May-17	18-May-17	-150
PWH.1L.D1Y1A02-03	POWERHOUSE - UNIT 1: LIFT D1Y1A-02 - Construct	07-Aug-17	14-Aug-17	18-May-17	25-May-17	-81
PWH.1F.General-5	POWERHOUSE UNIT 1 - INSTALLATION OF LOWER PART OF LOU	15-Aug-17	17-Aug-17	26-May-17	28-May-17	-81
PWH.1L.P1Y1A01-03	POWERHOUSE - UNIT 1: LIFT P1Y1A-01 - Construct (1st donut)	18-Aug-17	27-Aug-17	29-May-17	07-Jun-17	-81
PWH.E9.General-15	M23 - UNIT 1 - READY FOR INSTALLATION OF STAY RING & UPPE	16-Jul-17	16-Jul-17	16-Jul-17	16-Jul-17	-42
PWH.1L.General-02	Powerhouse 1, Semi Spiral Case - Lower Parts - Works completion f	28-Aug-17	28-Aug-17	08-Jun-17	08-Jun-17	-78
PWH.1F.General-03	POWERHOUSE UNIT 1 - INSTALLATION OF STAYRING & SPIRAL	29-Aug-17	16-Oct-17	16-Jul-17	03-Sep-17	-43
PWH.E9.General-12	19 - UNIT 1 INSTALLATION OF STAY RING & UPPER PIT LINER CO	16-Oct-17	23-Oct-17	16-Oct-17	03-Sep-17	-41
PWH.1L.P1Y1A02-03	POWERHOUSE - UNIT 1: LIFT P1Y1A-02 - Construct	16-Oct-17	23-Oct-17	03-Sep-17	10-Sep-17	-43
PWH.1L.P1Y1A02-100	POWERHOUSE - UNIT 1: LIFT P1Y1A-02 - Winter protection	23-Oct-17	25-Oct-17	10-Sep-17	11-Sep-17	-29
PWH.1L.P1F1A03-03	POWERHOUSE - UNIT 1: LIFT P1F1A-03 - Construct	25-Oct-17	01-Nov-17	11-Sep-17	18-Sep-17	-44
PWH.1L.P1F1A03-100	POWERHOUSE - UNIT 1: LIFT P1F1A-03 - Winter protection	02-Nov-17	06-Nov-17	18-Sep-17	19-Sep-17	-25
PWH.1L.P1L1A05-03	POWERHOUSE - UNIT 1: LIFT P1L1A-05 - Construct	06-Nov-17	15-Nov-17	19-Sep-17	26-Sep-17	-47
PWH.1L.P1L1A05-100	POWERHOUSE - UNIT 1: LIFT P1L1A-05 - Winter protection	15-Nov-17	19-Nov-17	26-Sep-17	27-Sep-17	-21
PWH.1U.P1USA01-03	POWERHOUSE - UNIT 1: LIFT P1USA-01 - Construct	19-Nov-17	07-Dec-17	05-Oct-17	18-Oct-17	-41
PWH.1U.P1U1A01-03	POWERHOUSE - UNIT 1: LIFT P1U1A-01 - Construct	07-Dec-17	18-Dec-17	21-Oct-17	28-Oct-17	-38
PWH.1U.P1U1A01-100	POWERHOUSE - UNIT 1: LIFT P1U1A-01 - Winter protection	19-Dec-17	19-Dec-17	28-Oct-17	01-Nov-17	-11
PWH.1U.P1UNA02-03	POWERHOUSE - UNIT 1: LIFT P1UNA-02 - Construct	19-Dec-17	29-Jan-18	13-Dec-17	23-Nov-17	-1
PWH.1U.P1UNB02-100	POWERHOUSE - UNIT 1: LIFT P1UNB-02 - Winter protection	25-Feb-18	25-Feb-18	24-Nov-17	02-Dec-17	-49
PWH.1U.P1UNB04-03	POWERHOUSE - UNIT 1: LIFT P1UNB-04 - Construct	25-Feb-18	24-Mar-18	28-Jan-18	05-Mar-18	-13
PWH.1U.P1USB03-03	POWERHOUSE - UNIT 1: LIFT P1USB-03 - Construct	24-Mar-18	07-Apr-18	26-Nov-17	14-Dec-17	-69
PWH.1U.P1USB03-100	POWERHOUSE - UNIT 1: LIFT P1USB-03 - Winter protection	08-Apr-18	08-Apr-18	15-Dec-17	23-Dec-17	-24
PWH.1U.P1USB04-03	POWERHOUSE - UNIT 1: LIFT P1USB-04 - Construct	08-Apr-18	20-Apr-18	08-Jan-18	07-Feb-18	-56
PWH.1U.P1USB05-03	POWERHOUSE - UNIT 1: LIFT P1USB-05 - Construct	20-Apr-18	04-May-18	14-Mar-18	31-Mar-18	-33
PWH.1U.P1USB05-100	POWERHOUSE - UNIT 1: LIFT P1USB-05 - Winter protection	04-May-18	14-May-18	15-Feb-18	03-Mar-18	-63
PWH.1U.P1U1A05-03	POWERHOUSE - UNIT 1: LIFT P1U1A-05 - Construct	14-May-18	25-May-18	09-Apr-18	20-Apr-18	-35
PWH.1W.P1W1A01-03	POWERHOUSE - UNIT 1: LIFT P1W1A-01 - Construct	25-May-18	05-Jun-18	29-Apr-18	10-May-18	-26
PWH.1W.P1W1A02-03	POWERHOUSE - UNIT 1: LIFT P1W1A-02 - Construct	05-Jun-18	16-Jun-18	29-Apr-18	10-May-18	-37
PWH.1W.P1W1A02-100	POWERHOUSE - UNIT 1: LIFT P1W1A-02 - Winter protection	16-Jun-18	26-Jun-18	15-May-18	25-May-18	-42
PWH.1W.P1W1A03-03	POWERHOUSE - UNIT 1: LIFT P1W1A-03 - Construct	26-Jun-18	07-Jul-18	15-May-18	26-May-18	-42
PWH.1W.P1W1A03-100	POWERHOUSE - UNIT 1: LIFT P1W1A-03 - Winter protection	07-Jul-18	21-Jul-18	26-May-18	18-Jun-18	-32
PWH.1W.P1W1A04-03	POWERHOUSE - UNIT 1: LIFT P1W1A-04 - Construct and curing p	21-Jul-18	04-Aug-18	27-May-18	19-Jun-18	-45
PWH.1F.P1FSA04-05	POWERHOUSE - UNIT 1: LIFT P1FSA-04 - Install Structural Steel (f	04-Aug-18	18-Aug-18	20-Jun-18	03-Jul-18	-45
PWH.1F.P1FSA04-03	POWERHOUSE - UNIT 1: LIFT P1FSA-04 - Construct	18-Aug-18	03-Sep-18	04-Jul-18	19-Jul-18	-45
PWH.1F.General-05	Powerhouse 1, Generator floor - Works completion	10-Sep-18	10-Sep-18	28-Jul-18	28-Jul-18	-43
PWH.E9.General-16	M24 - UNIT 1 - GENERATOR FLOOR COMPLETED INCLUDING P	03-Sep-18	10-Sep-18	20-Jul-18	27-Jul-18	-45
PWH.1F.P1F1A04-03	POWERHOUSE - UNIT 1: LIFT P1F1A-04 - Construct	03-Sep-18	10-Sep-18	20-Jul-18	27-Jul-18	-44
2		03-Sep-18	10-Sep-18	19-Jul-18	27-Jul-18	-45
3		03-Sep-18	10-Sep-18	20-Jul-18	27-Jul-18	-44
No Float Path		23-Sep-13A	04-Jul-19	23-Sep-13	04-Jul-19	0

Initially in previous schedules like November schedule: the mezzanine was driving the staying installation: now the pours following the late installation of draft tube are driving. Delay equal = 28 August (current planned installtion - 16 July (mezzanine scheduled on November schedule) = 44 days



Delay due to Andritz = October 16 - October 4th = 12 days. Pours are staggered from Unit 1 and in between

